RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

Solid Waste Management Units 35, 37, 38, and Area of Concern Q (RAAP-10) RCRA Facility Investigation Report

FINAL
SEPTEMBER 2010

PREPARED BY:

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

November 4, 2010

Commander,
Radford Army Ammunition Plant
Attn: SJMRF-OP-EQ (Jim McKenna)
P.O. Box 2
Radford, VA 24141-0099

P.W. Holt
Environmental Manager
Alliant Techsystems, Inc.
Radford Army Ammunition Plant
P.O. Box 1
Radford, VA 24141-0100

Re: Radford Army Ammunition Plant, Va.
Review of Army's Final RCRA Facility Investigation Report for
Solid Waste Management Units (SWMUs) 35, 37, 38, and
Area of Concern (AOC) Q

Dear Mr. McKenna and Ms. Holt:

The U.S. Environmental Protection Agency (EPA) and Virginia Department of Environmental Quality (VDEQ) have reviewed the U.S. Army's (Army's) September 2010 Final RCRA Facility Investigation (RFI) Report for Solid Waste Management Units (SWMUs) 35, 37, 38, and Area of Concern (AOC) Q, located at the Radford Army Ammunition Plant (RFAAP) in Radford, Virginia. Based upon our review, the report is approved, and in accordance with Part II. (E) (5) of RFAAP's Corrective Action Permit, it can now be considered final.

If you have any questions, please call me at 215-814-3413. Thanks.

Sincerely,

William Geiger
RCRA Project Manager
Office of Remediation (3LC20)

cc: James Cutler, VDEQ

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September 23, 2010

Mr. William Geiger
RCRA General Operations Branch, Mail Code: 3WC23
Waste and Chemicals Management Division
U. S. Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Mr. James L. Cutler, Jr.
Virginia Department of Environmental Quality
629 East Main Street
Richmond, VA 23219

Subject: With Certification, Solid Waste Management Units 35, 37, 38, and Area of Concern Q (RAAP-010) RCRA Facility Investigation Report, Final September 2010
EPA ID# VA1 210020730

Dear Mr. Geiger and Mr. Cutler:

Enclosed is the certification for the subject document that was sent to you on September 20, 2010. Also enclosed is the 20 September 2010 transmittal email.

Please coordinate with and provide any questions or comments to myself at (540) 639-8658, Jerry Redder ATK staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 731-5782.

Sincerely,

P.W. Holt, Environmental Manager
Alliant Techsystems Inc.

c: Karen Sismour
Virginia Department of Environmental Quality
P. O. Box 1105
Richmond, VA 23218

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Virginia Department of Environmental Quality
Blue Ridge Regional Office
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10-815-136
JMcKenna

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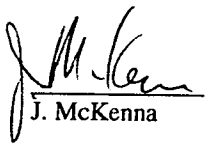
Coordination:



J. McKenna

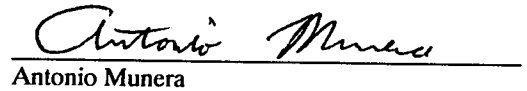
M. A. Miano

10-815-136
JMcKenna

Concerning the following:

Radford Army Ammunition Plant
Solid Waste Management Units
35, 37, 38 and Area of Concern Q
RCRA Facility Investigation Report
Final September 2010

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

SIGNATURE: 
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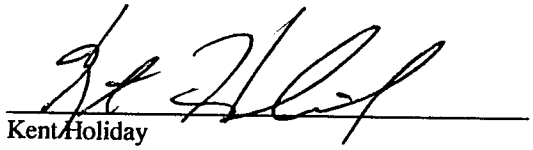
SIGNATURE: 
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10-815-136
JMcKenna

Greene, Anne

From: McKenna, Jim
Sent: Monday, September 20, 2010 3:06 PM
To: Greene, Anne; Cutler,Jim; dennis.druck@us.army.mil; diane.wisbeck@arcadis-us.com; durwood willis2; Geiger.William@epamail.epa.gov; Redder, Jerome; jim spencer; Llewellyn, Tim; Lohman,Elizabeth; Mendoza, Rich; Meyer, Tom NAB02; Parks, Jeffrey N; Sismour,Karen; Timothy.Leahy@shawgrp.com; Tina_MacGillivray@URSCorp.com
Subject: Fed Ex Numbers for Final SWMUs 35, 37, 38, and AOC Q RFI Report (UNCLASSIFIED)
Attachments: RAAP 10 RTCs complete.pdf

Importance: High

Classification: UNCLASSIFIED
Caveats: FOUO

All,

The above referenced report will be shipped via FedEx today. Below are the Fed Ex numbers and POCs.

Thank you for your support of the Radford AAP Installation Restoration Program, Jim McKenna

James McKenna 7962 5989 5759 2 Paper copies Will Geiger 7939 2792 8597 1 Paper copy/1 CD Jim Cutler 7962 5992 0639 1 Paper copy/1 CD Tom Meyer 7962 5992 8445 1 Paper copy/1 CD Richard Mendoza 7939 2795 7181 1 Paper copy/1 CD Dennis Druck 7962 5993 9902 1 CD Elizabeth Lohman 7962 5995 1064 1 CD Susan Ryan 7939 2796 7951 1 CD

Classification: UNCLASSIFIED
Caveats: FOUO

Response to Comments (November 12, 2009)
Comments on the *Draft Solid Waste Management Units 35, 37, 38, and Area of Concern Q (RAAP-10) RCRA Facility Investigation Report* for the Radford Army Ammunition Plant (RFAAP) located in Radford, Virginia, dated July 2009 (RFI Report). Received October 2, 2009.

GENERAL COMMENTS

1. The RFI Report concludes that, on the basis of the human health risk assessment (HHRA) and ecological risk assessment results, no further action is recommended for the sites. However, calcium sulfate sludge is present at the sites. Although soil and groundwater media are not currently impacted by the sludge at unacceptable levels, the constituents in the sludge itself do not appear to have been evaluated in the risk assessments. Table 2-4, Summary of Historical Analytical Data for Sediment/Soil Samples Collected at SWMU [Solid Waste Management Unit] 35, show that lead concentrations in two sludge samples collected from SWMU 35 exceeded 50,000 milligrams per kilogram (mg/kg), well above the residential and industrial action levels (400 mg/kg and 750 mg/kg, respectively). Arsenic, chromium, mercury, nickel, silver, dinitrotoluene mixture, and phenanthrene also exceeded applicable screening criteria in sludge samples 35SE1 and 35SE2, but it does not appear that these samples were considered in the evaluation of risk. Please revise the RFI to provide further justification that the calcium sulfate sludge at the sites, and specifically at SWMU 35, will not present an unacceptable level of risk to receptors. The RFI Report should clearly substantiate that an ongoing release to groundwater from the sludge itself is not possible, in consideration of the high levels of lead and other constituents detected in historical sludge samples. Also, what is the status of the remaining sludge as a waste? Are there any regulatory ramifications with leaving it in place?

   Response: Prior to the RFI, historical soil analytical data (1990 and 1992) were considered screening level data and excluded from the risk assessment given the age of the data, the use of non SW-846 analytical methods, the lack of available data validation reports/information, and the availability of sufficient newer validated RFI data to more appropriately characterize conditions at the site. It should be noted that a results transcription error occurred for the sample result 35SE2 in Table 2-4. The lead concentration for 35SE2 should be >5,000 mg/kg rather than the >50,000 mg/kg shown in the table. Table 2-4 will be revised accordingly,

   Sample results for the RFI (including SSP) did not confirm the presence of elevated lead levels in calcium sludge detected in the two samples collected from SWMU 35 in 1990. Lead samples results for 13 of 15 RFI samples of calcium sulfate sludge were below 400 mg/kg (17 to 290 mg/kg), with the remaining two sample results at 530 and 750 mg/kg, respectively. The mean concentration of lead detected in the RFI calcium sulfate samples was 198 mg/kg.

The risk assessments for each site evaluated the potential risk associated with current/future use of the sites as the drying beds are currently configured using surface soil data (SSP/RFI data from 0 to 1 ft bgs), which includes calcium sulfate sludge present in the drying beds. As discussed in Section 6.7 of the RFI Report, the results of the human health risk assessments for SWMUs 35, 37, and 38/Q did not indicate a requirement for future action for the site on the basis of human health; calculated site-related cancer risk and hazards were within USEPA target ranges for each of the receptors evaluated when considering background, target organs, and frequency of detection, and site-specific conditions.

Sections 4.1.2, 4.3.2, and 4.5.2 of the RFI Report present a detailed nature and extent assessment for each chemical of potential concern (COPC) at SWMUs 35, 37, and 38/Q including an assessment of COPC leaching to underlying soil and groundwater. As presented in these sections, evidence of appreciable leaching of COPCs from sludge to underlying subsurface soil or groundwater has not been observed at the sites. Figures 4-1, 4-2, 4-4, 4-5, 4-7, and 4-8 illustrate the vertical attenuation of concentrations from "A" level samples of sludge in the drying bed to "B" level samples of soil immediately below the sludge.

Sections 4.1.3, 4.3.3, 4.5.3, and 5.1.4 of the RFI Report present detailed soil-to-groundwater migration assessments for identified COPCs and concluded that appreciable leaching of COPCs from calcium sulfate sludge to subsurface soil or groundwater has not occurred at the site and is unlikely to occur in the future given the following:

- The results of RFI sampling indicated low concentrations of COPCs in calcium sulfate sludge, which are unlikely to represent a significant source for leaching to subsurface soil or groundwater. The neutral pH and higher organic content of the sludge will reduce the mobility and leachability of lead, chromium, and organic COPCs present in this material.
- Appreciable leaching of COPCs from sludge to underlying subsurface soil and groundwater has not been observed at the sites more than 55 years after waste management activities began and more than 25 years after waste management activities had ceased at the site;
- The limited organic COPCs detected in calcium sulfate sludge were not detected in groundwater samples collected at the sites;
- The primary inorganic COPCs detected in calcium sulfate sludge, lead and chromium, were not detected at dissolved concentrations above their adjusted risk-based screening levels.

The calcium sulfate sludge present in the drying beds is solid waste as defined in 40 CFR §261.2 but is not a listed hazardous waste or characteristic hazardous waste. Hazardous waste characteristics of the sludge were assessed by analyzing one composite sample of sludge from each drying bed for corrosivity (pH) and toxicity (full toxicity characteristic leaching procedure [TCLP] analysis).

Reactivity of the sludge was evaluated by analyzing discrete sludge samples for explosives content by SW-846 Methods 8330 and 8332; selected sludge samples were also analyzed for cyanide. Waste characterization results are presented in the attached table and summarized below:

- Sludge samples had pH levels in the range of 7.5 to 7.9 and therefore this material does not exhibit the characteristic of corrosivity as defined in 40 CFR §261.22;
- TCLP levels of sludge samples are below regulatory limits specified in 40 CRF § 261.24, and therefore this material does not exhibit the characteristic of toxicity;
- TCLP detections are limited to low levels of barium, silver, and chromium (one sample) at levels approximately three orders of magnitude below regulatory limits; and
- Explosives and cyanide are present in some of the sludge samples at low concentrations below human health risk-based screening levels and therefore this material does not exhibit the characteristic of reactivity as defined in 40 CFR §261.23.

Specific regulatory ramifications have not been identified for leaving the material in place given that the material is not a hazardous waste, does not contain hazardous constituents at levels that may pose a risk to human health or the environment, and does not represent a source area for future leaching to subsurface soil or groundwater at levels of concern.

2. There appear to be a few deviations from the work proposed in the *Final Work Plan Addendum 020 for RCRA Facility Investigation at Solid Waste Management Units 35, 37, 38, and Area of Concern Q (Work Plan Addendum 020)*, dated October 2007, that are not addressed in the RFI Report. The following deviations were noted:

   - Section 3.6.1.1, Inside Drying Bed Areas, and Section 3.6.1.2, Outside Drying Bed Areas, of Work Plan Addendum 020 indicate that target analyte list (TAL) metals plus cyanide were to be analyzed for at all of the SWMUs. It does not appear that samples were analyzed for cyanide, as results for this analyte could not be found in the RFI Report summary tables or in Appendix G, Analytical Data Evaluation. Please revise the RFI Report to indicate whether samples were analyzed for cyanide, and provide the results of these analyses. If cyanide was not analyzed for, revise the RFI Report to provide the justification for deviating from the Work Plan.

     Response: Upon further review, it appears that a sampling and analysis error occurred during execution of the RFI field program. The laboratory analysis for Target Analyte List (TAL) inorganics did not include cyanide.

Cyanide analysis was performed on 27 soil samples collected at SWMUs 37 and 38/Q for the SSP. Four of these samples were collected from calcium sulfate sludge contained in the drying beds. Cyanide was not identified as a COPC in soil or sludge with low concentrations detected (0.296 to 2.2 mg/kg) at levels 2 to 3 orders of magnitude below the adjusted risk-based screening levels. Based on representative results of sludge samples at these sites, cyanide is not considered a constituent of concern for these disposal areas and therefore, the lack of additional cyanide data for the RFI is not considered a significant data gap. Information on the nature of the change from work plan regarding cyanide analysis and analysis of associated uncertainties will be added to Section 3.4 of the RFI Report.

- Section 3.6.1.1, Inside Drying Bed Areas, of Work Plan Addendum 020 states that soil samples from inside SWMU 37 and SWMU 38 were to be analyzed for volatile organic compounds (VOCs) in addition to polychlorinated biphenyls (PCBs), pesticides, explosives, and metals including cyanide. Table 3-1, Field Sample Identifiers, Depths, and Analytical Methods, of the RFI Report indicates that soil samples collected from SWMU 37 were not analyzed for VOCs. Please revise the RFI Report to address this deviation from the Work Plan.

  Response: In accordance with the results of the SSP investigation and Table 4-4 from WPA 020, soil samples from inside SWMUs 37 and 38 were to be analyzed for metals, pesticides, PCBs, explosives including nitroglycerin/PETN. VOCs were not to be included in the analyses. The inclusion of VOCs in Section 3.6.1.1 was a text error.

- Table 4-4, Summary: Proposed Sample Identifiers, Depths, and Analytical Methods, of Work Plan Addendum 020 indicated that soil samples at SWMU 35 were to be analyzed for polynuclear aromatic hydrocarbons (PAHs) via SW-846 Method 8310. Table 3-1 of the RFI Report shows that soil samples at SWMU 35 were not analyzed for PAHs via SW-846 Method 8310. Please revise the RFI Report to address this deviation from the Work Plan.

  Response: Since the approval of the work plan, a method of SW-846 8270 to detect low level SVOCs (including PAHs) has been developed and is used for samples at the facility. This low-level SW-846 method has certain advantages over Method 8310 including more reliability in identifying target PAH compounds with comparable detection limits to Method 8310. Section 3.4 of the RFI Report will revised to discuss the change in analytical methods from the work plan and rationale for this change.

- Section 3.6.2.1, Monitoring Well Installation, of Work Plan Addendum 020 states that monitoring wells will be installed with a 15-foot long screen. Table 2-3, Monitoring Well and Groundwater Elevation Data, of the RFI Report shows that many of the wells have screens greater than 15 feet in length. Some wells have screens that are up to 25 feet in length (37MW1 and 38MW3). Please revise the RFI Report to address this deviation from the Work Plan. Additionally, please indicate at what depth(s) the pumps were placed during sampling.

  Response: Section 3.4 of the RFI Report will be revised include information regarding the installation of 5 to 10 foot longer well screens than proposed in the work plan. Given that the monitoring wells were installed during a period of a prolonged drought, additional screen length was installed above the water levels encountered during drilling to ensure that the top of the screen would be above seasonally high groundwater levels in the future.

  The standing water columns at the time of sampling in the RFI wells at SWMUs 35, 37, and 38/Q ranged from approximately 10 to 15 feet, with the exception of 38MW3, which had a standing water column of approximately 18 feet. Sampling pumps were placed at the mid point of the water column for low flow sampling. This addition information will be incorporated into the RFI Report.

3. The HHRA does not appear to have included all available data for SWMUs 35, 37, and SWMU 38/Area of Concern (AOC) Q in the risk evaluation. Section 2, Site Background, describes previous investigations in these three areas, including soil and groundwater sampling, dating back to the early 1990s. However, the HHRA presented in the RFI Report only evaluates soil data collected during the site screening process (SSP) investigation in 2003 and the RFI in 2007; and groundwater data collected during sampling events in February and June 2008. Please revise the HHRA to include all applicable data in the evaluation of risks in each area, and provide justification for excluding any data from sampling locations that have not been remediated.

   Response: Prior to the RFI, historical soil analytical data (1990 and 1992) were considered screening level data and excluded from the risk assessment given the age of the data, the use of non SW-846 analytical methods, the lack of available data validation reports/information, and the availability of sufficient newer validated RFI data to more appropriately characterize conditions at the site.

4. The selection of chemicals of potential concern (COPCs) in the HHRA was based on the comparison of maximum detected concentrations (MDCs) to the October 2007 EPA Region 3 Risk-Based Concentrations (RBCs) for soil and tap water. It should be noted, however, that Region 3 now relies on the Regional Screening Levels (RSLs), which are updated periodically to incorporate the most current

toxicity information and can be found online (www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm). The RSLs are maintained by Oak Ridge National Laboratory under an Interagency Agreement with EPA as an update of the EPA Region 3 RBC Table, Region 6 HHMSSL Table and the Region 9 PRG Table. The RSLs may substantially differ from the RBCs since they address dermal, oral, and inhalation exposure while the RBCs only address oral exposure. In addition, the RSLs no longer support route-to-route extrapolation. It is recommended that future evaluations incorporate the RSLs, which reflect the most current toxicity data. The impacts on the overall risk conclusions by using outdated screening levels should be discussed at a minimum in the uncertainty analysis.

In addition to being used in the COPC selection process, the EPA Region 3 RBC table was also the source for toxicity data evaluated in the HHRA. As a result, the HHRA has applied outdated toxicity data for some compounds. Please revise the HHRA to incorporate the latest screening values and toxicity data provided in the RSL tables.

Response: As discussed on the August 13, 2009, Army/USEPA/VDEQ/TechLaw conference call (Discussion Point #1): Per agreements reached in partnering meetings in June 2008 and October 2008, it was approved to utilize the October 2007 RBC table for HHRAs completed or substantially complete as of that time. The revised Regional Screening Table was not released to the public until September 2008. The results of the HHRAs for SWMU 45 and RAAP 10 (SWMUs 35, 37, 38, and AOC Q) were presented at the October 2008 meeting and will therefore utilize the April 2007 RBC table. During the October 2008 partnering meeting, it was also agreed that regardless of what toxicity data is used for the HHRA for a site, the new toxicity data would be used to calculate remedial goals. For URS the new regional screening levels will be used starting with the Study Area at SWMU 13 RFI Report in compliance with previous agreements. If an updated value changed significantly so that it would impact the conclusions for the site, an analysis of the effects of this change will be conducted. A discussion of the use of the October 2007 RBC values versus the 2008 RSLs will be added to the uncertainties section of the report.

5. The HHRA makes reference to the examination of target organs in the case of non-carcinogens that exceed the target hazard index (HI) of 1. However, the RFI report does not discuss the methodology for conducting a target organ analysis, and supporting documentation is not provided to justify the removal of non-carcinogenic chemicals from further investigation based on this approach. Please supplement the discussions of HHRA methodology with a description of the target organ analysis conducted for non-carcinogens (e.g., segregation of HIs by target organs) and refer the reader to the appropriate tables in Appendix E where the target organ analysis can be located.

Response: A discussion of the methodology for conducting a target organ analysis and associated tables is included in Section 6.4, page 6-11.

6. Cancer risk estimates derived in the HHRA were compared to "EPA's target risk range for Superfund sites of 1E-06 to 1E-04" (Section 6.4, Risk Characterization, Page 6-11) resulting in the conclusion that the HHRA "did not indicate a requirement for further action for [SWMUs 35, 37, and 38/AOC Q]" (Section 6.7, HHRA Conclusions). However, the regulatory target of 1E-06 – not the risk management range – should be used as the basis for any cumulative HHRA and removal action at the site. Estimated cancer risks less than 1E-06 are considered *de minimus*, and those that fall in the risk management range (i.e., 1E-06 and 1E-04) must be evaluated further on a case-by-case basis. Risks that fall within the range are not necessarily acceptable, as it is up to the risk manager to decide whether risks within the risk management range require remedial action based on site-specific reasons. As a result, the justification for a no further action recommendation for the three areas evaluated in the RFI Report should be revised using lines of evidence other than the upper bound of the risk management range.

   Response: As requested in the October 26, 2009 email from Will Geiger (USEPA) to Jim McKenna, this comment has been disregarded.

7. The HHRA does not discuss the use of surrogate chemicals for physico-chemical data based on chemical structure and characteristics in the case of detected chemicals for which no toxicity values are available. Please address the use of surrogate chemicals to ensure that potential impacts of all COPCs are considered in the evaluation of cumulative human health risks.

   Response: The use of provisional or surrogate chemical data for COPCs at the site is discussed in Section 6.6.4.

8. The HHRA indicates that a vapor intrusion evaluation was conducted for volatile organic chemicals in groundwater using the Johnson and Ettinger Model (JEM); however, there is no discussion of the methods and assumptions used to evaluate this pathway. For example, if no occupied buildings are present at the sites, a description of the assumptions used to evaluate this pathway should be provided. To promote clarity in the document please include a discussion of how the vapor intrusion pathway was evaluated and explain the assumptions used in the model.

   Response: A discussion of the Johnson and Ettinger Model is provided in Section 6.2.3. Assumptions used to evaluate this pathway are provided in Tables E.1-4.6, E.2-4.6, and E.3-4.6 and the model results are provided in Appendix E.4.

9. The "Frequently Ask Questions" section on the Region III Ecological Risk Assessment webpage states that "Where appropriate, updated values that may be available in subsequent releases of the EPA Ecological Soil Screening Levels, and the NOAA SQuiRT values should be used in place of the values cited in the 1995

Region 3 BTAG table"
(http://www.epa.gov/reg3hscd/risk/eco/faqs/screenbench.htm). Please ensure that this statement has been accounted for when selecting plant and invertebrate Toxicity Reference Values (TRVs).

Response: As presented in the Radford SLERA framework (September 2007) per Ruth Prince, the following hierarchy will be used 1) Eco SSLs, 2) ORNL values, and 3) BTAG values in accordance with the associated table.

10. A review of the tables comparing Method Detection Limits (MDLs) of non-detect chemicals against screening values found that many chemicals were not selected as COPCs because they lacked screening values. This approach implicitly assumes that chemicals without a screening value are of no ecological concern. The *EPA 1997 Ecological Risk Assessment Guidance for Superfund* states that a contaminant should not be eliminated from the list of contaminants to be investigated only because toxicity information is lacking; instead, limited or missing toxicity information must be addressed using best professional judgment and discussed as an uncertainty. In light of this guidance, please discuss those chemicals lacking screening values in the uncertainty analysis.

    Response: The uncertainty related to the lack of toxicological data is presented in Section 7.5.4.

11. The Plant and Invertebrate/Microbial Screening tables for SWMU 35, 37, and 38/AOC Q were compared to Exposure Point Concentrations (EPCs) summary tables for each specific area. Several chemicals, such as arsenic, cadmium, iron, and selenium, lacked an EPC even though one had been calculated using ProUCL. Please revise these tables include all of the calculated EPC values.

    Response: As a refinement step, EPC HQs are only calculated for those chemicals for which the preliminary HQ (using the MDC) exceeds 1. Since the preliminary HQs for arsenic, cadmium, iron, and selenium are less than 1, a refined HQ utilizing the EPC is not calculated; therefore, the EPCs are not presented on the tables.

12. The Exposure Point Concentration Summary tables for SWMU 35, 37, and 38/AOC Q where compared against their respective SLERA Occurrence/Distribution tables. Ninety five percent (95%) UCLs were not calculated for several chemicals, such as barium, cobalt, and thallium, even though there was enough data (e.g., frequency of detection equal to 10/10). Please justify why no 95% UCLs were calculated for these chemicals.

    Response: 95% UCLs are only calculated for chemicals that have a preliminary HQ greater than 1 for at least one receptor; therefore, 95% UCLs were not calculated for barium, cobalt, and thallium.

SPECIFIC COMMENTS

13. Subsection 2.1.3 describes SWMU 35 as being situated at an elevation of approximately 1,699 to 1,701 feet above mean sea level, and being approximately 18 feet higher than the New River. Figure 2-5 describes the New River as having an elevation of 1690 feet above mean sea level. Please provide a correction to the Figure or the Subsection to rectify the differences illustrated. Please provide the elevation above mean sea level for all wells, including newly drilled wells and existing wells, used in the characterization of all SWMUs and AOCs in this RFI.

    Response: The New River has an elevation of 1680 ft above mean sea level at this location. The vertical scales of elevation of Figure 2-5 in feet mean sea level are labeled incorrectly. The correct scale for both vertical axes should start at 1660 ft and end at 1720 ft rather than the 1670 and 1730 ft shown on the figure. Figure 2-5 will be revised to show the correct scales and elevations. The text in Section 2.1.1 will be revised to reflect a 19 to 21 ft higher elevation for SWMU 35 than the New River. Elevations above mean sea level for all wells are provided in Table 2-3.

14. The New River is described as having an elevation of 1690' msl in Figure 2-5. Monitoring well 35MW2 is shown on Figure 2-6 with ground water elevation at 1685.56' msl. The ground water potentiometric surface depicted in Figure 2-5 is shown to be higher than the surface water in the New River. Explain whether these conditions are seasonal or permanent, and what they mean to the interpretation of ground water and surface water flow at these SWMU.

    Response: The vertical scales of elevation on Figure 2-5 in feet mean sea level are labeled incorrectly and therefore are inconsistent with Figure 2-6. The correct scale for both vertical axes should start at 1660 ft and end at 1720 ft rather than the 1670 ft and 1730 ft shown. Groundwater elevations in the area of SWMU 35 at 35MW1 and 35MW2 are higher than the surface water of the New River with groundwater flow toward the New River as shown on Figure 2-6. Figure 2-5 will be revised to show the correct scales and elevations.

15. If SWMU 35 ground water elevation data was collected on January 18, 2009 and shown on Figure 2-6 (dated May 2008), when was the ground water elevation data shown on Figure 2-5 (August 2008) collected? Why do neither of these figures contain the date of ground water collection? What was the elevation of the New River surface water pool at SWMU 35 on January 18, 2008?

    Response: The date on the figure in the date box is the date the figure was created not the date of the groundwater sampling event. The date (January 18, 2008) of the groundwater sampling will be added to Figures 2-5 and 2-6. Only one groundwater elevation data was collected at the site. As discussed in the response to Comments 13 and 14, the vertical scales of elevation are labeled

incorrectly on Figure 2-5 and will be revised to show the correct scales. The revised Figure 2-5 will show an river elevation of 1680 ft above mean sea level.

16. Table 6-1 provides the information regarding monitoring well locations with respect to ground water flow at each sample area. SWMU 35 has only two downgradient wells. SWMU 37 has only two downgradient wells. SWMU 38/AOC Q has no upgradient well and only two down gradient wells. Include monitoring well D-5 in the assessment of SWMU 35.

    Response: The approved work plan for the RFI for SWMU 35 included the installation and sampling of two new downgradient wells 35MW1 and 35MW2 immediately adjacent to and downgradient of SWMU 35 to appropriately evaluate potential releases to groundwater. Monitoring well D-5 was not sampled as part of the RFI at SWMU 35. Given the proximate location of 35MW1 and 35MW2 to SWMU 35 and lack of detectable site-related constituents in groundwater above adjusted risk-based screening levels, the inclusion of additional monitoring well in the RFI assessment at a location farther downgradient of the unit is not necessary.

17. Subsection 6.2.2.2 states that due to a ground water depth greater than 15 ft at SWMU 35, the construction worker is assessed only for the vapor pathway to account for potential vapors released to ambient air from groundwater beneath excavation trenches, but is not assessed for the ingestion or dermal contact pathways. Figure 2-5 is presented with both vertical and horizontal scales. Upon measuring these scales, ground water is encountered at less than 15 feet below the bottom of the calcium sulfate sludge. Figure 2-6 shows that ground water in the vicinity of SWMU 35 has a potentiometric contour of 1686.5 feet above msl which crosses the 1700 feet above msl ground surface elevation. Higher elevation potentiometric surface contours cross the same 1700 feet msl ground surface contours at fewer than 15 feet in Figure 2-6. Further, 35SB10 (Figure 2-5, Log of Boring) encountered the potentiometric surface of ground water at 16 feet below land surface, as did each boring: 35SB5, 35SB6, 35SB7 (15.5), 35SB8, and 35SB9). Furthermore, boring 35SB10 is depicted on Figure 2-5 to be terminated at the sand and gravel layer, over 2 feet below the ground water potentiometric surface as depicted on Figure 2-5. Also, please note on the boring log that 35SB10 was terminated at the sand and gravel (GM) layer.

    Response: The depth of 15 ft is the maximum depth for most utilities. Therefore, the depth of 15 ft would be from the ground surface in the area around the SWMU rather than the SWMU bottom.

18. Table 2-3 lists 35MW1 at a ground surface elevation of 1703.72 and Figure 2-5 shows the land surface elevation at 35MW1 to be over 1710 feet in elevation and ground water at about 1695', while Figure 2-6 shows ground water for 35MW1 at 1686.60'. Table 2-3 provides no sample information which coincides with the

August 2008 date on Figure 2-5. Please provide the August 2008 sampling information for all wells at SWMU 35, including D-5.

Response: Figure 2-5 will be revised. The August 2008 date on Figure 2-5 is the date the map was created rather than the date the groundwater elevations were taken. The January 18, 2008 date of the groundwater elevation data will be added to the title of the figure.

19. If the ground water data were collected on January 18, 2008 (subsection 2.1.7.1), why is the hydraulic gradient calculation dated January 29, 2008? What was the hydraulic gradient on January 18, 2008?

    Response: The table in Section 2.1.7.1 will be revised to reflect date the elevation data was collected (January 18, 2008).

20. Section 2.1.8.4 states that sample 35SL1 was tested for metals, however Table 2-4 indicates that metals were not tested.

    Response: Sample 35SL1 was sampled for TCLP metals not TAL metals. The TCLP metals results will be added to the table.

21. Figure 2-16 provides a potentiometric contour map for August 2008. However, the date box for this map states June 2008. Please clarify by including the date of data collection used in the making of this figure.

    Response: Date box is the date the map was created. This will be updated and the date of August 12, 2008 will be added to the title.

22. Figure 2-16 provides a ground water elevation for ground water well 38MW1 at 1681.50. The closest potentiometric contour line is at 1681.5, but does not go through the well point 38MW1. Please explain.

    Response: Figure 2-16 will be revised.

23. Table 2-3 presents 38MW1 at a ground surface elevation of 1709.40. Figure 2-14 shows the ground surface elevation for 38MW1 at over 1710 feet above msl. Please explain.

    Response: Figure 2-14 will be revised to show a ground surface elevation of 1709.4 ft at 38MW1.

24. Please install 3 hydrogeologically down gradient wells at SWMU 38/AOC Q. A table on page 3-3 of the draft RFI describes 3 wells as being either downgradient (2), or cross gradient (1) of SWMU 38/AOC Q. The potentiometric contour maps at Figure 2-15/2-16 shows no wells hydrogeologically downgradient of the ground surface foot print of SWMU 38/AOC Q.

Response: Further assessment of groundwater flow patterns in the SWMU 37 (November 10, 2009), SWMU 38, and AOC Q area has been conducted by obtaining one additional round of water level data from the six wells installed for the RFI (at SWMU 37/38/AOC Q) supplemented by 16 existing monitoring wells located at SWMU 9 (located between SWMU 37 and SWMU 38/AOC Q) and HWMU 7 (located adjacent to SWMU 37). This assessment confirms a north/northeasterly direction of groundwater flow across the SWMU 38/AOC Q area. Although monitoring wells are not installed directly north of this area, further assessment of groundwater at the site is not considered necessary based on the following:

- Limited calcium sulfate material is present in the drying beds at SWMU 38 (0 to 1 ft thick layer) and AOC Q (0.25 to 1 ft thick layer). This material is not a hazardous waste, does not contain hazardous constituents at levels that may pose a risk to human health or the environment, and does not represent a source area for future leaching to subsurface soil or groundwater at levels of concern;
- Risk assessment results for the site were within USEPA ranges of 1E-06 to 1E-04 for carcinogenic and 1E+00 or less for non-carcinogenic hazard when considering target organs and background; and
- Two of the three monitoring wells (38MW2and 38MW3) are installed immediately adjacent to the drying bed berms at SWMU 38 and AOC Q, and therefore, are considered appropriate locations to measure potential releases from the units due to their proximity.

25. Please install 3 hydrogeologically down gradient wells at SWMU 37. A table on page 3-3 of the draft RFI describes 3 wells as being either downgradient (2), or upgradient (1) of SWMU 37. The potentiometric contour map at Figure 2-16 shows no wells hydrogeologically downgradient of the ground surface foot print of SWMU 37.

Response: Further assessment of groundwater flow patterns in the SWMU 37 area has been conducted by obtaining one additional round of water level data from the six wells installed for the RFI (at SWMU 37/38/AOC Q) supplemented by 16 existing monitoring wells located at SWMU 9 (located between SWMU 37 and SWMU 38/AOC Q) and HWMU 7 (located adjacent to SWMU 37). This assessment shows an apparent groundwater flow divide extending across the central portion of SWMU 37 and into adjacent SWMU 9. On the western side of the divide, groundwater flows toward well 37MW3 in a northwesterly direction and on the eastern side of the divide groundwater flows toward the east-southeast. Based on this assessment, well 37MW3 is located downgradient of SWMU 37 and is appropriate for assessing releases from the unit. Well 37MW2 is also considered appropriate to evaluate potential releases from SWMU 37 due its location immediately adjacent to the drying bed. Based on the results of this additional groundwater flow assessment and results of the risk assessment, fate and transport assessment, and the characteristics of the calcium sulfate sludge, additional assessment of groundwater releases at SWMU 37 is not warranted.

26. Please provide the date of the information used in Figure 2-14, especially the potentiometric surface data. Information provided in Figure 2-16 and Figure 2-15 shows that ground water in 37MW3 is at a higher elevation that ground water in 37MW1 on two different dates. Please provide information on the ground water divide in this area.

Response: Potentiometric surface data from January 19, 2008 were used to prepare cross-section Figures 2-14 (across SWMU 38/AOC Q area) and 2-15 (across SWMU 37 area). Potentiometric representations on these figures are consistent with those shown on Figures 2-15 and 2-16. As discussed in the response to Comment 25, an additional assessment of groundwater flow has been conducted in the SWMU 37 (November 10, 2009) by obtaining one additional round of water level data from the six monitoring wells installed for the RFI (SWMU 37/38/AOC Q) supplemented by 16 existing monitoring wells located at SWMU 9 (located between SWMU 37 and SWMU 38/AOC Q) and HWMU 7 (located adjacent to SWMU 37). This assessment shows an apparent groundwater flow divide extending across the central portion of SWMU 37 and into adjacent SWMU 9. On the western side of the divide, groundwater flows toward well 37MW3 in a northwesterly direction and on the eastern side of the divide groundwater flows toward the east-southeast. The RFI Report will be revised to include a revised assessment of groundwater flow based on these measurements along with a potentiometric map showing the interpreted groundwater flow patterns.

27. Figure 2-13 illustrates the ground water elevation and potentiometric contour elevation in the vicinity of 37MW3 and 37MW1. Figure 2-15 and Figure 2-16 each indicate that ground water in 37MW3 is at a higher elevation than 37MW1. Please check these wells for an upward flow component of ground water. Please do the same for 38MW3 and 38MW1. Check to see if any of the wells screened in the bedrock are being overly influenced by the hydraulic heads in this formation, rather than formations above the bedrock. Consider installing nested wells.

Response: An additional assessment of groundwater flow (November 10, 2009), has been conducted for the SWMU 37, SWMU 38, and AOC Q using 22 monitoring wells as described in the response to Comments 25 and 26. Each of these wells is similarly constructed to monitor the uppermost zone of groundwater across the bedrock interface where hydraulic head levels are slightly above or below the bedrock surface. Hydraulic head measurements in these wells show a radial component of flow in the area of SWMU 37, SWMU 9, and HWMU 7. These flow patterns may be attributable to local conditions related to topography, drainage features, the presence of former lagoon areas (including the inactive lagoons at SWMU 9 that are partially full of water), and the site's proximity to the New River at a location of an inside bend of the river. Based on the results of this additional groundwater flow assessment, construction of the monitoring wells to

monitor the uppermost zone of groundwater, and results of the risk assessment, fate and transport assessment, and the characteristics of the calcium sulfate sludge, additional assessment of groundwater releases at SWMU 37, SWMU 38, and AOC Q is not warranted.

28. **Section 2.2.8.1, Verification Investigation – Dames and Moore 1992, Page 2-11:** This section indicates that waste characterization samples from SWMU 37, SWMU 38, and AOC Q were analyzed for VOCs, semi-volatile organic compounds (SVOCs), and toxicity characteristic leaching procedure (TCLP) metals. Table 2-6, Summary of Analytical Data for Sediment/Sludge Samples, provides the results of these analyses, but does not appear to include the TCLP metals results. Please revise the RFI Report to include the TCLP metals results of the sludge at SWMU 37, SWMU 38, and AOC Q, as these data will help classify the waste materials present in the sludge.

    Response: Historic TCLP results for SWMUs 35, 37, 38, and AOC Q will be provided. In addition, RFI TCLP results will be provided in Appendix C.6.

29. **Section 2.2.8.3, Site Screening Process Investigation – URS 2007a, Pages 2-11 to 2-12:** According to this section, a human health risk screening evaluation was conducted as part of a previous site screening process (SSP) investigation. However, although the previous screening evaluation was based on comparing MDCs with RBCs (i.e., the same approach used in the HHRA presented in the RFI Report), the two evaluations identified a few different COPCs. Specifically, the risk screening in the SSP investigation identified volatile organic compounds (VOCs), 2,4-dinitrotoluene (2,4-DNT), and metals as soil COPCs at SWMU 37; but the HHRA in the RFI Report identified metals and polychlorinated biphenyls (PCBs) as COPCs in soil. Given that the same risk screening approach was used, further explanation should be provided for the discrepancy between the COPCs identified in the two evaluations (e.g., updates in RBCs, changes in HHRA data set, etc.).

    Response: The following text will be added to Section 2.2.8.3 "Note that the COPCs identified in the SSP investigation may differ from the COPCs identified in the RFI based on updated RBC screening levels and additional soil data collected during the RFI used in the screening."

30. **Section 3.1.1, Soil Borings and Soil Sampling, Page 3-3:** The first paragraph on Page 3-3 states that "Soil samples were collected from each boring from the following depth intervals: (1) surface, (2) immediately below sludge (if present) or intermediate depth, and (3) terminal depth at specified depth." Based on the information provided in Table 3-1, Field Sample Identifiers, Depths, and Analytical Methods, the three samples per boring approach described above was not consistently applied at all of the SWMUs and AOC. One sample per boring was collected in some locations. *Work Plan Addendum 020* proposed to collect only surface soils at some locations, and this appears to be the approach that was

carried out during the RFI sampling. For clarity, please revise the statement on Page 3-3 of Section 3.1.1 to state that surface soil samples were collected from each boring, and additional subsurface soil samples (immediately below sludge or at an intermediate depth and at a terminal depth) were collected at some locations. Additionally, please describe the rationale for selection of the terminal sample depth at each of the SWMUs and AOC.

Response: In Section 3.1.1, the text will be revised as follows: "RFI soil samples were collected from each boring within the drying beds from the following depth intervals: (1) surface, (2) immediately below sludge (if present) or intermediate depth, and (3) terminal depth at specified depth. A surface soil sample was collected from the boring located outside the drying beds. As stated in WPA 020 (URS 2007), the terminal depths of the RFI borings within the drying beds of 8 ft below grade was established since additional delineation of impacted soil is not required below this depth given that concentrations of metals detected in subsurface soil samples collected from inside the drying beds are below background point estimates and the vertical organic constituent concentrations has been appropriately characterized in the SSP. In addition, the depth of the drying bed areas is 4 to 8 ft below the outside grade and therefore, samples collected from depths of 8 ft or less will provide data from the same soil strata for sample collected inside and outside of the SWMUs."

31. **Section 3.1.2, Monitoring Well Installation and Groundwater Sampling, Page 3-3:** The table included in Section 3.1.2 indicates that the groundwater sampling event at the sites was conducted in February 2008. According to Table 4-11, Summary of Detected Chemicals in Groundwater Analytical Samples at SWMU 38 and AOC Q, an additional sampling event occurred on June 24, 2008. Monitoring well 38MW3 was sampled for total and dissolved manganese on this date. The text portion of the RFI Report should describe the sampling event on June 24, 2008 and indicate why this sampling event was conducted, as it was not planned in Work Plan Addendum 020.

Response: An additional table will be added to Section 3.1.2 for the June 2008 groundwater sampling event. Section 3.1.2 text will be revised as follows: "In December 2007, monitoring wells 35MW1 and 35MW2 were installed at SWMU 35 (Figure 3-1), monitoring wells 37MW1, 37MW2, and 37MW3 were installed at SWMU 37 (Figure 3-2), and monitoring wells 38MW1, 38MW2, and 38MW3 were installed at SWMU 38/AOC Q (Figure 3-3) to evaluate potential releases to groundwater. A groundwater sampling event was completed at the sites in February 2008. Based in the results of the initial groundwater sampling event, additional confirmation groundwater sampling was conducted in June 2008 for pesticides at monitoring well 37MW2 and for manganese at 38MW3. The groundwater sampling analytical parameters are summarized below and in Table 3-1. Monitoring well construction data are summarized in Table 2-3."

32. **Section 3.4, Work Plan Field Changes, Page 3-7:** This section documents changes from the Work Plan that were initiated in the field (i.e., offsetting the locations of monitoring wells 38MW1 and 38MW2), but the RFI Report does not address any implications of these changes, or whether initial objectives of monitoring groundwater at the specified locations have been met. This section also indicates that fifteen additional stratigraphic soil borings were completed east of SWMU 38 to delineate the lateral and vertical extent of sludge in this area. The RFI Report does not appear to include any boring logs or other documentation of these borings in Appendix C nor do the additional borings appear to have specific IDs as none are shown on Figure 3-3, Sample Locations. It is also unclear whether these boring locations were surveyed. Please revise the RFI Report to describe any implications of the work plan field changes described in Section 3.4. Also, revise the RFI Report to include documentation of the fifteen additional borings that were completed east of SWMU 38, including boring logs, boring IDs, and surveyed coordinates, if available. If documentation is unavailable, indicate why this information was not collected.

Response: The monitoring well offsets did not have a significant effect on the planned assessment of groundwater conditions at SWMU 38/AOC Q because the offset locations were in the same relative position to the drying beds as originally proposed. Monitoring well 38MW2 was offset south of its planned location but at a similar position adjacent to and west of the drying bed and therefore, the location offset did not change the planned assessment of groundwater quality adjacent to the drying bed in the direction of the New River. Monitoring well 38MW1 was offset west of its planned location but remained still more than 140 feet east of the drying bed in a direction away from the New River. Section 3.4 will be revised to include this additional information.

The soil sampling and analysis table for SWMU 38 in Section 3.1.1 identifies the stratigraphic soil borings as 38SC1 through 38SC15. These borings were completed to shallow depths and therefore boring logs were not prepared. Boring information (including depth and survey coordinates) will be added to Table 2-2 and boring IDs will be added to Figure 3-3.

33. **Section 4.1.2.5, PCBs, Page 4-4:** Aroclor 1254 was detected at concentrations above its adjusted residential risk based screening criterion (R-RBC) in 8 of 22 soil samples. Based on the locations of these exceedances as shown on Figure 4-1, Extent of Human Health COPCs – Soil, it appears that the lateral extent of this contamination has not been delineated to the south and east of SWMU 35. The surface samples collected outside of the drying bed area to the south (35SB2) and east (35SB3) both reported exceedances of the R-RBC. Please revise the RFI Report to address this data gap.

Response: PCBs are not identified as a risk or hazard driver in the HHRA. Based on the small size of the site and the number of samples collected no additional characterization is necessary.

34. **Section 4.3.2.6, VOCs, Page 4-9:** Trichloroethylene (TCE) was detected in soil at SWMU 37 above its soil screening level (SSL) for migration to groundwater, based on a dilution attenuation factor (DAF) of 20. This section also notes that "groundwater sample results did not indicate leaching of TCE from soil to groundwater at detectable levels." However, it does not appear that a groundwater sample was collected at a location downgradient from the SSL exceedances at boring location 37SB2. Figure 2-15, Potentiometric Contour Map for January 2008, shows the groundwater flow direction at SWMU 37 is to the northeast. No groundwater monitoring wells are located directly northeast of SWMU 37 to monitor groundwater downgradient of the site. Please revise the RFI Report to address this data gap. Additionally, groundwater monitoring northeast of SWMU 37 may be necessary (see comment 25).

Response: As discussed in the response to Comment 25, further assessment of groundwater flow patterns in the SWMU 37 (November 10, 2009) area has been conducted by obtaining one additional round of water level data from the six wells installed for the RFI (at SWMU 37/38/AOC Q) supplemented by 16 existing monitoring wells located at SWMU 9 (located between SWMU 37 and SWMU 38/AOC Q) and HWMU 7 (located adjacent to SWMU 37). This assessment shows that well 37MW3 is appropriately positioned at a downgradient location of the drying bed in the flow path of groundwater originating from the general area of boring 37SB2 in the central portion of the drying bed. The RFI Report will be revised to include this additional information.

Based on the results of this additional groundwater flow assessment and results of the risk assessment, fate and transport assessment, and the characteristics of the calcium sulfate sludge, additional assessment of groundwater releases at SWMU 37 is not warranted.

35. **Table 4-12, Summary of Risk Screening Results for Groundwater at SWMU 38 and AOC Q:** Table 4-12 identifies the maximum detected concentrations of dissolved manganese and total manganese in groundwater as 1,050 micrograms per liter (ug/l) and 990 ug/l, respectively. Table 4-11, Summary of Detected Chemicals in Groundwater Analytical Samples at SWMU 38 and AOC Q, shows the maximum detected concentrations of dissolved and total manganese as 2,400 ug/l and 2,600 ug/l, respectively, as identified in well 38MW3 during the February 2008 sampling event. Please revise the RFI Report to address this discrepancy. The maximum detected concentrations for total and dissolved manganese as shown on Table 4-11 should be used in any evaluations of risk unless additional justification is provided.

Response: As discussed on the August 13, 2009, Army/USEPA/VDEQ/TechLaw conference call (Discussion Point #1): Betty Ann Quinn stated that she wanted to see both sets of analytical data, but that typically, only the dissolved metals concentrations needed to be carried through in

the risk assessment. She also added that, if it appeared that there was something unusual about the results, the total metals may be more representative of aquifer conditions. The detected concentrations of total and dissolved manganese do not indicate any unusual conditions at the site.

36. **Section 5.0, Contaminant Fate and Transport, Page 5-1:** This section presents a table that summarizes the COPCs identified at "the site". However, the chemicals listed are not COPCs in all three areas (i.e., SWMUs 35, 37, and 38/AOC Q). Furthermore, the difference between the chemicals listed under the column headings "Soil – Human Health" and "Soil SSL DAF20" in the table is unclear. Please revise the table to identify the specific COPCs associated with each area; and add as a footnote or incorporate into the text an explanation of the columns in the table.

    Response: The summary table in Section 5.0 will be revised.

37. **Section 5.3, Fate and Transport Summary:** Further investigation of the source of the pesticides in groundwater at SWMU 37 may be warranted.

    Response: The pesticide detections in groundwater were not considered site related since the pesticides detected in groundwater were not detected in soil at the site and the detections from the two rounds of sampling were low level and not consistently above screening levels. Detections were not above available MCLs. Thus the available data does not suggest a source exists that requires further investigation.

38. **Section 6.1.1.1, Surface Soil and Total Soil, Page 6-2:** This section indicates that soil samples collected during the SSP investigation in 2003 and for the RFI in 2007 were evaluated in the HHRA. However, as stated in the General Comments above, other previous investigations at SWMUs 35, 37, and 38/AOC Q included soil sample collection. Please revise the HHRA to include all soil data collected previously for soils that have not been removed; or provide justification for not considering these data in the HHRA. This information should be included in the data evaluation section of the HHRA which describes what data were deemed useable for risk analysis as well as data that were excluded and the reasons for excluding the data (e.g., data did not meet data quality objectives for use in HHRA, etc.).

    Response: See response to Comment #1.

39. **Section 6.1.1.2, Groundwater, Page 6-2:** This section states that groundwater data from only the February and June 2008 sampling events were evaluated in the HHRA. However, according to Section 2, Site Background, groundwater samples were also collected during other investigations, some dating back to the early 1990s. Please revise the risk assessment to include other relevant groundwater data, or provide rationale for not including them in the risk evaluation.

Furthermore, this section makes reference to the use of "dissolved metals data". Please ensure that only data from unfiltered groundwater samples are used in the HHRA.

Response: See response to Comments #1 and #35.

40. **Section 6.1.2, Identification of COPCs, Pages 6-2 to 6-4:** The COPCs summarized in tables in this section include notes that identify chemicals that were "not carried through the HHRA due to low frequency of detection". However, the definition of "low frequency of detection" is not provided, and potential deviations to this decision rule are not fully explained. For example, nitroglycerin, which was detected at SWMU 35 at a "low" frequency of detection (i.e., 1 of 10 in surface soil, and 1 of 22 in total soil samples), was retained as a COPC because the single detected concentration was above the industrial screening levels. It is not clear whether other chemicals that were removed as COPCs due to "low frequency of detection" have been compared to RBCs. Please define "low frequency of detection" and clarify this decision rule.

Furthermore, several chemicals were identified as occurring at a "low frequency of detection" and also flagged as having no screening value available. The fate of these chemicals in the HHRA is unclear. For example, dimethylphthalate at SWMU 35; methylcyclohexane, di-n-octylphthalate and dimethylphthalate at SWMU 37; and cyclohexane and methylcyclohexane at SWMU 38/AOC Q were classified as occurring at a "low frequency of detection" as well as having no screening value available. Please clarify the steps involved in removing chemicals from further evaluation as COPCs. For conservativeness, those chemicals for which no screening criteria are available should be retained and evaluated – either quantitatively with the use of surrogates or qualitatively based on their known chemical properties. Finally, low frequency is not a line of evidence that can be used to eliminate chemicals unless a spatial analysis is conducted to determine if a single detection or low frequency of detection is in an area where a release may have occurred. It should be noted that the *Risk Assessment Guidance for Superfund* (RAGS) Part A provides guidance on the use of frequency and recommends a 5 percent frequency of detection as a limit, as long as there are at least 20 samples. Thus, a frequency of 1 of 6 for methylcyclohexane, di-n-octylphthalate and dimethylphthalate at SWMU 37 is not considered low frequency since the frequency is almost 17 percent. Please address this concern.

Response: Per Ruth Prince's e-mail on 8/22/2007, if you only have 1/10 or 2/100 detections, even if that detection exceeds a screening level, the majority of your dataset does not. Risk assessors often rule out COCs by FOD (frequency of detection, usually at a cut-off of 5%), and so do not bring these chemicals through any further risk assessment. The ProUCL approach in version 4.0 essentially does the same thing, because your EPC winds up being a nondetect value, reflecting the nature of your data distribution. There would be no sense carrying that

nondetect into further risk assessment. The only caveat I would have is if the single or few detections are really high concentrations that do not appear to be fully characterized - i.e., a hotspot needing further characterization.

Of the chemical that were detected at a low frequency of detections, nitroglycerin at SWMU 35 was retained within the risk assessment due to a value greater than the industrial screening level; therefore potentially indicating a hot spot. No chemicals other than those listed in the tables were excluded from the HHRA.

41. **Section 6.2.3, Calculation of EPCs, Page 6-7:** The second paragraph in this section indicates that EPA's ProUCL 4.0 software, released in 2007, was used to calculate the 95 percent upper confidence limit on the mean (95 percent UCL) concentrations for detected chemicals. However, it should be noted that a more recent version of the ProUCL software, Version 4.00.04, was released in February 2009. Please use the latest version of ProUCL, available online at www.epa.gov/nerlesd1/tsc/software.htm, to ensure that the latest developments in UCL calculation methodology are incorporated. This comment also applies to the use of ProUCL 4.0 for distribution testing and comparison of site data to background concentrations (Section 6.4.3, Background, Page 6-15).

    Response: This report was prepared prior to the release of ProUCL Version 4.00.04; therefore, the report will not be revised.

42. **Section 6.3, Toxicity Assessment, Page 6-8:** This section states that the EPA Region 3 RBC table was the source of chronic toxicity criteria used to quantify non-carcinogenic hazards and carcinogenic risks in the HHRA. However, as indicated in the General Comments above, the use of toxicity data presented on the RBC table instead of the more recent RSL table has resulted in the use of outdated toxicity data for some compounds. Please revise the HHRA to incorporate the latest toxicity data provided in the RSL table.

    Response: See response to Comment #4.

43. **Section 6.3.1.1, Cancer Slope Factors, Page 6-9; and Section 6.3.1.2, Reference Doses and Reference Concentrations, Pages 6-9 to 6-10:** These two sections describe the derivation of toxicity criteria for carcinogens based on cancer slope factors (CSFs), and non-carcinogens based on reference doses (RfDs), and reference concentrations (RfCs). It should be noted, however, that for risk evaluations of inhalation exposure, EPA guidance recommends that unit risk factors (URFs; for carcinogens) and RfCs (for non-carcinogens) be used instead of CSFs and RfDs. Specifically, EPA's final RAGS Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), issued in January 2009, indicates that inhalation CSFs and RfDs should not be used to evaluate inhalation risks because studies have shown that inhalation toxicity is not a function of inhalation rate or body weight. Please revise the HHRA to incorporate this approach.

Response: This HHRA was completed prior to the release of the inhalation guidance. Per previous agreements, URS will begin to use the new guidance with the SWMU 13 RFI.

44. **Section 6.5, HHRA Summary, Pages 6-16 to 6-19:** This section summarizes the risk results for each of the three areas evaluated in the RFI, based on EPA's target risk range of 1E-06 to 1E-04. However, as indicated in the General Comments above, the regulatory target of 1E-06 – not the risk management range – should be used as the basis for cumulative HHRAs. Risks that fall within the range are not necessarily acceptable. Please revise the summary and conclusions to indicate exposure scenarios and chemicals associated with risk estimates that exceed the 1E-06 *de minimus* target.

    Response: See response to Comment #6.

45. **Section 7.1.1.1, Ecological Site Characterization, Page 7-2.** The text states that a Virginia Department of Game and Inland Fisheries survey identified two rare plant species (i.e., Midland Sedge and Shaggy False Gromwell) associated with grassland communities at RFAAP. Please specify if the plant communities at the targeted SWMUs and AOC Q have been evaluated for the presence of these two species.

    Response: The following text will be added to Section 7.1.1.1: "No threatened wildlife species or rare plant species were identified at the site."

46. **Section 7.2.1.3, Terrestrial Wildlife, Page 7-8:** The table in this section summarizes the chemicals which either have only NOAEL HQs above 1 or NOAEL and LOAEL HQs above 1 per receptor. A few errors were identified when the table was compared to Tables F.2-14 through F.2-22. For example, cadmium, chromium, and zinc are listed as only having NOAEL HQs above 1 for the meadow vole. However, Table F.2-4 shows that HXM and nitroglycerin also have NOAEL HQs above 1. Please review this table to ensure all of the appropriate chemicals are listed.

    Response: Will review and revise summary table.

47. **Section 7.2.3, Risk Management – Scientific Management Decision Point (SMDP), Italicized Conclusion. Page 7-9:** The SMDP states that "Although metal concentrations in plants were above the screening levels, vegetation at the site is lush and diverse and indicators of chemical vegetative stress were not observed with the exception of limited gravel areas." Simply stating that the area appears lush and diverse is insufficient grounds to conclude a lack of risk. For example, it is not known if the local plant community shows a response in terms of lower species diversity, reduced growth, or other more subtle responses that might be observable when compared to an unimpacted reference location. Please

discuss in the uncertainty section the limitations of the current conclusions on the lack of risk to the plant community. This additional information will help support risk management decision making.

Response: The following text will be added to Section 7.5.3: "The qualitative nature of the conclusion of lack of risk to the plant community based on the lack of indicator of chemical vegetative stress and lush vegetation present at the site creates uncertainty since it is not known that if the local plant community shows a response in terms of lower species diversity, reduced growth, or other more subtle responses that might be observable when compared to an unimpacted reference location."

48. **Section 7.4.1.3, Terrestrial Wildlife, Page 7-12:** The table in this section summarizes the chemicals which either had only NOAEL HQs above 1 or NOAEL and LOAEL HQs above 1 per receptor. One error was identified when the table was compared to the Tables F.4-14 through F.4-22. The list of chemicals for the American Robin did not include 2, 4-Dinitroluene, which had a NOAEL above 1.0. Please revise this table accordingly.

    Response: Will review and revise summary table.

49. **Section 7.5, Exposure and risk uncertainty analysis, Page 7-13 and 7-14:** This section should be expanded to address issues associated with (a) the potential for additive toxic effects of exposure by wildlife receptors to site-related chemicals, (b) the qualitative nature of the evaluation of risk to the plant community, (c) the effect on risk conclusions of high detection limits for PCBs in several soil samples from SWMU 35 (see Table F.2-3b), and (d) any concerns associated with listed plant species.

    Response: For part (a): The following text will be added to Section 7.5.6: "An HQ of less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects. The potential for risk increases as the HQ increases above one. However, this result should be considered in the context of other characteristic of the exposure area. In addition, it should be noted that the calculation of chemical specific HQs does not account for multiple chemicals acting through the same exposure mechanism."

    For part (b): See Comment #47.

    For part (c): The following text will be added to Section 7.5.1: "Elevated reporting limits for chemicals, such as PAHs at SWMU 35, could result in an underestimation of risk at the site due to potentially failing to identify a COPEC.

    For part (d): See Comment #45.

50. **Table F.2-24 (Wildlife Summary) and Table F.4-24 (Wildlife Summary):** The SLERA Wildlife Summary tables for SWMU 35 and SWMU 38/AOC Q are missing from Appendices F.2 and F.4, respectively. Please review these appendices and update accordingly.

Response: Noted.

"McKenna, Jim J Mr CIV USA AMC"
<jim.mckenna@us.army.mil>
07/07/10 01:37 PM

To "Cutler,Jim" <James.Cutler@deq.virginia.gov>, <dennis.druck@us.army.mil>, <Geiger.William@epamail.epa.gov>,
cc
bcc
Subject FW: RAAP 10 - SWMU 37 - Additional Groundwater Sample (UNCLASSIFIED)

History: This message has been replied to.

Classification: UNCLASSIFIED
Caveats: FOUO

Will and Jim Cutler,

Per USEPA/VDEQ's request, URS installed and sampled an additional well (37MW4) at SWMU 37 (see attached figure for location). URS has received the results for the groundwater sample for the additional well. Per the agreement at the February partnering meeting, the sample was analyzed for VOCs. The only chemical detected was toluene at a concentration of 0.22 ug/L which is below the adjusted tap water screening level (230 ug/L). See the attached lab sample results. TCE, which was the chemical of concern due to an SSL exceedance, was not detected in groundwater at the site. URS proposes that we implement the remainder of the changes set forth in the original response to comments and finalize the report which recommended No Further Action for SWMUs 35, 37, 38, and AOC Q. The final report will include additional potentiometric maps (the map presented at the February partnering meeting and a map for the most recent sampling event), as well as, revised text regarding the groundwater flow in the SWMU 37, SWMU 38, and AOC A area.

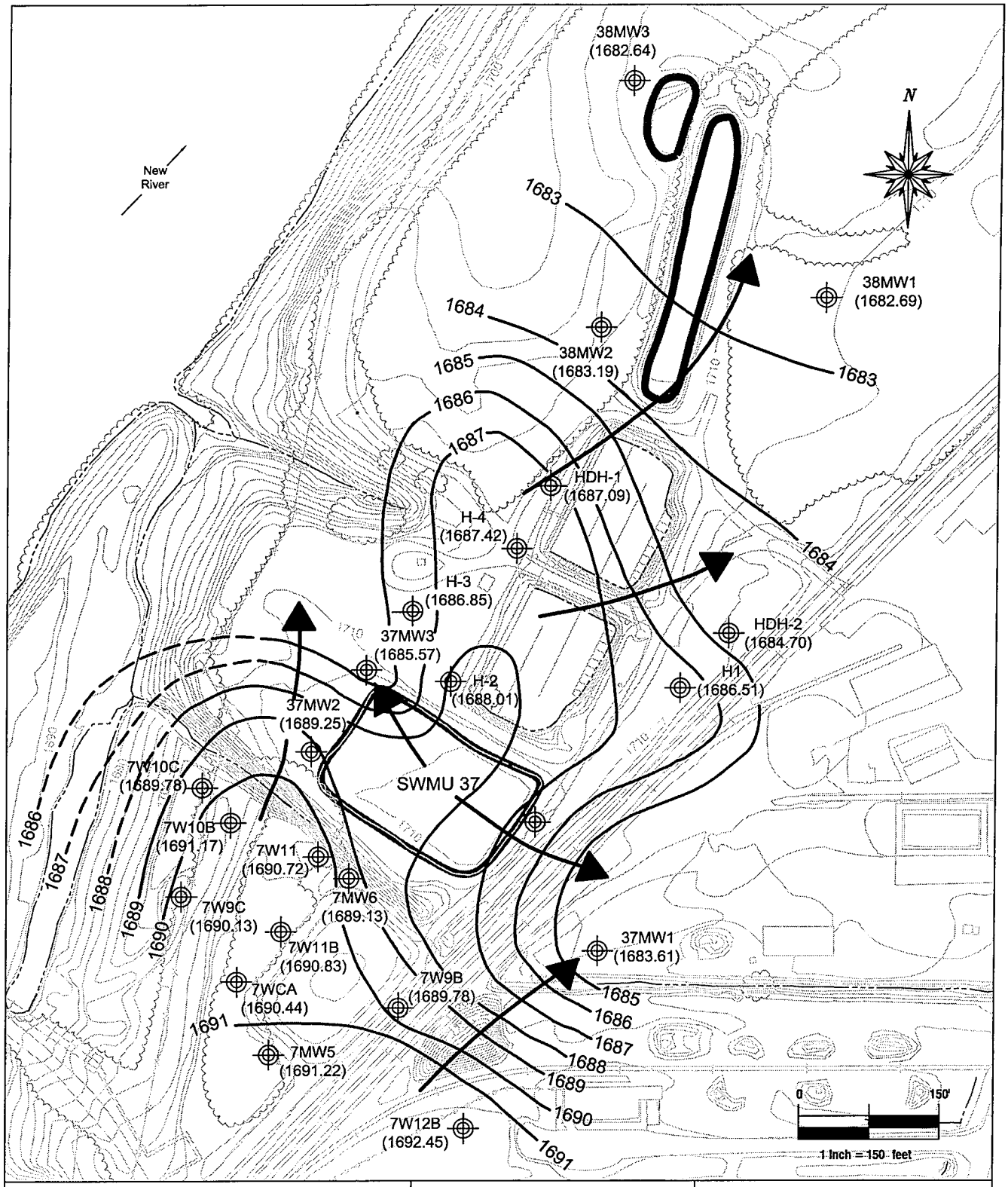
Let me know if you have any questions or comments.

Also what's the status of the our RTCs for the SWMU 13 RFI Report? Don't want this to fall off the radar.

Thanks,
Jim

Classification: UNCLASSIFIED
Caveats: FOUO

SWMU 37 map for proposed well.pdf SWMU 37 MW4 Results.pdf



Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Groundwater Flow Direction
- Monitoring Well
- Proposed Monitoring Well
- Potentiometric Contour
- (1688.96) Groundwater Elevation (feet, mean sea level)

FIGURE 2-15

Potentiometric Contour Map for November 2009

Date: February 2009	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 150 feet	File Name: Fig.2-15 PotMap

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS
URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

37MW4

Laboratory: TriMatrix Laboratories, Inc. SDG: RF100610

Client: URS Corporation Project: RFAAP RAAP 10

Matrix: Water Laboratory ID: 1006296-01 File ID: 1006296-01.D

Sampled: 06/16/10 12:05 Prepared: 06/22/10 08:00 Analyzed: 06/22/10 12:11

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 1006220 Sequence: 0F23013 Calibration: 0F23002 Instrument: 323

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	2.1	U
71-43-2	Benzene	1	1.0	1.0	0.18	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.18	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.13	U
75-25-2	Bromoform	1	2.0	2.0	0.15	U
74-83-9	Bromomethane	1	1.0	1.0	0.18	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.18	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.13	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.19	U
75-00-3	Chloroethane	1	1.0	1.0	0.15	U
67-66-3	Chloroform	1	1.0	1.0	0.17	U
74-87-3	Chloromethane	1	1.0	1.0	0.16	U
110-82-7	Cyclohexane	1	5.0	5.0	0.25	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.40	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.12	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.13	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.12	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.21	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.13	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.13	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.13	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.20	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.15	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.25	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.23	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.14	U
591-78-6	2-Hexanone	1	10	10	0.29	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.15	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.30	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.28	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.20	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.26	U
78-93-3	2-Butanone (MEK)	1	10	10	0.55	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.28	U
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.070	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.16	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

37MW4

Laboratory: TriMatrix Laboratories, Inc. SDG: RF100610

Client: URS Corporation Project: RFAAP RAAP 10

Matrix: Water Laboratory ID: 1006296-01 File ID: 1006296-01.D

Sampled: 06/16/10 12:05 Prepared: 06/22/10 08:00 Analyzed: 06/22/10 12:11

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 1006220 Sequence: 0F23013 Calibration: 0F23002 Instrument: 323

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
108-88-3	Toluene	1	0.22	1.0	0.16	J
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.18	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.19	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.18	U
79-01-6	Trichloroethene	1	1.0	1.0	0.092	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.20	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.13	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.10	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.42	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.6	106	85 - 115	
1,2-Dichloroethane-d4	40.0	45.0	112	70 - 120	
Toluene-d8	40.0	37.1	93	85 - 120	
4-Bromofluorobenzene	40.0	36.2	91	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	255420	4.28	262326	4.28	
Chlorobenzene-d5	203366	7.26	237261	7.26	
1,4-Dichlorobenzene-d4	113175	9.55	144453	9.55	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: RF100610

Client: URS Corporation Project: RFAAP RAAP 10

Matrix: Water Laboratory ID: 1006296-02 File ID: 1006296-02.D

Sampled: 06/16/10 00:00 Prepared: 06/22/10 08:00 Analyzed: 06/22/10 12:39

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 1006220 Sequence: 0F23013 Calibration: 0F23002 Instrument: 323

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	2.1	U UJ c
71-43-2	Benzene	1	1.0	1.0	0.18	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.18	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.13	U
75-25-2	Bromoform	1	2.0	2.0	0.15	U
74-83-9	Bromomethane	1	1.0	1.0	0.18	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.18	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.13	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.19	U
75-00-3	Chloroethane	1	1.0	1.0	0.15	U
67-66-3	Chloroform	1	1.0	1.0	0.17	U
74-87-3	Chloromethane	1	1.0	1.0	0.16	U
110-82-7	Cyclohexane	1	5.0	5.0	0.25	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.40	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.12	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.13	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.12	U
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75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.13	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.13	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.13	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.20	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.15	U
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10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.23	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.14	U
591-78-6	2-Hexanone	1	10	10	0.29	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.15	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.30	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.28	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.20	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.26	U
78-93-3	2-Butanone (MEK)	1	10	10	0.55	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.28	U
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.070	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.16	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: RF100610

Client: URS Corporation Project: RFAAP RAAP 10

Matrix: Water Laboratory ID: 1006296-02 File ID: 1006296-02.D

Sampled: 06/16/10 00:00 Prepared: 06/22/10 08:00 Analyzed: 06/22/10 12:39

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 1006220 Sequence: 0F23013 Calibration: 0F23002 Instrument: 323

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
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87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.18	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.19	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.18	U
79-01-6	Trichloroethene	1	1.0	1.0	0.092	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.20	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.13	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.10	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.42	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.8	105	85 - 115	
1,2-Dichloroethane-d4	40.0	45.2	113	70 - 120	
Toluene-d8	40.0	36.6	92	85 - 120	
4-Bromofluorobenzene	40.0	37.0	92	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	259095	4.28	262326	4.28	
Chlorobenzene-d5	204709	7.26	237261	7.26	
1,4-Dichlorobenzene-d4	115535	9.55	144453	9.55	

* Values outside of QC limits

Geiger.William@epamail.epa.gov
12/08/09 03:45 PM

To "McKenna, Jim J Mr CIV USA AMC" <jim.mckenna@us.army.mil>
cc diane.wisbeck@arcadis-us.com, "jim spencer" <james_o_spencer@urscorp.com>, "Parks, Jeffrey N" <Jeffrey.Parks@shawgrp.com>, jerome.redder@atk.com,
bcc
Subject RAAP-10 RTCs

Jim, USEPA and VDEQ have reviewed Radford's responses to our comments on the RAAP-10 draft RFI, dated July 2009. We agree with all of the responses, with the exception of Comment #34. It is not clear from the revised Draft Potentiometric Map provided at the November 18 Meeting (formerly Figure 2-15), that a groundwater sample was obtained downgradient of soil boring 37SB2, where an elevated level of TCE was detected. Depending on where the groundwater divide occurs at SWMU 37, groundwater may be flowing to the Southeast, but passing to the North of well 37MW1.

EPA and VADEQ strongly recommend that a hydrogeologically downgradient well be installed on the east side of SWMU 37, and sampled for appropriate parameters.

As stated in the RTCs, the text, the site conceptual model, and various figures including 6-1 and 6-2 should be revised to reflect the updated interpretation of groundwater flow, including a discussion of the apparent ground water divide in the vicinity of SWMU 37, SWMU 38, and AOC Q.

Please call or email me with any questions. Thanks

William A. Geiger
Remedial Project Manager
Office of Remediation (3LC20)
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103-2029
Phone: 215.814.3413
Geiger.William@epa.gov

"McKenna, Jim J Mr CIV USA AMC"
<jim.mckenna@us.army.mil>
11/13/09 02:06 PM

To <diane.wisbeck@arcadis-us.com>, <Geiger.William@epamail.epa.gov>, <jerome.redder@atk.com>, "jim spencer"
cc
bcc
Subject RE: Agenda topics for 18 Nov 2009 Partnering Meeting (UNCLASSIFIED)

History: This message has been forwarded.

Classification: UNCLASSIFIED
Caveats: FOUO

Will, Jim Cutler and all,

Attaching the following for our 18 Nov 2009 meeting.

1. Two pdf files containing examples/excerpt of Statement of Basis and Site Status Update for use in issuing the RCRA CORA Permit. Note these are internal drafts and therefore are a work in progress but wanted you to see where we are with them.

2. "List of Planned and Submitted Documents" 09 Nov 2009

3. IRP "Status Update" Nov 2009

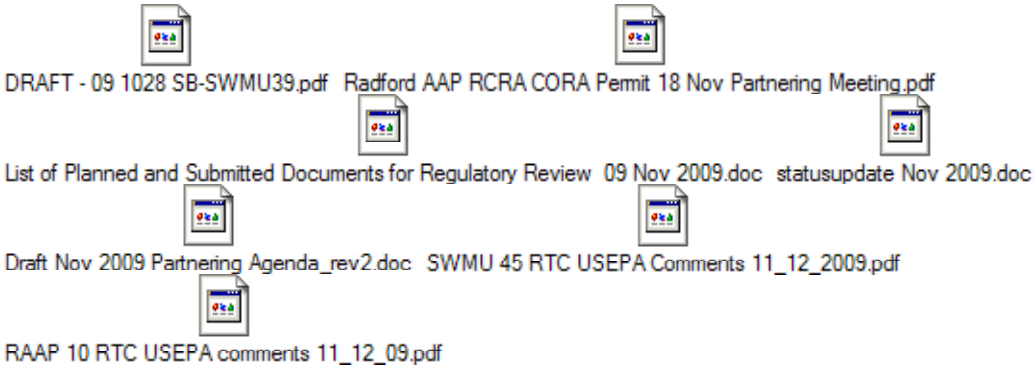
4. Draft meeting agenda, same as I sent before

5. RTCs for SWMU 45 SSP and RAAP-010 RFI reports

Please send to others in your organization who need to see this.

Thanks,
Jim

Classification: UNCLASSIFIED
Caveats: FOUO



Response to Comments (November 12, 2009)
Comments on the *Draft Solid Waste Management Units 35, 37, 38, and Area of Concern Q (RAAP-10) RCRA Facility Investigation Report* for the Radford Army Ammunition Plant (RFAAP) located in Radford, Virginia, dated July 2009 (RFI Report). Received October 2, 2009.

GENERAL COMMENTS

1. The RFI Report concludes that, on the basis of the human health risk assessment (HHRA) and ecological risk assessment results, no further action is recommended for the sites. However, calcium sulfate sludge is present at the sites. Although soil and groundwater media are not currently impacted by the sludge at unacceptable levels, the constituents in the sludge itself do not appear to have been evaluated in the risk assessments. Table 2-4, Summary of Historical Analytical Data for Sediment/Soil Samples Collected at SWMU [Solid Waste Management Unit] 35, show that lead concentrations in two sludge samples collected from SWMU 35 exceeded 50,000 milligrams per kilogram (mg/kg), well above the residential and industrial action levels (400 mg/kg and 750 mg/kg, respectively). Arsenic, chromium, mercury, nickel, silver, dinitrotoluene mixture, and phenanthrene also exceeded applicable screening criteria in sludge samples 35SE1 and 35SE2, but it does not appear that these samples were considered in the evaluation of risk. Please revise the RFI to provide further justification that the calcium sulfate sludge at the sites, and specifically at SWMU 35, will not present an unacceptable level of risk to receptors. The RFI Report should clearly substantiate that an ongoing release to groundwater from the sludge itself is not possible, in consideration of the high levels of lead and other constituents detected in historical sludge samples. Also, what is the status of the remaining sludge as a waste? Are there any regulatory ramifications with leaving it in place?

   Response: Prior to the RFI, historical soil analytical data (1990 and 1992) were considered screening level data and excluded from the risk assessment given the age of the data, the use of non SW-846 analytical methods, the lack of available data validation reports/information, and the availability of sufficient newer validated RFI data to more appropriately characterize conditions at the site. It should be noted that a results transcription error occurred for the sample result 35SE2 in Table 2-4. The lead concentration for 35SE2 should be >5,000 mg/kg rather than the >50,000 mg/kg shown in the table. Table 2-4 will be revised accordingly,

   Sample results for the RFI (including SSP) did not confirm the presence of elevated lead levels in calcium sludge detected in the two samples collected from SWMU 35 in 1990. Lead samples results for 13 of 15 RFI samples of calcium sulfate sludge were below 400 mg/kg (17 to 290 mg/kg), with the remaining two sample results at 530 and 750 mg/kg, respectively. The mean concentration of lead detected in the RFI calcium sulfate samples was 198 mg/kg.

The risk assessments for each site evaluated the potential risk associated with current/future use of the sites as the drying beds are currently configured using surface soil data (SSP/RFI data from 0 to 1 ft bgs), which includes calcium sulfate sludge present in the drying beds. As discussed in Section 6.7 of the RFI Report, the results of the human health risk assessments for SWMUs 35, 37, and 38/Q did not indicate a requirement for future action for the site on the basis of human health; calculated site-related cancer risk and hazards were within USEPA target ranges for each of the receptors evaluated when considering background, target organs, and frequency of detection, and site-specific conditions.

Sections 4.1.2, 4.3.2, and 4.5.2 of the RFI Report present a detailed nature and extent assessment for each chemical of potential concern (COPC) at SWMUs 35, 37, and 38/Q including an assessment of COPC leaching to underlying soil and groundwater. As presented in these sections, evidence of appreciable leaching of COPCs from sludge to underlying subsurface soil or groundwater has not been observed at the sites. Figures 4-1, 4-2, 4-4, 4-5, 4-7, and 4-8 illustrate the vertical attenuation of concentrations from "A" level samples of sludge in the drying bed to "B" level samples of soil immediately below the sludge.

Sections 4.1.3, 4.3.3, 4.5.3, and 5.1.4 of the RFI Report present detailed soil-to-groundwater migration assessments for identified COPCs and concluded that appreciable leaching of COPCs from calcium sulfate sludge to subsurface soil or groundwater has not occurred at the site and is unlikely to occur in the future given the following:

- The results of RFI sampling indicated low concentrations of COPCs in calcium sulfate sludge, which are unlikely to represent a significant source for leaching to subsurface soil or groundwater. The neutral pH and higher organic content of the sludge will reduce the mobility and leachability of lead, chromium, and organic COPCs present in this material.
- Appreciable leaching of COPCs from sludge to underlying subsurface soil and groundwater has not been observed at the sites more than 55 years after waste management activities began and more than 25 years after waste management activities had ceased at the site;
- The limited organic COPCs detected in calcium sulfate sludge were not detected in groundwater samples collected at the sites;
- The primary inorganic COPCs detected in calcium sulfate sludge, lead and chromium, were not detected at dissolved concentrations above their adjusted risk-based screening levels.

The calcium sulfate sludge present in the drying beds is solid waste as defined in 40 CFR §261.2 but is not a listed hazardous waste or characteristic hazardous waste. Hazardous waste characteristics of the sludge were assessed by analyzing one composite sample of sludge from each drying bed for corrosivity (pH) and toxicity (full toxicity characteristic leaching procedure [TCLP] analysis).

Reactivity of the sludge was evaluated by analyzing discrete sludge samples for explosives content by SW-846 Methods 8330 and 8332; selected sludge samples were also analyzed for cyanide. Waste characterization results are presented in the attached table and summarized below:

- Sludge samples had pH levels in the range of 7.5 to 7.9 and therefore this material does not exhibit the characteristic of corrosivity as defined in 40 CFR §261.22;
- TCLP levels of sludge samples are below regulatory limits specified in 40 CRF § 261.24, and therefore this material does not exhibit the characteristic of toxicity;
- TCLP detections are limited to low levels of barium, silver, and chromium (one sample) at levels approximately three orders of magnitude below regulatory limits; and
- Explosives and cyanide are present in some of the sludge samples at low concentrations below human health risk-based screening levels and therefore this material does not exhibit the characteristic of reactivity as defined in 40 CFR §261.23.

Specific regulatory ramifications have not been identified for leaving the material in place given that the material is not a hazardous waste, does not contain hazardous constituents at levels that may pose a risk to human health or the environment, and does not represent a source area for future leaching to subsurface soil or groundwater at levels of concern.

2. There appear to be a few deviations from the work proposed in the *Final Work Plan Addendum 020 for RCRA Facility Investigation at Solid Waste Management Units 35, 37, 38, and Area of Concern Q (Work Plan Addendum 020)*, dated October 2007, that are not addressed in the RFI Report. The following deviations were noted:

    - Section 3.6.1.1, Inside Drying Bed Areas, and Section 3.6.1.2, Outside Drying Bed Areas, of Work Plan Addendum 020 indicate that target analyte list (TAL) metals plus cyanide were to be analyzed for at all of the SWMUs. It does not appear that samples were analyzed for cyanide, as results for this analyte could not be found in the RFI Report summary tables or in Appendix G, Analytical Data Evaluation. Please revise the RFI Report to indicate whether samples were analyzed for cyanide, and provide the results of these analyses. If cyanide was not analyzed for, revise the RFI Report to provide the justification for deviating from the Work Plan.

      Response: Upon further review, it appears that a sampling and analysis error occurred during execution of the RFI field program. The laboratory analysis for Target Analyte List (TAL) inorganics did not include cyanide.

Cyanide analysis was performed on 27 soil samples collected at SWMUs 37 and 38/Q for the SSP. Four of these samples were collected from calcium sulfate sludge contained in the drying beds. Cyanide was not identified as a COPC in soil or sludge with low concentrations detected (0.296 to 2.2 mg/kg) at levels 2 to 3 orders of magnitude below the adjusted risk-based screening levels. Based on representative results of sludge samples at these sites, cyanide is not considered a constituent of concern for these disposal areas and therefore, the lack of additional cyanide data for the RFI is not considered a significant data gap. Information on the nature of the change from work plan regarding cyanide analysis and analysis of associated uncertainties will be added to Section 3.4 of the RFI Report.

- Section 3.6.1.1, Inside Drying Bed Areas, of Work Plan Addendum 020 states that soil samples from inside SWMU 37 and SWMU 38 were to be analyzed for volatile organic compounds (VOCs) in addition to polychlorinated biphenyls (PCBs), pesticides, explosives, and metals including cyanide. Table 3-1, Field Sample Identifiers, Depths, and Analytical Methods, of the RFI Report indicates that soil samples collected from SWMU 37 were not analyzed for VOCs. Please revise the RFI Report to address this deviation from the Work Plan.

  Response: In accordance with the results of the SSP investigation and Table 4-4 from WPA 020, soil samples from inside SWMUs 37 and 38 were to be analyzed for metals, pesticides, PCBs, explosives including nitroglycerin/PETN. VOCs were not to be included in the analyses. The inclusion of VOCs in Section 3.6.1.1 was a text error.

- Table 4-4, Summary: Proposed Sample Identifiers, Depths, and Analytical Methods, of Work Plan Addendum 020 indicated that soil samples at SWMU 35 were to be analyzed for polynuclear aromatic hydrocarbons (PAHs) via SW-846 Method 8310. Table 3-1 of the RFI Report shows that soil samples at SWMU 35 were not analyzed for PAHs via SW-846 Method 8310. Please revise the RFI Report to address this deviation from the Work Plan.

  Response: Since the approval of the work plan, a method of SW-846 8270 to detect low level SVOCs (including PAHs) has been developed and is used for samples at the facility. This low-level SW-846 method has certain advantages over Method 8310 including more reliability in identifying target PAH compounds with comparable detection limits to Method 8310. Section 3.4 of the RFI Report will revised to discuss the change in analytical methods from the work plan and rationale for this change.

- Section 3.6.2.1, Monitoring Well Installation, of Work Plan Addendum 020 states that monitoring wells will be installed with a 15-foot long screen. Table 2-3, Monitoring Well and Groundwater Elevation Data, of the RFI Report shows that many of the wells have screens greater than 15 feet in length. Some wells have screens that are up to 25 feet in length (37MW1 and 38MW3). Please revise the RFI Report to address this deviation from the Work Plan. Additionally, please indicate at what depth(s) the pumps were placed during sampling.

  Response: Section 3.4 of the RFI Report will be revised include information regarding the installation of 5 to 10 foot longer well screens than proposed in the work plan. Given that the monitoring wells were installed during a period of a prolonged drought, additional screen length was installed above the water levels encountered during drilling to ensure that the top of the screen would be above seasonally high groundwater levels in the future.

  The standing water columns at the time of sampling in the RFI wells at SWMUs 35, 37, and 38/Q ranged from approximately 10 to 15 feet, with the exception of 38MW3, which had a standing water column of approximately 18 feet. Sampling pumps were placed at the mid point of the water column for low flow sampling. This addition information will be incorporated into the RFI Report.

3. The HHRA does not appear to have included all available data for SWMUs 35, 37, and SWMU 38/Area of Concern (AOC) Q in the risk evaluation. Section 2, Site Background, describes previous investigations in these three areas, including soil and groundwater sampling, dating back to the early 1990s. However, the HHRA presented in the RFI Report only evaluates soil data collected during the site screening process (SSP) investigation in 2003 and the RFI in 2007; and groundwater data collected during sampling events in February and June 2008. Please revise the HHRA to include all applicable data in the evaluation of risks in each area, and provide justification for excluding any data from sampling locations that have not been remediated.

   Response: Prior to the RFI, historical soil analytical data (1990 and 1992) were considered screening level data and excluded from the risk assessment given the age of the data, the use of non SW-846 analytical methods, the lack of available data validation reports/information, and the availability of sufficient newer validated RFI data to more appropriately characterize conditions at the site.

4. The selection of chemicals of potential concern (COPCs) in the HHRA was based on the comparison of maximum detected concentrations (MDCs) to the October 2007 EPA Region 3 Risk-Based Concentrations (RBCs) for soil and tap water. It should be noted, however, that Region 3 now relies on the Regional Screening Levels (RSLs), which are updated periodically to incorporate the most current

toxicity information and can be found online (www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm). The RSLs are maintained by Oak Ridge National Laboratory under an Interagency Agreement with EPA as an update of the EPA Region 3 RBC Table, Region 6 HHMSSL Table and the Region 9 PRG Table. The RSLs may substantially differ from the RBCs since they address dermal, oral, and inhalation exposure while the RBCs only address oral exposure. In addition, the RSLs no longer support route-to-route extrapolation. It is recommended that future evaluations incorporate the RSLs, which reflect the most current toxicity data. The impacts on the overall risk conclusions by using outdated screening levels should be discussed at a minimum in the uncertainty analysis.

In addition to being used in the COPC selection process, the EPA Region 3 RBC table was also the source for toxicity data evaluated in the HHRA. As a result, the HHRA has applied outdated toxicity data for some compounds. Please revise the HHRA to incorporate the latest screening values and toxicity data provided in the RSL tables.

Response: As discussed on the August 13, 2009, Army/USEPA/VDEQ/TechLaw conference call (Discussion Point #1): Per agreements reached in partnering meetings in June 2008 and October 2008, it was approved to utilize the October 2007 RBC table for HHRAs completed or substantially complete as of that time. The revised Regional Screening Table was not released to the public until September 2008. The results of the HHRAs for SWMU 45 and RAAP 10 (SWMUs 35, 37, 38, and AOC Q) were presented at the October 2008 meeting and will therefore utilize the April 2007 RBC table. During the October 2008 partnering meeting, it was also agreed that regardless of what toxicity data is used for the HHRA for a site, the new toxicity data would be used to calculate remedial goals. For URS the new regional screening levels will be used starting with the Study Area at SWMU 13 RFI Report in compliance with previous agreements. If an updated value changed significantly so that it would impact the conclusions for the site, an analysis of the effects of this change will be conducted. A discussion of the use of the October 2007 RBC values versus the 2008 RSLs will be added to the uncertainties section of the report.

5. The HHRA makes reference to the examination of target organs in the case of non-carcinogens that exceed the target hazard index (HI) of 1. However, the RFI report does not discuss the methodology for conducting a target organ analysis, and supporting documentation is not provided to justify the removal of non-carcinogenic chemicals from further investigation based on this approach. Please supplement the discussions of HHRA methodology with a description of the target organ analysis conducted for non-carcinogens (e.g., segregation of HIs by target organs) and refer the reader to the appropriate tables in Appendix E where the target organ analysis can be located.

Response: A discussion of the methodology for conducting a target organ analysis and associated tables is included in Section 6.4, page 6-11.

6. Cancer risk estimates derived in the HHRA were compared to "EPA's target risk range for Superfund sites of 1E-06 to 1E-04" (Section 6.4, Risk Characterization, Page 6-11) resulting in the conclusion that the HHRA "did not indicate a requirement for further action for [SWMUs 35, 37, and 38/AOC Q]" (Section 6.7, HHRA Conclusions). However, the regulatory target of 1E-06 – not the risk management range – should be used as the basis for any cumulative HHRA and removal action at the site. Estimated cancer risks less than 1E-06 are considered *de minimus*, and those that fall in the risk management range (i.e., 1E-06 and 1E-04) must be evaluated further on a case-by-case basis. Risks that fall within the range are not necessarily acceptable, as it is up to the risk manager to decide whether risks within the risk management range require remedial action based on site-specific reasons. As a result, the justification for a no further action recommendation for the three areas evaluated in the RFI Report should be revised using lines of evidence other than the upper bound of the risk management range.

   Response: As requested in the October 26, 2009 email from Will Geiger (USEPA) to Jim McKenna, this comment has been disregarded.

7. The HHRA does not discuss the use of surrogate chemicals for physico-chemical data based on chemical structure and characteristics in the case of detected chemicals for which no toxicity values are available. Please address the use of surrogate chemicals to ensure that potential impacts of all COPCs are considered in the evaluation of cumulative human health risks.

   Response: The use of provisional or surrogate chemical data for COPCs at the site is discussed in Section 6.6.4.

8. The HHRA indicates that a vapor intrusion evaluation was conducted for volatile organic chemicals in groundwater using the Johnson and Ettinger Model (JEM); however, there is no discussion of the methods and assumptions used to evaluate this pathway. For example, if no occupied buildings are present at the sites, a description of the assumptions used to evaluate this pathway should be provided. To promote clarity in the document please include a discussion of how the vapor intrusion pathway was evaluated and explain the assumptions used in the model.

   Response: A discussion of the Johnson and Ettinger Model is provided in Section 6.2.3. Assumptions used to evaluate this pathway are provided in Tables E.1-4.6, E.2-4.6, and E.3-4.6 and the model results are provided in Appendix E.4.

9. The "Frequently Ask Questions" section on the Region III Ecological Risk Assessment webpage states that "Where appropriate, updated values that may be available in subsequent releases of the EPA Ecological Soil Screening Levels, and the NOAA SQuiRT values should be used in place of the values cited in the 1995

Region 3 BTAG table" (http://www.epa.gov/reg3hscd/risk/eco/faqs/screenbench.htm). Please ensure that this statement has been accounted for when selecting plant and invertebrate Toxicity Reference Values (TRVs).

Response: As presented in the Radford SLERA framework (September 2007) per Ruth Prince, the following hierarchy will be used 1) Eco SSLs, 2) ORNL values, and 3) BTAG values in accordance with the associated table.

10. A review of the tables comparing Method Detection Limits (MDLs) of non-detect chemicals against screening values found that many chemicals were not selected as COPCs because they lacked screening values. This approach implicitly assumes that chemicals without a screening value are of no ecological concern. The *EPA 1997 Ecological Risk Assessment Guidance for Superfund* states that a contaminant should not be eliminated from the list of contaminants to be investigated only because toxicity information is lacking; instead, limited or missing toxicity information must be addressed using best professional judgment and discussed as an uncertainty. In light of this guidance, please discuss those chemicals lacking screening values in the uncertainty analysis.

    Response: The uncertainty related to the lack of toxicological data is presented in Section 7.5.4.

11. The Plant and Invertebrate/Microbial Screening tables for SWMU 35, 37, and 38/AOC Q were compared to Exposure Point Concentrations (EPCs) summary tables for each specific area. Several chemicals, such as arsenic, cadmium, iron, and selenium, lacked an EPC even though one had been calculated using ProUCL. Please revise these tables include all of the calculated EPC values.

    Response: As a refinement step, EPC HQs are only calculated for those chemicals for which the preliminary HQ (using the MDC) exceeds 1. Since the preliminary HQs for arsenic, cadmium, iron, and selenium are less than 1, a refined HQ utilizing the EPC is not calculated; therefore, the EPCs are not presented on the tables.

12. The Exposure Point Concentration Summary tables for SWMU 35, 37, and 38/AOC Q where compared against their respective SLERA Occurrence/Distribution tables. Ninety five percent (95%) UCLs were not calculated for several chemicals, such as barium, cobalt, and thallium, even though there was enough data (e.g., frequency of detection equal to 10/10). Please justify why no 95% UCLs were calculated for these chemicals.

    Response: 95% UCLs are only calculated for chemicals that have a preliminary HQ greater than 1 for at least one receptor; therefore, 95% UCLs were not calculated for barium, cobalt, and thallium.

SPECIFIC COMMENTS

13. Subsection 2.1.3 describes SWMU 35 as being situated at an elevation of approximately 1,699 to 1,701 feet above mean sea level, and being approximately 18 feet higher than the New River. Figure 2-5 describes the New River as having an elevation of 1690 feet above mean sea level. Please provide a correction to the Figure or the Subsection to rectify the differences illustrated. Please provide the elevation above mean sea level for all wells, including newly drilled wells and existing wells, used in the characterization of all SWMUs and AOCs in this RFI.

    Response: The New River has an elevation of 1680 ft above mean sea level at this location. The vertical scales of elevation of Figure 2-5 in feet mean sea level are labeled incorrectly. The correct scale for both vertical axes should start at 1660 ft and end at 1720 ft rather than the 1670 and 1730 ft shown on the figure. Figure 2-5 will be revised to show the correct scales and elevations. The text in Section 2.1.1 will be revised to reflect a 19 to 21 ft higher elevation for SWMU 35 than the New River. Elevations above mean sea level for all wells are provided in Table 2-3.

14. The New River is described as having an elevation of 1690' msl in Figure 2-5. Monitoring well 35MW2 is shown on Figure 2-6 with ground water elevation at 1685.56' msl. The ground water potentiometric surface depicted in Figure 2-5 is shown to be higher than the surface water in the New River. Explain whether these conditions are seasonal or permanent, and what they mean to the interpretation of ground water and surface water flow at these SWMU.

    Response: The vertical scales of elevation on Figure 2-5 in feet mean sea level are labeled incorrectly and therefore are inconsistent with Figure 2-6. The correct scale for both vertical axes should start at 1660 ft and end at 1720 ft rather than the 1670 ft and 1730 ft shown. Groundwater elevations in the area of SWMU 35 at 35MW1 and 35MW2 are higher than the surface water of the New River with groundwater flow toward the New River as shown on Figure 2-6. Figure 2-5 will be revised to show the correct scales and elevations.

15. If SWMU 35 ground water elevation data was collected on January 18, 2009 and shown on Figure 2-6 (dated May 2008), when was the ground water elevation data shown on Figure 2-5 (August 2008) collected? Why do neither of these figures contain the date of ground water collection? What was the elevation of the New River surface water pool at SWMU 35 on January 18, 2008?

    Response: The date on the figure in the date box is the date the figure was created not the date of the groundwater sampling event. The date (January 18, 2008) of the groundwater sampling will be added to Figures 2-5 and 2-6. Only one groundwater elevation data was collected at the site. As discussed in the response to Comments 13 and 14, the vertical scales of elevation are labeled

incorrectly on Figure 2-5 and will be revised to show the correct scales. The revised Figure 2-5 will show an river elevation of 1680 ft above mean sea level.

16. Table 6-1 provides the information regarding monitoring well locations with respect to ground water flow at each sample area. SWMU 35 has only two downgradient wells. SWMU 37 has only two downgradient wells. SWMU 38/AOC Q has no upgradient well and only two down gradient wells. Include monitoring well D-5 in the assessment of SWMU 35.

    Response: The approved work plan for the RFI for SWMU 35 included the installation and sampling of two new downgradient wells 35MW1 and 35MW2 immediately adjacent to and downgradient of SWMU 35 to appropriately evaluate potential releases to groundwater. Monitoring well D-5 was not sampled as part of the RFI at SWMU 35. Given the proximate location of 35MW1 and 35MW2 to SWMU 35 and lack of detectable site-related constituents in groundwater above adjusted risk-based screening levels, the inclusion of additional monitoring well in the RFI assessment at a location farther downgradient of the unit is not necessary.

17. Subsection 6.2.2.2 states that due to a ground water depth greater than 15 ft at SWMU 35, the construction worker is assessed only for the vapor pathway to account for potential vapors released to ambient air from groundwater beneath excavation trenches, but is not assessed for the ingestion or dermal contact pathways. Figure 2-5 is presented with both vertical and horizontal scales. Upon measuring these scales, ground water is encountered at less than 15 feet below the bottom of the calcium sulfate sludge. Figure 2-6 shows that ground water in the vicinity of SWMU 35 has a potentiometric contour of 1686.5 feet above msl which crosses the 1700 feet above msl ground surface elevation. Higher elevation potentiometric surface contours cross the same 1700 feet msl ground surface contours at fewer than 15 feet in Figure 2-6. Further, 35SB10 (Figure 2-5, Log of Boring) encountered the potentiometric surface of ground water at 16 feet below land surface, as did each boring: 35SB5, 35SB6, 35SB7 (15.5), 35SB8, and 35SB9). Furthermore, boring 35SB10 is depicted on Figure 2-5 to be terminated at the sand and gravel layer, over 2 feet below the ground water potentiometric surface as depicted on Figure 2-5. Also, please note on the boring log that 35SB10 was terminated at the sand and gravel (GM) layer.

    Response: The depth of 15 ft is the maximum depth for most utilities. Therefore, the depth of 15 ft would be from the ground surface in the area around the SWMU rather than the SWMU bottom.

18. Table 2-3 lists 35MW1 at a ground surface elevation of 1703.72 and Figure 2-5 shows the land surface elevation at 35MW1 to be over 1710 feet in elevation and ground water at about 1695', while Figure 2-6 shows ground water for 35MW1 at 1686.60'. Table 2-3 provides no sample information which coincides with the

August 2008 date on Figure 2-5. Please provide the August 2008 sampling information for all wells at SWMU 35, including D-5.

Response: Figure 2-5 will be revised. The August 2008 date on Figure 2-5 is the date the map was created rather than the date the groundwater elevations were taken. The January 18, 2008 date of the groundwater elevation data will be added to the title of the figure.

19. If the ground water data were collected on January 18, 2008 (subsection 2.1.7.1), why is the hydraulic gradient calculation dated January 29, 2008? What was the hydraulic gradient on January 18, 2008?

    Response: The table in Section 2.1.7.1 will be revised to reflect date the elevation data was collected (January 18, 2008).

20. Section 2.1.8.4 states that sample 35SL1 was tested for metals, however Table 2-4 indicates that metals were not tested.

    Response: Sample 35SL1 was sampled for TCLP metals not TAL metals. The TCLP metals results will be added to the table.

21. Figure 2-16 provides a potentiometric contour map for August 2008. However, the date box for this map states June 2008. Please clarify by including the date of data collection used in the making of this figure.

    Response: Date box is the date the map was created. This will be updated and the date of August 12, 2008 will be added to the title.

22. Figure 2-16 provides a ground water elevation for ground water well 38MW1 at 1681.50. The closest potentiometric contour line is at 1681.5, but does not go through the well point 38MW1. Please explain.

    Response: Figure 2-16 will be revised.

23. Table 2-3 presents 38MW1 at a ground surface elevation of 1709.40. Figure 2-14 shows the ground surface elevation for 38MW1 at over 1710 feet above msl. Please explain.

    Response: Figure 2-14 will be revised to show a ground surface elevation of 1709.4 ft at 38MW1.

24. Please install 3 hydrogeologically down gradient wells at SWMU 38/AOC Q. A table on page 3-3 of the draft RFI describes 3 wells as being either downgradient (2), or cross gradient (1) of SWMU 38/AOC Q. The potentiometric contour maps at Figure 2-15/2-16 shows no wells hydrogeologically downgradient of the ground surface foot print of SWMU 38/AOC Q.

Response: Further assessment of groundwater flow patterns in the SWMU 37 (November 10, 2009), SWMU 38, and AOC Q area has been conducted by obtaining one additional round of water level data from the six wells installed for the RFI (at SWMU 37/38/AOC Q) supplemented by 16 existing monitoring wells located at SWMU 9 (located between SWMU 37 and SWMU 38/AOC Q) and HWMU 7 (located adjacent to SWMU 37). This assessment confirms a north/northeasterly direction of groundwater flow across the SWMU 38/AOC Q area. Although monitoring wells are not installed directly north of this area, further assessment of groundwater at the site is not considered necessary based on the following:

- Limited calcium sulfate material is present in the drying beds at SWMU 38 (0 to 1 ft thick layer) and AOC Q (0.25 to 1 ft thick layer). This material is not a hazardous waste, does not contain hazardous constituents at levels that may pose a risk to human health or the environment, and does not represent a source area for future leaching to subsurface soil or groundwater at levels of concern;
- Risk assessment results for the site were within USEPA ranges of 1E-06 to 1E-04 for carcinogenic and 1E+00 or less for non-carcinogenic hazard when considering target organs and background; and
- Two of the three monitoring wells (38MW2and 38MW3) are installed immediately adjacent to the drying bed berms at SWMU 38 and AOC Q, and therefore, are considered appropriate locations to measure potential releases from the units due to their proximity.

25. Please install 3 hydrogeologically down gradient wells at SWMU 37. A table on page 3-3 of the draft RFI describes 3 wells as being either downgradient (2), or upgradient (1) of SWMU 37. The potentiometric contour map at Figure 2-16 shows no wells hydrogeologically downgradient of the ground surface foot print of SWMU 37.

Response: Further assessment of groundwater flow patterns in the SWMU 37 area has been conducted by obtaining one additional round of water level data from the six wells installed for the RFI (at SWMU 37/38/AOC Q) supplemented by 16 existing monitoring wells located at SWMU 9 (located between SWMU 37 and SWMU 38/AOC Q) and HWMU 7 (located adjacent to SWMU 37). This assessment shows an apparent groundwater flow divide extending across the central portion of SWMU 37 and into adjacent SWMU 9. On the western side of the divide, groundwater flows toward well 37MW3 in a northwesterly direction and on the eastern side of the divide groundwater flows toward the east-southeast. Based on this assessment, well 37MW3 is located downgradient of SWMU 37 and is appropriate for assessing releases from the unit. Well 37MW2 is also considered appropriate to evaluate potential releases from SWMU 37 due its location immediately adjacent to the drying bed. Based on the results of this additional groundwater flow assessment and results of the risk assessment, fate and transport assessment, and the characteristics of the calcium sulfate sludge, additional assessment of groundwater releases at SWMU 37 is not warranted.

26. Please provide the date of the information used in Figure 2-14, especially the potentiometric surface data. Information provided in Figure 2-16 and Figure 2-15 shows that ground water in 37MW3 is at a higher elevation that ground water in 37MW1 on two different dates. Please provide information on the ground water divide in this area.

    Response: Potentiometric surface data from January 19, 2008 were used to prepare cross-section Figures 2-14 (across SWMU 38/AOC Q area) and 2-15 (across SWMU 37 area). Potentiometric representations on these figures are consistent with those shown on Figures 2-15 and 2-16. As discussed in the response to Comment 25, an additional assessment of groundwater flow has been conducted in the SWMU 37 (November 10, 2009) by obtaining one additional round of water level data from the six monitoring wells installed for the RFI (SWMU 37/38/AOC Q) supplemented by 16 existing monitoring wells located at SWMU 9 (located between SWMU 37 and SWMU 38/AOC Q) and HWMU 7 (located adjacent to SWMU 37). This assessment shows an apparent groundwater flow divide extending across the central portion of SWMU 37 and into adjacent SWMU 9. On the western side of the divide, groundwater flows toward well 37MW3 in a northwesterly direction and on the eastern side of the divide groundwater flows toward the east-southeast. The RFI Report will be revised to include a revised assessment of groundwater flow based on these measurements along with a potentiometric map showing the interpreted groundwater flow patterns.

27. Figure 2-13 illustrates the ground water elevation and potentiometric contour elevation in the vicinity of 37MW3 and 37MW1. Figure 2-15 and Figure 2-16 each indicate that ground water in 37MW3 is at a higher elevation than 37MW1. Please check these wells for an upward flow component of ground water. Please do the same for 38MW3 and 38MW1. Check to see if any of the wells screened in the bedrock are being overly influenced by the hydraulic heads in this formation, rather than formations above the bedrock. Consider installing nested wells.

    Response: An additional assessment of groundwater flow (November 10, 2009), has been conducted for the SWMU 37, SWMU 38, and AOC Q using 22 monitoring wells as described in the response to Comments 25 and 26. Each of these wells is similarly constructed to monitor the uppermost zone of groundwater across the bedrock interface where hydraulic head levels are slightly above or below the bedrock surface. Hydraulic head measurements in these wells show a radial component of flow in the area of SWMU 37, SWMU 9, and HWMU 7. These flow patterns may be attributable to local conditions related to topography, drainage features, the presence of former lagoon areas (including the inactive lagoons at SWMU 9 that are partially full of water), and the site's proximity to the New River at a location of an inside bend of the river. Based on the results of this additional groundwater flow assessment, construction of the monitoring wells to

monitor the uppermost zone of groundwater, and results of the risk assessment, fate and transport assessment, and the characteristics of the calcium sulfate sludge, additional assessment of groundwater releases at SWMU 37, SWMU 38, and AOC Q is not warranted.

28. **Section 2.2.8.1, Verification Investigation – Dames and Moore 1992, Page 2-11:** This section indicates that waste characterization samples from SWMU 37, SWMU 38, and AOC Q were analyzed for VOCs, semi-volatile organic compounds (SVOCs), and toxicity characteristic leaching procedure (TCLP) metals. Table 2-6, Summary of Analytical Data for Sediment/Sludge Samples, provides the results of these analyses, but does not appear to include the TCLP metals results. Please revise the RFI Report to include the TCLP metals results of the sludge at SWMU 37, SWMU 38, and AOC Q, as these data will help classify the waste materials present in the sludge.

    Response: Historic TCLP results for SWMUs 35, 37, 38, and AOC Q will be provided. In addition, RFI TCLP results will be provided in Appendix C.6.

29. **Section 2.2.8.3, Site Screening Process Investigation – URS 2007a, Pages 2-11 to 2-12:** According to this section, a human health risk screening evaluation was conducted as part of a previous site screening process (SSP) investigation. However, although the previous screening evaluation was based on comparing MDCs with RBCs (i.e., the same approach used in the HHRA presented in the RFI Report), the two evaluations identified a few different COPCs. Specifically, the risk screening in the SSP investigation identified volatile organic compounds (VOCs), 2,4-dinitrotoluene (2,4-DNT), and metals as soil COPCs at SWMU 37; but the HHRA in the RFI Report identified metals and polychlorinated biphenyls (PCBs) as COPCs in soil. Given that the same risk screening approach was used, further explanation should be provided for the discrepancy between the COPCs identified in the two evaluations (e.g., updates in RBCs, changes in HHRA data set, etc.).

    Response: The following text will be added to Section 2.2.8.3 "Note that the COPCs identified in the SSP investigation may differ from the COPCs identified in the RFI based on updated RBC screening levels and additional soil data collected during the RFI used in the screening."

30. **Section 3.1.1, Soil Borings and Soil Sampling, Page 3-3:** The first paragraph on Page 3-3 states that "Soil samples were collected from each boring from the following depth intervals: (1) surface, (2) immediately below sludge (if present) or intermediate depth, and (3) terminal depth at specified depth." Based on the information provided in Table 3-1, Field Sample Identifiers, Depths, and Analytical Methods, the three samples per boring approach described above was not consistently applied at all of the SWMUs and AOC. One sample per boring was collected in some locations. *Work Plan Addendum 020* proposed to collect only surface soils at some locations, and this appears to be the approach that was

carried out during the RFI sampling. For clarity, please revise the statement on Page 3-3 of Section 3.1.1 to state that surface soil samples were collected from each boring, and additional subsurface soil samples (immediately below sludge or at an intermediate depth and at a terminal depth) were collected at some locations. Additionally, please describe the rationale for selection of the terminal sample depth at each of the SWMUs and AOC.

Response: In Section 3.1.1, the text will be revised as follows: "RFI soil samples were collected from each boring within the drying beds from the following depth intervals: (1) surface, (2) immediately below sludge (if present) or intermediate depth, and (3) terminal depth at specified depth. A surface soil sample was collected from the boring located outside the drying beds. As stated in WPA 020 (URS 2007), the terminal depths of the RFI borings within the drying beds of 8 ft below grade was established since additional delineation of impacted soil is not required below this depth given that concentrations of metals detected in subsurface soil samples collected from inside the drying beds are below background point estimates and the vertical organic constituent concentrations has been appropriately characterized in the SSP. In addition, the depth of the drying bed areas is 4 to 8 ft below the outside grade and therefore, samples collected from depths of 8 ft or less will provide data from the same soil strata for sample collected inside and outside of the SWMUs."

31. **Section 3.1.2, Monitoring Well Installation and Groundwater Sampling, Page 3-3:** The table included in Section 3.1.2 indicates that the groundwater sampling event at the sites was conducted in February 2008. According to Table 4-11, Summary of Detected Chemicals in Groundwater Analytical Samples at SWMU 38 and AOC Q, an additional sampling event occurred on June 24, 2008. Monitoring well 38MW3 was sampled for total and dissolved manganese on this date. The text portion of the RFI Report should describe the sampling event on June 24, 2008 and indicate why this sampling event was conducted, as it was not planned in Work Plan Addendum 020.

Response: An additional table will be added to Section 3.1.2 for the June 2008 groundwater sampling event. Section 3.1.2 text will be revised as follows: "In December 2007, monitoring wells 35MW1 and 35MW2 were installed at SWMU 35 (Figure 3-1), monitoring wells 37MW1, 37MW2, and 37MW3 were installed at SWMU 37 (Figure 3-2), and monitoring wells 38MW1, 38MW2, and 38MW3 were installed at SWMU 38/AOC Q (Figure 3-3) to evaluate potential releases to groundwater. A groundwater sampling event was completed at the sites in February 2008. Based in the results of the initial groundwater sampling event, additional confirmation groundwater sampling was conducted in June 2008 for pesticides at monitoring well 37MW2 and for manganese at 38MW3. The groundwater sampling analytical parameters are summarized below and in Table 3-1. Monitoring well construction data are summarized in Table 2-3."

32. **Section 3.4, Work Plan Field Changes, Page 3-7:** This section documents changes from the Work Plan that were initiated in the field (i.e., offsetting the locations of monitoring wells 38MW1 and 38MW2), but the RFI Report does not address any implications of these changes, or whether initial objectives of monitoring groundwater at the specified locations have been met. This section also indicates that fifteen additional stratigraphic soil borings were completed east of SWMU 38 to delineate the lateral and vertical extent of sludge in this area. The RFI Report does not appear to include any boring logs or other documentation of these borings in Appendix C nor do the additional borings appear to have specific IDs as none are shown on Figure 3-3, Sample Locations. It is also unclear whether these boring locations were surveyed. Please revise the RFI Report to describe any implications of the work plan field changes described in Section 3.4. Also, revise the RFI Report to include documentation of the fifteen additional borings that were completed east of SWMU 38, including boring logs, boring IDs, and surveyed coordinates, if available. If documentation is unavailable, indicate why this information was not collected.

    Response: The monitoring well offsets did not have a significant effect on the planned assessment of groundwater conditions at SWMU 38/AOC Q because the offset locations were in the same relative position to the drying beds as originally proposed. Monitoring well 38MW2 was offset south of its planned location but at a similar position adjacent to and west of the drying bed and therefore, the location offset did not change the planned assessment of groundwater quality adjacent to the drying bed in the direction of the New River. Monitoring well 38MW1 was offset west of its planned location but remained still more than 140 feet east of the drying bed in a direction away from the New River. Section 3.4 will be revised to include this additional information.

    The soil sampling and analysis table for SWMU 38 in Section 3.1.1 identifies the stratigraphic soil borings as 38SC1 through 38SC15. These borings were completed to shallow depths and therefore boring logs were not prepared. Boring information (including depth and survey coordinates) will be added to Table 2-2 and boring IDs will be added to Figure 3-3.

33. **Section 4.1.2.5, PCBs, Page 4-4:** Aroclor 1254 was detected at concentrations above its adjusted residential risk based screening criterion (R-RBC) in 8 of 22 soil samples. Based on the locations of these exceedances as shown on Figure 4-1, Extent of Human Health COPCs – Soil, it appears that the lateral extent of this contamination has not been delineated to the south and east of SWMU 35. The surface samples collected outside of the drying bed area to the south (35SB2) and east (35SB3) both reported exceedances of the R-RBC. Please revise the RFI Report to address this data gap.

    Response: PCBs are not identified as a risk or hazard driver in the HHRA. Based on the small size of the site and the number of samples collected no additional characterization is necessary.

34. **Section 4.3.2.6, VOCs, Page 4-9:** Trichloroethylene (TCE) was detected in soil at SWMU 37 above its soil screening level (SSL) for migration to groundwater, based on a dilution attenuation factor (DAF) of 20. This section also notes that "groundwater sample results did not indicate leaching of TCE from soil to groundwater at detectable levels." However, it does not appear that a groundwater sample was collected at a location downgradient from the SSL exceedances at boring location 37SB2. Figure 2-15, Potentiometric Contour Map for January 2008, shows the groundwater flow direction at SWMU 37 is to the northeast. No groundwater monitoring wells are located directly northeast of SWMU 37 to monitor groundwater downgradient of the site. Please revise the RFI Report to address this data gap. Additionally, groundwater monitoring northeast of SWMU 37 may be necessary (see comment 25).

    Response: As discussed in the response to Comment 25, further assessment of groundwater flow patterns in the SWMU 37 (November 10, 2009) area has been conducted by obtaining one additional round of water level data from the six wells installed for the RFI (at SWMU 37/38/AOC Q) supplemented by 16 existing monitoring wells located at SWMU 9 (located between SWMU 37 and SWMU 38/AOC Q) and HWMU 7 (located adjacent to SWMU 37). This assessment shows that well 37MW3 is appropriately positioned at a downgradient location of the drying bed in the flow path of groundwater originating from the general area of boring 37SB2 in the central portion of the drying bed. The RFI Report will be revised to include this additional information.

    Based on the results of this additional groundwater flow assessment and results of the risk assessment, fate and transport assessment, and the characteristics of the calcium sulfate sludge, additional assessment of groundwater releases at SWMU 37 is not warranted.

35. **Table 4-12, Summary of Risk Screening Results for Groundwater at SWMU 38 and AOC Q:** Table 4-12 identifies the maximum detected concentrations of dissolved manganese and total manganese in groundwater as 1,050 micrograms per liter (ug/l) and 990 ug/l, respectively. Table 4-11, Summary of Detected Chemicals in Groundwater Analytical Samples at SWMU 38 and AOC Q, shows the maximum detected concentrations of dissolved and total manganese as 2,400 ug/l and 2,600 ug/l, respectively, as identified in well 38MW3 during the February 2008 sampling event. Please revise the RFI Report to address this discrepancy. The maximum detected concentrations for total and dissolved manganese as shown on Table 4-11 should be used in any evaluations of risk unless additional justification is provided.

    Response: As discussed on the August 13, 2009, Army/USEPA/VDEQ/TechLaw conference call (Discussion Point #1): Betty Ann Quinn stated that she wanted to see both sets of analytical data, but that typically, only the dissolved metals concentrations needed to be carried through in

the risk assessment. She also added that, if it appeared that there was something unusual about the results, the total metals may be more representative of aquifer conditions. The detected concentrations of total and dissolved manganese do not indicate any unusual conditions at the site.

36. **Section 5.0, Contaminant Fate and Transport, Page 5-1:** This section presents a table that summarizes the COPCs identified at "the site". However, the chemicals listed are not COPCs in all three areas (i.e., SWMUs 35, 37, and 38/AOC Q). Furthermore, the difference between the chemicals listed under the column headings "Soil – Human Health" and "Soil SSL DAF20" in the table is unclear. Please revise the table to identify the specific COPCs associated with each area; and add as a footnote or incorporate into the text an explanation of the columns in the table.

    Response: The summary table in Section 5.0 will be revised.

37. **Section 5.3, Fate and Transport Summary:** Further investigation of the source of the pesticides in groundwater at SWMU 37 may be warranted.

    Response: The pesticide detections in groundwater were not considered site related since the pesticides detected in groundwater were not detected in soil at the site and the detections from the two rounds of sampling were low level and not consistently above screening levels. Detections were not above available MCLs. Thus the available data does not suggest a source exists that requires further investigation.

38. **Section 6.1.1.1, Surface Soil and Total Soil, Page 6-2:** This section indicates that soil samples collected during the SSP investigation in 2003 and for the RFI in 2007 were evaluated in the HHRA. However, as stated in the General Comments above, other previous investigations at SWMUs 35, 37, and 38/AOC Q included soil sample collection. Please revise the HHRA to include all soil data collected previously for soils that have not been removed; or provide justification for not considering these data in the HHRA. This information should be included in the data evaluation section of the HHRA which describes what data were deemed useable for risk analysis as well as data that were excluded and the reasons for excluding the data (e.g., data did not meet data quality objectives for use in HHRA, etc.).

    Response: See response to Comment #1.

39. **Section 6.1.1.2, Groundwater, Page 6-2:** This section states that groundwater data from only the February and June 2008 sampling events were evaluated in the HHRA. However, according to Section 2, Site Background, groundwater samples were also collected during other investigations, some dating back to the early 1990s. Please revise the risk assessment to include other relevant groundwater data, or provide rationale for not including them in the risk evaluation.

Furthermore, this section makes reference to the use of "dissolved metals data". Please ensure that only data from unfiltered groundwater samples are used in the HHRA.

Response: See response to Comments #1 and #35.

40. **Section 6.1.2, Identification of COPCs, Pages 6-2 to 6-4:** The COPCs summarized in tables in this section include notes that identify chemicals that were "not carried through the HHRA due to low frequency of detection". However, the definition of "low frequency of detection" is not provided, and potential deviations to this decision rule are not fully explained. For example, nitroglycerin, which was detected at SWMU 35 at a "low" frequency of detection (i.e., 1 of 10 in surface soil, and 1 of 22 in total soil samples), was retained as a COPC because the single detected concentration was above the industrial screening levels. It is not clear whether other chemicals that were removed as COPCs due to "low frequency of detection" have been compared to RBCs. Please define "low frequency of detection" and clarify this decision rule.

    Furthermore, several chemicals were identified as occurring at a "low frequency of detection" and also flagged as having no screening value available. The fate of these chemicals in the HHRA is unclear. For example, dimethylphthalate at SWMU 35; methylcyclohexane, di-n-octylphthalate and dimethylphthalate at SWMU 37; and cyclohexane and methylcyclohexane at SWMU 38/AOC Q were classified as occurring at a "low frequency of detection" as well as having no screening value available. Please clarify the steps involved in removing chemicals from further evaluation as COPCs. For conservativeness, those chemicals for which no screening criteria are available should be retained and evaluated – either quantitatively with the use of surrogates or qualitatively based on their known chemical properties. Finally, low frequency is not a line of evidence that can be used to eliminate chemicals unless a spatial analysis is conducted to determine if a single detection or low frequency of detection is in an area where a release may have occurred. It should be noted that the *Risk Assessment Guidance for Superfund* (RAGS) Part A provides guidance on the use of frequency and recommends a 5 percent frequency of detection as a limit, as long as there are at least 20 samples. Thus, a frequency of 1 of 6 for methylcyclohexane, di-n-octylphthalate and dimethylphthalate at SWMU 37 is not considered low frequency since the frequency is almost 17 percent. Please address this concern.

    Response: Per Ruth Prince's e-mail on 8/22/2007, if you only have 1/10 or 2/100 detections, even if that detection exceeds a screening level, the majority of your dataset does not. Risk assessors often rule out COCs by FOD (frequency of detection, usually at a cut-off of 5%), and so do not bring these chemicals through any further risk assessment. The ProUCL approach in version 4.0 essentially does the same thing, because your EPC winds up being a nondetect value, reflecting the nature of your data distribution. There would be no sense carrying that

nondetect into further risk assessment. The only caveat I would have is if the single or few detections are really high concentrations that do not appear to be fully characterized - i.e., a hotspot needing further characterization.

Of the chemical that were detected at a low frequency of detections, nitroglycerin at SWMU 35 was retained within the risk assessment due to a value greater than the industrial screening level; therefore potentially indicating a hot spot. No chemicals other than those listed in the tables were excluded from the HHRA.

41. **Section 6.2.3, Calculation of EPCs, Page 6-7:** The second paragraph in this section indicates that EPA's ProUCL 4.0 software, released in 2007, was used to calculate the 95 percent upper confidence limit on the mean (95 percent UCL) concentrations for detected chemicals. However, it should be noted that a more recent version of the ProUCL software, Version 4.00.04, was released in February 2009. Please use the latest version of ProUCL, available online at www.epa.gov/nerlesd1/tsc/software.htm, to ensure that the latest developments in UCL calculation methodology are incorporated. This comment also applies to the use of ProUCL 4.0 for distribution testing and comparison of site data to background concentrations (Section 6.4.3, Background, Page 6-15).

    Response: This report was prepared prior to the release of ProUCL Version 4.00.04; therefore, the report will not be revised.

42. **Section 6.3, Toxicity Assessment, Page 6-8:** This section states that the EPA Region 3 RBC table was the source of chronic toxicity criteria used to quantify non-carcinogenic hazards and carcinogenic risks in the HHRA. However, as indicated in the General Comments above, the use of toxicity data presented on the RBC table instead of the more recent RSL table has resulted in the use of outdated toxicity data for some compounds. Please revise the HHRA to incorporate the latest toxicity data provided in the RSL table.

    Response: See response to Comment #4.

43. **Section 6.3.1.1, Cancer Slope Factors, Page 6-9; and Section 6.3.1.2, Reference Doses and Reference Concentrations, Pages 6-9 to 6-10:** These two sections describe the derivation of toxicity criteria for carcinogens based on cancer slope factors (CSFs), and non-carcinogens based on reference doses (RfDs), and reference concentrations (RfCs). It should be noted, however, that for risk evaluations of inhalation exposure, EPA guidance recommends that unit risk factors (URFs; for carcinogens) and RfCs (for non-carcinogens) be used instead of CSFs and RfDs. Specifically, EPA's final RAGS Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), issued in January 2009, indicates that inhalation CSFs and RfDs should not be used to evaluate inhalation risks because studies have shown that inhalation toxicity is not a function of inhalation rate or body weight. Please revise the HHRA to incorporate this approach.

Response: This HHRA was completed prior to the release of the inhalation guidance. Per previous agreements, URS will begin to use the new guidance with the SWMU 13 RFI.

44. **Section 6.5, HHRA Summary, Pages 6-16 to 6-19:** This section summarizes the risk results for each of the three areas evaluated in the RFI, based on EPA's target risk range of 1E-06 to 1E-04. However, as indicated in the General Comments above, the regulatory target of 1E-06 – not the risk management range – should be used as the basis for cumulative HHRAs. Risks that fall within the range are not necessarily acceptable. Please revise the summary and conclusions to indicate exposure scenarios and chemicals associated with risk estimates that exceed the 1E-06 *de minimus* target.

    Response: See response to Comment #6.

45. **Section 7.1.1.1, Ecological Site Characterization, Page 7-2.** The text states that a Virginia Department of Game and Inland Fisheries survey identified two rare plant species (i.e., Midland Sedge and Shaggy False Gromwell) associated with grassland communities at RFAAP. Please specify if the plant communities at the targeted SWMUs and AOC Q have been evaluated for the presence of these two species.

    Response: The following text will be added to Section 7.1.1.1: "No threatened wildlife species or rare plant species were identified at the site."

46. **Section 7.2.1.3, Terrestrial Wildlife, Page 7-8:** The table in this section summarizes the chemicals which either have only NOAEL HQs above 1 or NOAEL and LOAEL HQs above 1 per receptor. A few errors were identified when the table was compared to Tables F.2-14 through F.2-22. For example, cadmium, chromium, and zinc are listed as only having NOAEL HQs above 1 for the meadow vole. However, Table F.2-4 shows that HXM and nitroglycerin also have NOAEL HQs above 1. Please review this table to ensure all of the appropriate chemicals are listed.

    Response: Will review and revise summary table.

47. **Section 7.2.3, Risk Management – Scientific Management Decision Point (SMDP), Italicized Conclusion. Page 7-9:** The SMDP states that "Although metal concentrations in plants were above the screening levels, vegetation at the site is lush and diverse and indicators of chemical vegetative stress were not observed with the exception of limited gravel areas." Simply stating that the area appears lush and diverse is insufficient grounds to conclude a lack of risk. For example, it is not known if the local plant community shows a response in terms of lower species diversity, reduced growth, or other more subtle responses that might be observable when compared to an unimpacted reference location. Please

discuss in the uncertainty section the limitations of the current conclusions on the lack of risk to the plant community. This additional information will help support risk management decision making.

Response: The following text will be added to Section 7.5.3: "The qualitative nature of the conclusion of lack of risk to the plant community based on the lack of indicator of chemical vegetative stress and lush vegetation present at the site creates uncertainty since it is not known that if the local plant community shows a response in terms of lower species diversity, reduced growth, or other more subtle responses that might be observable when compared to an unimpacted reference location."

48. **Section 7.4.1.3, Terrestrial Wildlife, Page 7-12:** The table in this section summarizes the chemicals which either had only NOAEL HQs above 1 or NOAEL and LOAEL HQs above 1 per receptor. One error was identified when the table was compared to the Tables F.4-14 through F.4-22. The list of chemicals for the American Robin did not include 2, 4-Dinitroluene, which had a NOAEL above 1.0. Please revise this table accordingly.

    Response: Will review and revise summary table.

49. **Section 7.5, Exposure and risk uncertainty analysis, Page 7-13 and 7-14:** This section should be expanded to address issues associated with (a) the potential for additive toxic effects of exposure by wildlife receptors to site-related chemicals, (b) the qualitative nature of the evaluation of risk to the plant community, (c) the effect on risk conclusions of high detection limits for PCBs in several soil samples from SWMU 35 (see Table F.2-3b), and (d) any concerns associated with listed plant species.

    Response: For part (a): The following text will be added to Section 7.5.6: "An HQ of less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects. The potential for risk increases as the HQ increases above one. However, this result should be considered in the context of other characteristic of the exposure area. In addition, it should be noted that the calculation of chemical specific HQs does not account for multiple chemicals acting through the same exposure mechanism."

    For part (b): See Comment #47.

    For part (c): The following text will be added to Section 7.5.1: "Elevated reporting limits for chemicals, such as PAHs at SWMU 35, could result in an underestimation of risk at the site due to potentially failing to identify a COPEC.

    For part (d): See Comment #45.

50. **Table F.2-24 (Wildlife Summary) and Table F.4-24 (Wildlife Summary):** The SLERA Wildlife Summary tables for SWMU 35 and SWMU 38/AOC Q are missing from Appendices F.2 and F.4, respectively. Please review these appendices and update accordingly.

    Response: Noted.

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10/02/09 02:01 PM

To "McKenna, Jim J Mr CIV USA AMC" <jim.mckenna@us.army.mil>
cc "jim spencer" <james_o_spencer@urscorp.com>, "Parks, Jeffrey N" <Jeffrey.Parks@shawgrp.com>, jerome.redder@atk.com, "McKenna, Jim J Mr CIV USA
bcc
Subject SWMUs 35, 37, 38, AOC Q RFI Comments

History: This message has been forwarded.

Attached are EPA/VDEQ comments on the SWMUs 35, 37, 38, and AOC Q draft RFI submitted in July 2009. Please call or email me with any questions.

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Comments SWMU 35 etc.doc

Presented below are review comments on the *Draft Solid Waste Management Units 35, 37, 38, and Area of Concern Q (RAAP-10) RCRA Facility Investigation Report* for the Radford Army Ammunition Plant (RFAAP) located in Radford, Virginia, dated July 2009 (RFI Report).

GENERAL COMMENTS

1. The RFI Report concludes that, on the basis of the human health risk assessment (HHRA) and ecological risk assessment results, no further action is recommended for the sites. However, calcium sulfate sludge is present at the sites. Although soil and groundwater media are not currently impacted by the sludge at unacceptable levels, the constituents in the sludge itself do not appear to have been evaluated in the risk assessments. Table 2-4, Summary of Historical Analytical Data for Sediment/Soil Samples Collected at SWMU [Solid Waste Management Unit] 35, show that lead concentrations in two sludge samples collected from SWMU 35 exceeded 50,000 milligrams per kilogram (mg/kg), well above the residential and industrial action levels (400 mg/kg and 750 mg/kg, respectively). Arsenic, chromium, mercury, nickel, silver, dinitrotoluene mixture, and phenanthrene also exceeded applicable screening criteria in sludge samples 35SE1 and 35SE2, but it does not appear that these samples were considered in the evaluation of risk. Please revise the RFI to provide further justification that the calcium sulfate sludge at the sites, and specifically at SWMU 35, will not present an unacceptable level of risk to receptors. The RFI Report should clearly substantiate that an ongoing release to groundwater from the sludge itself is not possible, in consideration of the high levels of lead and other constituents detected in historical sludge samples. Also, what is the status of the remaining sludge as a waste? Are there any regulatory ramifications with leaving it in place?

2. There appear to be a few deviations from the work proposed in the *Final Work Plan Addendum 020 for RCRA Facility Investigation at Solid Waste Management Units 35, 37, 38, and Area of Concern Q (Work Plan Addendum 020),* dated October 2007, that are not addressed in the RFI Report. The following deviations were noted:

    - Section 3.6.1.1, Inside Drying Bed Areas, and Section 3.6.1.2, Outside Drying Bed Areas, of Work Plan Addendum 020 indicate that target analyte list (TAL) metals plus cyanide were to be analyzed for at all of the SWMUs. It does not appear that samples were analyzed for cyanide, as results for this analyte could not be found in the RFI Report summary tables or in Appendix G, Analytical Data Evaluation. Please revise the RFI Report to indicate whether samples were analyzed for cyanide, and provide the results of these analyses. If cyanide was not analyzed for, revise the RFI Report to provide the justification for deviating from the Work Plan.

- Section 3.6.1.1, Inside Drying Bed Areas, of Work Plan Addendum 020 states that soil samples from inside SWMU 37 and SWMU 38 were to be analyzed for volatile organic compounds (VOCs) in addition to polychlorinated biphenyls (PCBs), pesticides, explosives, and metals including cyanide. Table 3-1, Field Sample Identifiers, Depths, and Analytical Methods, of the RFI Report indicates that soil samples collected from SWMU 37 were not analyzed for VOCs. Please revise the RFI Report to address this deviation from the Work Plan.

- Table 4-4, Summary: Proposed Sample Identifiers, Depths, and Analytical Methods, of Work Plan Addendum 020 indicated that soil samples at SWMU 35 were to be analyzed for polynuclear aromatic hydrocarbons (PAHs) via SW-846 Method 8310. Table 3-1 of the RFI Report shows that soil samples at SWMU 35 were not analyzed for PAHs via SW-846 Method 8310. Please revise the RFI Report to address this deviation from the Work Plan.

- Section 3.6.2.1, Monitoring Well Installation, of Work Plan Addendum 020 states that monitoring wells will be installed with a 15-foot long screen. Table 2-3, Monitoring Well and Groundwater Elevation Data, of the RFI Report shows that many of the wells have screens greater than 15 feet in length. Some wells have screens that are up to 25 feet in length (37MW1 and 38MW3). Please revise the RFI Report to address this deviation from the Work Plan. Additionally, please indicate at what depth(s) the pumps were placed during sampling.

3. The HHRA does not appear to have included all available data for SWMUs 35, 37, and SWMU 38/Area of Concern (AOC) Q in the risk evaluation. Section 2, Site Background, describes previous investigations in these three areas, including soil and groundwater sampling, dating back to the early 1990s. However, the HHRA presented in the RFI Report only evaluates soil data collected during the site screening process (SSP) investigation in 2003 and the RFI in 2007; and groundwater data collected during sampling events in February and June 2008. Please revise the HHRA to include all applicable data in the evaluation of risks in each area, and provide justification for excluding any data from sampling locations that have not been remediated.

4. The selection of chemicals of potential concern (COPCs) in the HHRA was based on the comparison of maximum detected concentrations (MDCs) to the October 2007 EPA Region 3 Risk-Based Concentrations (RBCs) for soil and tap water. It should be noted, however, that Region 3 now relies on the Regional Screening Levels (RSLs), which are updated periodically to incorporate the most current toxicity information and can be found online (www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm). The RSLs are maintained by Oak Ridge National Laboratory under an Interagency Agreement with EPA as an update of the EPA Region 3 RBC Table, Region 6

HHMSSL Table and the Region 9 PRG Table. The RSLs may substantially differ from the RBCs since they address dermal, oral, and inhalation exposure while the RBCs only address oral exposure. In addition, the RSLs no longer support route-to-route extrapolation. It is recommended that future evaluations incorporate the RSLs, which reflect the most current toxicity data. The impacts on the overall risk conclusions by using outdated screening levels should be discussed at a minimum in the uncertainty analysis.

In addition to being used in the COPC selection process, the EPA Region 3 RBC table was also the source for toxicity data evaluated in the HHRA. As a result, the HHRA has applied outdated toxicity data for some compounds. Please revise the HHRA to incorporate the latest screening values and toxicity data provided in the RSL tables.

5. The HHRA makes reference to the examination of target organs in the case of non-carcinogens that exceed the target hazard index (HI) of 1. However, the RFI report does not discuss the methodology for conducting a target organ analysis, and supporting documentation is not provided to justify the removal of non-carcinogenic chemicals from further investigation based on this approach. Please supplement the discussions of HHRA methodology with a description of the target organ analysis conducted for non-carcinogens (e.g., segregation of HIs by target organs) and refer the reader to the appropriate tables in Appendix E where the target organ analysis can be located.

6. Cancer risk estimates derived in the HHRA were compared to "EPA's target risk range for Superfund sites of 1E-06 to 1E-04" (Section 6.4, Risk Characterization, Page 6-11) resulting in the conclusion that the HHRA "did not indicate a requirement for further action for [SWMUs 35, 37, and 38/AOC Q]" (Section 6.7, HHRA Conclusions). However, the regulatory target of 1E-06 – not the risk management range – should be used as the basis for any cumulative HHRA and removal action at the site. Estimated cancer risks less than 1E-06 are considered *de minimus*, and those that fall in the risk management range (i.e., 1E-06 and 1E-04) must be evaluated further on a case-by-case basis. Risks that fall within the range are not necessarily acceptable, as it is up to the risk manager to decide whether risks within the risk management range require remedial action based on site-specific reasons. As a result, the justification for a no further action recommendation for the three areas evaluated in the RFI Report should be revised using lines of evidence other than the upper bound of the risk management range.

7. The HHRA does not discuss the use of surrogate chemicals for physico-chemical data based on chemical structure and characteristics in the case of detected chemicals for which no toxicity values are available. Please address the use of surrogate chemicals to ensure that potential impacts of all COPCs are considered in the evaluation of cumulative human health risks.

8. The HHRA indicates that a vapor intrusion evaluation was conducted for volatile organic chemicals in groundwater using the Johnson and Ettinger Model (JEM);

however, there is no discussion of the methods and assumptions used to evaluate this pathway. For example, if no occupied buildings are present at the sites, a description of the assumptions used to evaluate this pathway should be provided. To promote clarity in the document please include a discussion of how the vapor intrusion pathway was evaluated and explain the assumptions used in the model.

9. The "Frequently Ask Questions" section on the Region III Ecological Risk Assessment webpage states that "Where appropriate, updated values that may be available in subsequent releases of the EPA Ecological Soil Screening Levels, and the NOAA SQuiRT values should be used in place of the values cited in the 1995 Region 3 BTAG table" (http://www.epa.gov/reg3hscd/risk/eco/faqs/screenbench.htm). Please ensure that this statement has been accounted for when selecting plant and invertebrate Toxicity Reference Values (TRVs).

10. A review of the tables comparing Method Detection Limits (MDLs) of non-detect chemicals against screening values found that many chemicals were not selected as COPCs because they lacked screening values. This approach implicitly assumes that chemicals without a screening value are of no ecological concern. The *EPA 1997 Ecological Risk Assessment Guidance for Superfund* states that a contaminant should not be eliminated from the list of contaminants to be investigated only because toxicity information is lacking; instead, limited or missing toxicity information must be addressed using best professional judgment and discussed as an uncertainty. In light of this guidance, please discuss those chemicals lacking screening values in the uncertainty analysis.

11. The Plant and Invertebrate/Microbial Screening tables for SWMU 35, 37, and 38/AOC Q were compared to Exposure Point Concentrations (EPCs) summary tables for each specific area. Several chemicals, such as arsenic, cadmium, iron, and selenium, lacked an EPC even though one had been calculated using ProUCL. Please revise these tables include all of the calculated EPC values.

12. The Exposure Point Concentration Summary tables for SWMU 35, 37, and 38/AOC Q where compared against their respective SLERA Occurrence/Distribution tables. Ninety five percent (95%) UCLs were not calculated for several chemicals, such as barium, cobalt, and thallium, even though there was enough data (e.g., frequency of detection equal to 10/10). Please justify why no 95% UCLs were calculated for these chemicals.

SPECIFIC COMMENTS

13. Subsection 2.1.3 describes SWMU 35 as being situated at an elevation of approximately 1,699 to 1,701 feet above mean sea level, and being approximately 18 feet higher than the New River. Figure 2-5 describes the New River as having an elevation of 1690 feet above mean sea level. Please provide a correction to the Figure or the Subsection to rectify the differences illustrated. Please provide the

elevation above mean sea level for all wells, including newly drilled wells and existing wells, used in the characterization of all SWMUs and AOCs in this RFI.

14. The New River is described as having an elevation of 1690' msl in Figure 2-5. Monitoring well 35MW2 is shown on Figure 2-6 with ground water elevation at 1685.56' msl. The ground water potentiometric surface depicted in Figure 2-5 is shown to be higher than the surface water in the New River. Explain whether these conditions are seasonal or permanent, and what they mean to the interpretation of ground water and surface water flow at these SWMU.

15. If SWMU 35 ground water elevation data was collected on January 18, 2009 and shown on Figure 2-6 (dated May 2008), when was the ground water elevation data shown on Figure 2-5 (August 2008) collected? Why do neither of these figures contain the date of ground water collection? What was the elevation of the New River surface water pool at SWMU 35 on January 18, 2008?

16. Table 6-1 provides the information regarding monitoring well locations with respect to ground water flow at each sample area. SWMU 35 has only two downgradient wells. SWMU 37 has only two downgradient wells. SWMU 38/AOC Q has no upgradient well and only two down gradient wells. Include monitoring well D-5 in the assessment of SWMU 35.

17. Subsection 6.2.2.2 states that due to a ground water depth greater than 15 ft at SWMU 35, the construction worker is assessed only for the vapor pathway to account for potential vapors released to ambient air from groundwater beneath excavation trenches, but is not assessed for the ingestion or dermal contact pathways. Figure 2-5 is presented with both vertical and horizontal scales. Upon measuring these scales, ground water is encountered at less than 15 feet below the bottom of the calcium sulfate sludge. Figure 2-6 shows that ground water in the vicinity of SWMU 35 has a potentiometric contour of 1686.5 feet above msl which crosses the 1700 feet above msl ground surface elevation. Higher elevation potentiometric surface contours cross the same 1700 feet msl ground surface contours at fewer than 15 feet in Figure 2-6. Further, 35SB10 (Figure 2-5, Log of Boring) encountered the potentiometric surface of ground water at 16 feet below land surface, as did each boring: 35SB5, 35SB6, 35SB7 (15.5), 35SB8, and 35SB9). Furthermore, boring 35SB10 is depicted on Figure 2-5 to be terminated at the sand and gravel layer, over 2 feet below the ground water potentiometric surface as depicted on Figure 2-5. Also, please note on the boring log that 35SB10 was terminated at the sand and gravel (GM) layer.

18. Table 2-3 lists 35MW1 at a ground surface elevation of 1703.72 and Figure 2-5 shows the land surface elevation at 35MW1 to be over 1710 feet in elevation and ground water at about 1695', while Figure 2-6 shows ground water for 35MW1 at 1686.60'. Table 2-3 provides no sample information which coincides with the August 2008 date on Figure 2-5. Please provide the August 2008 sampling information for all wells at SWMU 35, including D-5.

19. If the ground water data were collected on January 18, 2008 (subsection 2.1.7.1), why is the hydraulic gradient calculation dated January 29, 2008? What was the hydraulic gradient on January 18, 2008?

20. Section 2.1.8.4 states that sample 35SL1 was tested for metals, however Table 2-4 indicates that metals were not tested.

21. Figure 2-16 provides a potentiometric contour map for August 2008. However, the date box for this map states June 2008. Please clarify by including the date of data collection used in the making of this figure.

22. Figure 2-16 provides a ground water elevation for ground water well 38MW1 at 1681.50. The closest potentiometric contour line is at 1681.5, but does not go through the well point 38MW1. Please explain.

23. Table 2-3 presents 38MW1 at a ground surface elevation of 1709.40. Figure 2-14 shows the ground surface elevation for 38MW1 at over 1710 feet above msl. Please explain.

24. Please install 3 hydrogeologically down gradient wells at SWMU 38/AOC Q. A table on page 3-3 of the draft RFI describes 3 wells as being either downgradient (2), or cross gradient (1) of SWMU 38/AOC Q. The potentiometric contour maps at Figure 2-15/2-16 shows no wells hydrogeologically downgradient of the ground surface foot print of SWMU 38/AOC Q.

25. Please install 3 hydrogeologically down gradient wells at SWMU 37. A table on page 3-3 of the draft RFI describes 3 wells as being either downgradient (2), or upgradient (1) of SWMU 37. The potentiometric contour map at Figure 2-16 shows no wells hydrogeologically downgradient of the ground surface foot print of SWMU 37.

26. Please provide the date of the information used in Figure 2-14, especially the potentiometric surface data. Information provided in Figure 2-16 and Figure 2-15 shows that ground water in 37MW3 is at a higher elevation that ground water in 37MW1 on two different dates. Please provide information on the ground water divide in this area.

27. Figure 2-13 illustrates the ground water elevation and potentiometric contour elevation in the vicinity of 37MW3 and 37MW1. Figure 2-15 and Figure 2-16 each indicate that ground water in 37MW3 is at a higher elevation than 37MW1. Please check these wells for an upward flow component of ground water. Please do the same for 38MW3 and 38MW1. Check to see if any of the wells screened in the bedrock are being overly influenced by the hydraulic heads in this formation, rather than formations above the bedrock. Consider installing nested wells.

28. **Section 2.2.8.1, Verification Investigation – Dames and Moore 1992, Page 2-11:** This section indicates that waste characterization samples from SWMU 37, SWMU 38, and AOC Q were analyzed for VOCs, semi-volatile organic compounds (SVOCs), and toxicity characteristic leaching procedure (TCLP) metals. Table 2-6, Summary of Analytical Data for Sediment/Sludge Samples, provides the results of these analyses, but does not appear to include the TCLP metals results. Please revise the RFI Report to include the TCLP metals results of the sludge at SWMU 37, SWMU 38, and AOC Q, as these data will help classify the waste materials present in the sludge.

29. **Section 2.2.8.3, Site Screening Process Investigation – URS 2007a, Pages 2-11 to 2-12:** According to this section, a human health risk screening evaluation was conducted as part of a previous site screening process (SSP) investigation. However, although the previous screening evaluation was based on comparing MDCs with RBCs (i.e., the same approach used in the HHRA presented in the RFI Report), the two evaluations identified a few different COPCs. Specifically, the risk screening in the SSP investigation identified volatile organic compounds (VOCs), 2,4-dinitrotoluene (2,4-DNT), and metals as soil COPCs at SWMU 37; but the HHRA in the RFI Report identified metals and polychlorinated biphenyls (PCBs) as COPCs in soil. Given that the same risk screening approach was used, further explanation should be provided for the discrepancy between the COPCs identified in the two evaluations (e.g., updates in RBCs, changes in HHRA data set, etc.).

30. **Section 3.1.1, Soil Borings and Soil Sampling, Page 3-3:** The first paragraph on Page 3-3 states that "Soil samples were collected from each boring from the following depth intervals: (1) surface, (2) immediately below sludge (if present) or intermediate depth, and (3) terminal depth at specified depth." Based on the information provided in Table 3-1, Field Sample Identifiers, Depths, and Analytical Methods, the three samples per boring approach described above was not consistently applied at all of the SWMUs and AOC. One sample per boring was collected in some locations. *Work Plan Addendum 020* proposed to collect only surface soils at some locations, and this appears to be the approach that was carried out during the RFI sampling. For clarity, please revise the statement on Page 3-3 of Section 3.1.1 to state that surface soil samples were collected from each boring, and additional subsurface soil samples (immediately below sludge or at an intermediate depth and at a terminal depth) were collected at some locations. Additionally, please describe the rationale for selection of the terminal sample depth at each of the SWMUs and AOC.

31. **Section 3.1.2, Monitoring Well Installation and Groundwater Sampling, Page 3-3:** The table included in Section 3.1.2 indicates that the groundwater sampling event at the sites was conducted in February 2008. According to Table 4-11, Summary of Detected Chemicals in Groundwater Analytical Samples at SWMU 38 and AOC Q, an additional sampling event occurred on June 24, 2008.

Monitoring well 38MW3 was sampled for total and dissolved manganese on this date. The text portion of the RFI Report should describe the sampling event on June 24, 2008 and indicate why this sampling event was conducted, as it was not planned in Work Plan Addendum 020.

32. **Section 3.4, Work Plan Field Changes, Page 3-7:** This section documents changes from the Work Plan that were initiated in the field (i.e., offsetting the locations of monitoring wells 38MW1 and 38MW2), but the RFI Report does not address any implications of these changes, or whether initial objectives of monitoring groundwater at the specified locations have been met. This section also indicates that fifteen additional stratigraphic soil borings were completed east of SWMU 38 to delineate the lateral and vertical extent of sludge in this area. The RFI Report does not appear to include any boring logs or other documentation of these borings in Appendix C nor do the additional borings appear to have specific IDs as none are shown on Figure 3-3, Sample Locations. It is also unclear whether these boring locations were surveyed. Please revise the RFI Report to describe any implications of the work plan field changes described in Section 3.4. Also, revise the RFI Report to include documentation of the fifteen additional borings that were completed east of SWMU 38, including boring logs, boring IDs, and surveyed coordinates, if available. If documentation is unavailable, indicate why this information was not collected.

33. **Section 4.1.2.5, PCBs, Page 4-4:** Aroclor 1254 was detected at concentrations above its adjusted residential risk based screening criterion (R-RBC) in 8 of 22 soil samples. Based on the locations of these exceedances as shown on Figure 4-1, Extent of Human Health COPCs – Soil, it appears that the lateral extent of this contamination has not been delineated to the south and east of SWMU 35. The surface samples collected outside of the drying bed area to the south (35SB2) and east (35SB3) both reported exceedances of the R-RBC. Please revise the RFI Report to address this data gap.

34. **Section 4.3.2.6, VOCs, Page 4-9:** Trichloroethylene (TCE) was detected in soil at SWMU 37 above its soil screening level (SSL) for migration to groundwater, based on a dilution attenuation factor (DAF) of 20. This section also notes that "groundwater sample results did not indicate leaching of TCE from soil to groundwater at detectable levels." However, it does not appear that a groundwater sample was collected at a location downgradient from the SSL exceedances at boring location 37SB2. Figure 2-15, Potentiometric Contour Map for January 2008, shows the groundwater flow direction at SWMU 37 is to the northeast. No groundwater monitoring wells are located directly northeast of SWMU 37 to monitor groundwater downgradient of the site. Please revise the RFI Report to address this data gap. Additionally, groundwater monitoring northeast of SWMU 37 may be necessary (see comment 25).

35. **Table 4-12, Summary of Risk Screening Results for Groundwater at SWMU 38 and AOC Q:** Table 4-12 identifies the maximum detected concentrations of

dissolved manganese and total manganese in groundwater as 1,050 micrograms per liter (ug/l) and 990 ug/l, respectively. Table 4-11, Summary of Detected Chemicals in Groundwater Analytical Samples at SWMU 38 and AOC Q, shows the maximum detected concentrations of dissolved and total manganese as 2,400 ug/l and 2,600 ug/l, respectively, as identified in well 38MW3 during the February 2008 sampling event. Please revise the RFI Report to address this discrepancy. The maximum detected concentrations for total and dissolved manganese as shown on Table 4-11 should be used in any evaluations of risk unless additional justification is provided.

36. **Section 5.0, Contaminant Fate and Transport, Page 5-1:** This section presents a table that summarizes the COPCs identified at "the site". However, the chemicals listed are not COPCs in all three areas (i.e., SWMUs 35, 37, and 38/AOC Q). Furthermore, the difference between the chemicals listed under the column headings "Soil – Human Health" and "Soil SSL DAF20" in the table is unclear. Please revise the table to identify the specific COPCs associated with each area; and add as a footnote or incorporate into the text an explanation of the columns in the table.

37. **Section 5.3, Fate and Transport Summary:** Further investigation of the source of the pesticides in groundwater at SWMU 37 may be warranted.

38. **Section 6.1.1.1, Surface Soil and Total Soil, Page 6-2:** This section indicates that soil samples collected during the SSP investigation in 2003 and for the RFI in 2007 were evaluated in the HHRA. However, as stated in the General Comments above, other previous investigations at SWMUs 35, 37, and 38/AOC Q included soil sample collection. Please revise the HHRA to include all soil data collected previously for soils that have not been removed; or provide justification for not considering these data in the HHRA. This information should be included in the data evaluation section of the HHRA which describes what data were deemed useable for risk analysis as well as data that were excluded and the reasons for excluding the data (e.g., data did not meet data quality objectives for use in HHRA, etc.).

39. **Section 6.1.1.2, Groundwater, Page 6-2:** This section states that groundwater data from only the February and June 2008 sampling events were evaluated in the HHRA. However, according to Section 2, Site Background, groundwater samples were also collected during other investigations, some dating back to the early 1990s. Please revise the risk assessment to include other relevant groundwater data, or provide rationale for not including them in the risk evaluation. Furthermore, this section makes reference to the use of "dissolved metals data". Please ensure that only data from unfiltered groundwater samples are used in the HHRA.

40. **Section 6.1.2, Identification of COPCs, Pages 6-2 to 6-4:** The COPCs summarized in tables in this section include notes that identify chemicals that

were "not carried through the HHRA due to low frequency of detection". However, the definition of "low frequency of detection" is not provided, and potential deviations to this decision rule are not fully explained. For example, nitroglycerin, which was detected at SWMU 35 at a "low" frequency of detection (i.e., 1 of 10 in surface soil, and 1 of 22 in total soil samples), was retained as a COPC because the single detected concentration was above the industrial screening levels. It is not clear whether other chemicals that were removed as COPCs due to "low frequency of detection" have been compared to RBCs. Please define "low frequency of detection" and clarify this decision rule.

Furthermore, several chemicals were identified as occurring at a "low frequency of detection" and also flagged as having no screening value available. The fate of these chemicals in the HHRA is unclear. For example, dimethylphthalate at SWMU 35; methylcyclohexane, di-n-octylphthalate and dimethylphthalate at SWMU 37; and cyclohexane and methylcyclohexane at SWMU 38/AOC Q were classified as occurring at a "low frequency of detection" as well as having no screening value available. Please clarify the steps involved in removing chemicals from further evaluation as COPCs. For conservativeness, those chemicals for which no screening criteria are available should be retained and evaluated – either quantitatively with the use of surrogates or qualitatively based on their known chemical properties. Finally, low frequency is not a line of evidence that can be used to eliminate chemicals unless a spatial analysis is conducted to determine if a single detection or low frequency of detection is in an area where a release may have occurred. It should be noted that the *Risk Assessment Guidance for Superfund* (RAGS) Part A provides guidance on the use of frequency and recommends a 5 percent frequency of detection as a limit, as long as there are at least 20 samples. Thus, a frequency of 1 of 6 for methylcyclohexane, di-n-octylphthalate and dimethylphthalate at SWMU 37 is not considered low frequency since the frequency is almost 17 percent. Please address this concern.

41. **Section 6.2.3, Calculation of EPCs, Page 6-7:** The second paragraph in this section indicates that EPA's ProUCL 4.0 software, released in 2007, was used to calculate the 95 percent upper confidence limit on the mean (95 percent UCL) concentrations for detected chemicals. However, it should be noted that a more recent version of the ProUCL software, Version 4.00.04, was released in February 2009. Please use the latest version of ProUCL, available online at www.epa.gov/nerlesd1/tsc/software.htm, to ensure that the latest developments in UCL calculation methodology are incorporated. This comment also applies to the use of ProUCL 4.0 for distribution testing and comparison of site data to background concentrations (Section 6.4.3, Background, Page 6-15).

42. **Section 6.3, Toxicity Assessment, Page 6-8:** This section states that the EPA Region 3 RBC table was the source of chronic toxicity criteria used to quantify non-carcinogenic hazards and carcinogenic risks in the HHRA. However, as indicated in the General Comments above, the use of toxicity data presented on the RBC table instead of the more recent RSL table has resulted in the use of

outdated toxicity data for some compounds. Please revise the HHRA to incorporate the latest toxicity data provided in the RSL table.

43. **Section 6.3.1.1, Cancer Slope Factors, Page 6-9; and Section 6.3.1.2, Reference Doses and Reference Concentrations, Pages 6-9 to 6-10:** These two sections describe the derivation of toxicity criteria for carcinogens based on cancer slope factors (CSFs), and non-carcinogens based on reference doses (RfDs), and reference concentrations (RfCs). It should be noted, however, that for risk evaluations of inhalation exposure, EPA guidance recommends that unit risk factors (URFs; for carcinogens) and RfCs (for non-carcinogens) be used instead of CSFs and RfDs. Specifically, EPA's final RAGS Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), issued in January 2009, indicates that inhalation CSFs and RfDs should not be used to evaluate inhalation risks because studies have shown that inhalation toxicity is not a function of inhalation rate or body weight. Please revise the HHRA to incorporate this approach.

44. **Section 6.5, HHRA Summary, Pages 6-16 to 6-19:** This section summarizes the risk results for each of the three areas evaluated in the RFI, based on EPA's target risk range of 1E-06 to 1E-04. However, as indicated in the General Comments above, the regulatory target of 1E-06 – not the risk management range – should be used as the basis for cumulative HHRAs. Risks that fall within the range are not necessarily acceptable. Please revise the summary and conclusions to indicate exposure scenarios and chemicals associated with risk estimates that exceed the 1E-06 *de minimus* target.

45. **Section 7.1.1.1, Ecological Site Characterization, Page 7-2.** The text states that a Virginia Department of Game and Inland Fisheries survey identified two rare plant species (i.e., Midland Sedge and Shaggy False Gromwell) associated with grassland communities at RFAAP. Please specify if the plant communities at the targeted SWMUs and AOC Q have been evaluated for the presence of these two species.

46. **Section 7.2.1.3, Terrestrial Wildlife, Page 7-8:** The table in this section summarizes the chemicals which either have only NOAEL HQs above 1 or NOAEL and LOAEL HQs above 1 per receptor. A few errors were identified when the table was compared to Tables F.2-14 through F.2-22. For example, cadmium, chromium, and zinc are listed as only having NOAEL HQs above 1 for the meadow vole. However, Table F.2-4 shows that HXM and nitroglycerin also have NOAEL HQs above 1. Please review this table to ensure all of the appropriate chemicals are listed.

47. **Section 7.2.3, Risk Management – Scientific Management Decision Point (SMDP), Italicized Conclusion. Page 7-9:** The SMDP states that "Although metal concentrations in plants were above the screening levels, vegetation at the

site is lush and diverse and indicators of chemical vegetative stress were not observed with the exception of limited gravel areas." Simply stating that the area appears lush and diverse is insufficient grounds to conclude a lack of risk. For example, it is not known if the local plant community shows a response in terms of lower species diversity, reduced growth, or other more subtle responses that might be observable when compared to an unimpacted reference location. Please discuss in the uncertainty section the limitations of the current conclusions on the lack of risk to the plant community. This additional information will help support risk management decision making.

48. **Section 7.4.1.3, Terrestrial Wildlife, Page 7-12:** The table in this section summarizes the chemicals which either had only NOAEL HQs above 1 or NOAEL and LOAEL HQs above 1 per receptor. One error was identified when the table was compared to the Tables F.4-14 through F.4-22. The list of chemicals for the American Robin did not include 2, 4-Dinitroluene, which had a NOAEL above 1.0. Please revise this table accordingly.

49. **Section 7.5, Exposure and risk uncertainty analysis, Page 7-13 and 7-14:** This section should be expanded to address issues associated with (a) the potential for additive toxic effects of exposure by wildlife receptors to site-related chemicals, (b) the qualitative nature of the evaluation of risk to the plant community, (c) the effect on risk conclusions of high detection limits for PCBs in several soil samples from SWMU 35 (see Table F.2-3b), and (d) any concerns associated with listed plant species.

50. **Table F.2-24 (Wildlife Summary) and Table F.4-24 (Wildlife Summary):** The SLERA Wildlife Summary tables for SWMU 35 and SWMU 38/AOC Q are missing from Appendices F.2 and F.4, respectively. Please review these appendices and update accordingly.

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August 13, 2009

Mr. William Geiger
RCRA General Operations Branch, Mail Code: 3WC23
Waste and Chemicals Management Division
U. S. Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Mr. James L. Cutler, Jr.
Virginia Department of Environmental Quality
629 East Main Street
Richmond, VA 24143-0100

Subject: With Certification, Solid Waste Management Units 35, 37, 38, and Area of Concern Q (RAAP-10) RCRA Facility Investigation Report Draft July 2009
EPA ID# VA1 210020730

Dear Mr. Geiger and Mr. Cutler:

Enclosed is the certification for the subject document that was sent to you on July 27, 2009. Also enclosed is the 27 July 2009 transmittal email.

Please coordinate with and provide any questions or comments to myself at (540) 639-8658, Jerry Redder ATK staff (540) 639-7536 or Jim McKenna, ACO Staff (540) 731-5782.

Sincerely,

P.W. Holt, Environmental Manager
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09-815-132
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Concerning the following:

Radford Army Ammunition Plant

Solid Waste Management Units 35, 37, 38 and Area of Concern Q (RAAP-10)
RCRA Facility Investigation Report
Draft July 2009

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

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TITLE: LTC, CM
Commanding

SIGNATURE:
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09-815-132
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DEPARTMENT OF THE ARMY
US ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE
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ABERDEEN PROVING GROUND MD 21010-5403

MCHB-TS-REH

10 AUG 2009

MEMORANDUM FOR Office of Environmental Quality, Radford Army Ammunition Plant (SJMRF-OP-EQ/Mr. Jim McKenna), P.O. Box 2, Radford, VA 24143-0002

SUBJECT: Draft RCRA Facility Investigation/Corrective Measures Study Report for SWMUs 35, 37, 38, and Area of Concern Q (RAAP-10), Radford Army Ammunition Plant, Virginia, July 2009

1. The US Army Center for Health Promotion and Preventive Medicine reviewed the subject document, without comment, on behalf of the Office of The Surgeon General pursuant to Army Regulation 200-1 (Environmental Protection and Enhancement). We appreciate the opportunity to review this report.

2. We concur with the recommendation of no further action at these sites as being protective of human health and the environment.

3. The document was reviewed by Mr. Dennis Druck, Environmental Health Risk Assessment Program. He can be reached at DSN 584-2953, commercial (410) 436-2953 or electronic mail, dennis.druck@us.army.mil.

FOR THE COMMANDER:

JEFFREY S. KIRKPATRICK
Director, Health Risk Management

CF:
HQDA (DASG-PPM-NC)
IMCOM-NE (IMNE-PWD-E)
USACE (CEHNC-CX-ES)
USAEC (IMAE-CD/Mr. Rich Mendoza)

EXECUTIVE SUMMARY

URS Group, Inc. (URS) conducted a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at Radford Army Ammunition Plant (RFAAP) Solid Waste Management Units (SWMU) 35, 37, 38, and Area of Concern (AOC) Q, Calcium Sulfate Lagoons, located in the Main Manufacturing Area (MMA) of the RFAAP. The sites consist of four separate calcium sulfate drying beds. Due to the close proximity of SWMU 38 and AOC Q, these areas are assessed as one site for nature and extent assessment and risk assessment.

The work was conducted by URS Group, Inc. (URS) to fulfill the requirements set forth in the 2000 RCRA Corrective Action permit (USEPA 2000) as tasked by the United States Army Corps of Engineers (USACE), Baltimore District. URS performed the RFI in accordance with the Master Work Plan (MWP) developed for RFAAP and Work Plan Addendum (WPA) 020 to the MWP (URS 2003). These documents, approved by the United States Environmental Protection Agency (USEPA) Region III and the Virginia Department of Environmental Quality (VDEQ), contain the Master Quality Assurance Plan (MQAP), the Master Health and Safety Plan (MHSP), and associated project-specific addenda.

Nature and Extent Assessment

At SWMU 35, the primary site-related chemicals of potential concern (COPCs) in soil are metals, polychlorinated biphenyls (PCBs), and nitroglycerin located primarily within the drying bed. COPCs identified in groundwater at SWMU 35 were limited to manganese and chloroform, with dissolved metals and chloroform concentrations detected below their unadjusted tap water risk-based concentrations (T-RBCs) or maximum contaminant levels (MCLs).

At SWMU 37, the primary site-related COPCs in soil at SWMU 37 are metals and PCBs located within the drying bed. COPCs identified in groundwater at SWMU 37 were limited to manganese, pesticides (alpha-BHC and heptachlor epoxide), and chloroform, with dissolved metals, chloroform, and heptachlor epoxide concentrations detected below their unadjusted T-RBCs or MCLs. An MCL is not available for alpha-BHC, but as presented in Section 6.0, alpha-BHC was not identified as a risk or hazard driver in the human health risk assessment.

At SWMU 38/AOC Q, the primary site-related COPCs in soil are metals and Aroclor 1254 located within the drying bed. COPCs identified in groundwater at SWMU 38 were limited to manganese and chloroform, with chloroform concentrations detected below its MCL. As presented in Section 4.7.3, a specific site-specific source related to disposal activities for the manganese concentrations detected above the T-RBC in well 38MW3 was not identified. Manganese concentrations within material in the drying bed (87 to 550 mg/kg) were similar to manganese concentrations in soil outside the drying bed (222 to 600 mg/kg) where no indication of impacts from site use was noted (i.e., no sludge present). Manganese concentrations at the site also were within the low-to-mid range of concentrations of manganese in the background data set (16.7 to 2,040 mg/kg). The occurrence of dissolved manganese at concentrations above the T-RBC at one well location 38MW3 may be due to natural geologic conditions (i.e., weathering of bedrock containing manganese and alluvial deposition).

With regard to groundwater detections of chloroform at the sites, it is important to note that studies and groundwater investigations have shown the presence of chloroform in most groundwater samples collected at the facility regardless of location. The concentrations of chloroform detected in monitoring wells at the sites are low level concentrations below the range of chloroform levels present in the water transmitted through water lines at the facility. The sites are located downgradient of developed areas containing water lines that could be leaking, which may have been the source of chloroform. In addition, as presented in Section 6.0 chloroform was not identified as a risk driver in the human health risk assessments for the sites.

Fate and Transport Assessment

The fate and transport assessment did not identify volatilization as an important fate and transport process at the sites given the low concentrations of VOCs detected in soil and sludge. Mass transport and erosion

of COPCs contained in sludge was not observed outside of the drying beds. Significant leaching of organic and inorganic COPCs from the calcium sulfate sludge to underlying soil was not apparent from the data collected.

Groundwater samples collected from the drying bed areas did not indicate appreciable leaching of constituents detected in calcium sulfate sludge to groundwater. Although low level concentrations of chloroform were detected at SWMU 35, SWMU 37, and SWMU 38/AOC Q, chloroform was not detected in soil at the sites and chloroform was detected in upgradient wells at the sites. It is important to note that studies and groundwater investigations have shown the presence of chloroform in most groundwater samples collected at the facility regardless of location. The concentrations of chloroform detected in monitoring wells at the sites are low level concentrations below the range of chloroform levels present in the water transmitted through water lines at the facility. The sites are located downgradient of developed areas containing water lines that could be leaking, which may have been the source of chloroform. In addition, as presented in Section 6.0 chloroform was not identified as a risk driver in the human health risk assessments. At SWMU 37, data suggests the site is not the source of pesticides in groundwater since the pesticides detected in groundwater were not detected in soil at the site and pesticides were also detected in background well 37MW1. At SWMU 38, a specific site-specific source related to disposal activities for the manganese concentrations detected above the T-RBC in well 38MW3 was not identified.

Human Health Risk Assessment (HHRA)

HHRAs were performed to evaluate the potential human health effects associated with releases to soil and groundwater at the sites. Receptors evaluated included: current/future maintenance worker, hypothetical future construction worker, hypothetical future commercial worker, hypothetical future adult resident, hypothetical future child resident, and hypothetical future lifetime resident. Total carcinogenic risk calculated for each receptor was below or within USEPA's target risk range for Superfund sites (1E-06 to 1E-04, USEPA 1989) for the sites. The mean concentrations for lead in surface soil and total soil for SWMU 35 (233.6 mg/kg - surface soil and 137.1 mg/kg - total soil), SWMU 37 (121 mg/kg - surface soil and 64.05 mg/kg - total soil), and SWMU 38/AOC Q (26.61 mg/kg - surface soil and 17.63 mg/kg - total soil) were below the residential lead screening level of 400 mg/kg; therefore, additional lead modeling was not conducted for the sites. Total non carcinogenic hazards after consideration of target organs, background, and site specific conditions, for all receptors were equal to or below the USEPA reference hazard index (HI) of 1E+00 with the exception of the construction worker at each site due to aluminum (SWMU 35, SWMU 37, SWMU 38/AOCQ) and manganese (SWMU 38/AOC Q) in soil. Additional comparison of site soil concentrations to background point estimates, indicated that the sites' soil concentration for these metals were not significantly above background. The results of the human health risk assessments did not indicate a requirement for further action for the sites.

Screening Level Ecological Risk Assessment (SLERA)

A SLERA was performed to evaluate potential ecological risks associated with previous activities at the site. Direct contact and wildlife ingestion pathways were evaluated for soil. Terrestrial receptors that were evaluated included: plant communities, soil invertebrate/ microbial communities, American Robin, Red-tailed Hawk, Meadow Vole, Red Fox, and Short-tailed Shrew. The SLERA assessed risk by comparing various exposure estimates for chemicals to available toxicity reference values (TRVs) for each receptor. The relative risk was expressed as a hazard quotient (HQ). An HQ of less than 1 indicates no or negligible risk. The potential for risk increases as the HQ increases above unity. HQs were calculated for no effects range observable adverse effect levels (NOAELs) and lowest observable adverse effect levels (LOAELs). Preliminary and refined risk characterizations were conducted, with refined characterizations considering 95% upper confidence limits (UCLs) concentrations, background evaluations, and other more environmentally realistic assumptions than conservative preliminary estimates.

Based on the results of the SLERAs and risk management considerations, no need for further action is required at SWMU 35, SWMU 37, and SWMU 38/AOC Q on the basis of ecological risk.

Conclusions and Recommendation

Based on the results of the RFI, HHRAs, and SLERAs, no further action is recommended for the sites.

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LIST OF ABBREVIATIONS AND ACRONYMS

°C .....Degrees Celsius
% .....Percent
AF .....Area Use Factor
AL .....Action Level
AOC .....Area of Concern
ATSDR .....Agency for Toxic Substance Disease Registry
bgs .....Below Ground Surface
BOD .....Biochemical Oxygen Demand
BTAG.....Biological Technical Assistance Group
CDI.....Chronic Daily Intake
cfs.....Cubic Feet Per Second
CL .....Sandy Clay
cm/sec .....Centimeters Per Second
CMO .....Corrective Measure Objective
CMS .....Corrective Measures Study
CNS.....Central Nervous System
COC .....Chemical of Concern
COPC .....Chemical of Potential Concern
COPEC.....Chemical of Potential Ecological Concern
CSM .....Conceptual Site Model
CSF .....Cancer Slope Factor
DAF .....Dilution Attenuation Factor
DQO.....Data Quality Objective
DNT .....Dinitrotoluene
ECSM.....Ecological Conceptual Site Model
EPC .....Exposure Point Concentration
EPIC.....Environmental Photographic Interpretation Center
ERAGS .....Ecological Risk Assessment Guidance for Superfund
f_{oc}.....Fraction Organic Content
ft.....Feet
ft^2.....Square Feet
ft/ft .....Feet per Foot
GI .....Gastrointestinal
GM .....Sand and Gravel
GP .....Sandy Gravel
GPS .....Global Positioning System
HBN .....Health-Based Number
HEAST.....Human Health Effects Assessment Summary Table
HHRA .....Human Health Risk Assessment
HI .....Hazard Index
HMX .....Cyclo-1,3,5,7-tetramethylene 2,4,6,8-tetranitramine; Octogen
HQ.....Hazard Quotient
I-RBC.....Industrial Risk-Based Concentration
IDM.....Investigation-Derived Material
IRIS.....Integrated Risk Information System
k_{oc} .....Organic Carbon Partition Coefficient
k_d .....Distribution Coefficient

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

L/kg.....Liter per Kilogram
LOAEL .....Lowest Observable Adverse Effect Level
MCL.....Maximum Contaminant Level
MDC .....Maximum Detected Concentration
MDL.....Method Detection Limit
µg/L.....Micrograms per Liter
µm .....Micrometer
mg .....Milligram
mg/kg .....Milligrams per Kilogram
MHSP.....Master Health and Safety Plan
ML .....Sandy Silt
MMA .....Main Manufacturing Area
MRL.....Minimal Risk Level
MQAP.....Master Quality Assurance Plan
msl.....Mean Sea Level
MWP.....Master Work Plan
NCEA.....National Center for Environmental Assessment
NFO .....No Further Action
NOAEL.....No Observable Adverse Effect Level
O&M.....Operation and Maintenance
ORP.....Oxidation-Reduction Potential
PAH .....Polynuclear Aromatic Hydrocarbon
PCB.....Polychlorinated Biphenyl
PEF.....Particulate Emission Factor
PETN .....Pentaerythritol tetranitrate
PPE.....Personal Protective Equipment
PPRTV.....Provisional Peer-Reviewed Toxicity Values
PSI.....Pounds per Square Inch
PVC.....Polyvinyl Chloride
QA.....Quality Assurance
QC.....Quality Control
R-RBC .....Residential Risk-Based Concentration
RAGS.....Risk Assessment Guidance for Superfund
RBC .....Risk-Based Concentration
RCRA.....Resource Conservation and Recovery Act
RDA.....Recommended Daily Allowance
RFA.....RCRA Facility Assessment
RfC.....Risk Reference Concentration
RfD.....Risk Reference Dose
RFAAP.....Radford Army Ammunition Plant
RFI .....RCRA Facility Investigation
RG.....Remedial Goal
SC.....Clayey Sand
SLERA.....Screening Level Ecological Risk Assessment
SM.....Silty Sand
SMDP.....Scientific Management Decision Point

LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

SOP .....Standard Operating Procedure
SSL.....Soil Screening Level
SSP.....Site Screening Process
SVOC.....Semi-volatile Organic Compound
SWMU .....Solid Waste Management Unit
T-RBC.....Tap Water Risk-Based Concentration
TAL.....Target Analyte List
TCE.....Trichloroethene
TCL.....Target Compound List
TCLP.....Toxicity Characteristic Leaching Procedure
TIC .....Tentatively Identified Compound
THM.....Trihalomethanes
TOC .....Total Organic Carbon
TNT.....Trinitrotoluene
TRV .....Toxicity Reference Value
UCL .....Upper Confidence Limit
URS.....URS Group, Inc.
USACE .....United States Army Corps of Engineers
USEPA.....United States Environmental Protection Agency
USATHAMA..United States Army Toxic and Hazardous Material Agency
UTL.....Upper Tolerance Limit
VDEQ .....Virginia Department of Environmental Quality
VI .....Verification Investigation
VOC .....Volatile Organic Compound
VPDES.....Virginia Pollution Discharge Elimination System
VRP.....Voluntary Remediation Program
WPA.....Work Plan Addendum

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1.0 INTRODUCTION

This Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) report presents the results and findings of the investigations conducted at Solid Waste Management Units (SWMUs) 35, 37, and 38, and Area of Concern (AOC) Q, Calcium Sulfate Drying Beds, located in the Main Manufacturing Area (MMA) at the Radford Army Ammunition Plant (RFAAP), Radford, Virginia (the sites). The sites consist of four separate calcium sulfate drying beds. Due to the close proximity of SWMU 38 and AOC Q, these areas are assessed as one site for nature and extent assessment and risk assessment.

The work was conducted by URS Group, Inc. (URS) to fulfill the requirements set forth in the 2000 RCRA Corrective Action permit (USEPA 2000) as tasked by the United States Army Corps of Engineers (USACE), Baltimore District. URS performed the RFI in accordance with the Master Work Plan (MWP) developed for RFAAP and Work Plan Addendum (WPA) 020 to the MWP (URS 2003). These documents, approved by the United States Environmental Protection Agency (USEPA) Region III and the Virginia Department of Environmental Quality (VDEQ), contain the Master Quality Assurance Plan (MQAP), the Master Health and Safety Plan (MHSP), and associated project-specific addenda.

This RFI investigation included: direct push soil borings, installation of monitoring wells, physical soil testing, chemical sampling of soil and groundwater, and aquifer characterization. The RFI was designed to:

- Fill data gaps from previous site investigations at the sites;
- Evaluate the nature and extent of chemicals present in soil at the sites;
- Evaluate potential releases to groundwater at the sites;
- Evaluate potential risks to human health and the environment using the physical and chemical data collected at the sites; and
- Collect data to support completion of a Corrective Measures Study (CMS) for the sites.

Section 2.0 of this report presents site background information including: site history, physical setting, and previous investigation results. The RFI field investigation program is described in Section 3.0. Sufficient data was collected for the RFI to complete a Nature and Extent of Chemicals Assessment (Section 4.0), Fate and Transport Evaluation (Section 5.0), Human Health Risk Assessment (HHRA) (Section 6.0), and a Screening Level Ecological Risk Assessment (SLERA) (Section 7.0).

The results of the risk assessments and fate and transport assessment did not indicate a requirement to complete a CMS for SWMUs 35, 37, 38, and AOC Q, and therefore, a CMS has not been prepared for this report.

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2.0 SITE BACKGROUND

A comprehensive discussion of the regional physiography, soil, geology, and groundwater at RFAAP is included in the RFAAP MWP (URS 2003) and therefore is not discussed in this report.

2.1 SWMU 35 – CALCIUM SULFATE DRYING BEDS

2.1.1 Site Description

SWMU 35 is an approximately 160 feet (ft) by 80 ft calcium sulfate drying bed located in the northeast section of the MMA at RFAAP (Figure 2-1) between SWMU 8 (east) and SWMU 10 (west). The drying bed is an enclosed depressed area (approximately 5 ft from surrounding areas). The RFAAP Installation perimeter fence is between the site and the New River located 120 ft north of the site. The land north of fence slopes steeply down to the New River, which is approximately 19 to 21 ft lower than SWMU 35 (Figure 2-2).

Structures adjacent to SWMU 35 (Figure 2-2) include a biological treatment plant and equalization basin (SWMU 10) approximately 100 ft northwest of SWMU 35, piping and appurtenances associated with SWMU 10 located southwest of SWMU 35, and two calcium sulfate concrete basin treatment areas (SWMU 8 eastern and western) with the western treatment area approximately 50 ft southeast of SWMU 35.

2.1.2 Site History

A USEPA RCRA Facility Assessment (RFA) conducted at RFAAP identified the SWMU 35 calcium sulfate drying bed as having the potential to release constituents into the environment (USEPA 1987). Beginning in the Korean War era and continuing through approximately 1980, the SWMU 35 calcium sulfate drying bed periodically received sludge removed from SWMU 8. After drying, the sludge was reportedly removed from SWMU 35 and disposed of in various locations at RFAAP (Dames & Moore 1992). SWMU 8 formerly consisted of an eastern and western lagoon and was replaced with an eastern and western concrete treatment tank that manages neutralized wastewater from the A-B Line Acidic Wastewater Treatment Plant. The neutralization process that takes place at the treatment plant is as follows:

$$Ca(OH)_2 + H_2SO_4 \rightarrow CaSO_4 + 2H_2O$$

This neutralized wastewater containing calcium sulfate flows through a series of weir gates in the SWMU 8 lagoons, causing the calcium sulfate to precipitate and settle as sludge. RFAAP reported that "sediment" from SWMU 10 was potentially deposited in SWMU 35, most likely during the early 1980s (Dames and Moore 1994).

2.1.3 Physiography

SWMU 35 is an approximately 160 ft by 80 ft calcium sulfate drying bed (Figure 2-2). The drying bed is an enclosed depressed area (approximately 5 ft lower in elevation than surrounding areas) situated at an elevation of approximately 1,699 to 1,701 ft above mean sea level (msl). The RFAAP Installation perimeter fence is between the site and the New River which is located 120 ft north of the site. The land

north of fence slopes steeply down to the New River, which is approximately 19-21 ft lower than SWMU 35.

2.1.4 Surface Water

Figure 2-3 shows surface-water drainage patterns in the site area. Based on topography, SWMU 35 drains internally (i.e., stormwater runoff does not flow out of the immediate SWMU area). During the time of the field investigation, the drying bed contained heavy vegetation. No standing water was observed within the drying bed. The New River is the major surface-water feature in the area and flows southeast approximately 120 ft north of SWMU 35. Other surface water bodies, drainage ditches, manholes, catch basins, or other flow paths are not present in the immediate vicinity.

2.1.5 Site Soil

Unison-Urban Land complex soil underlies the site area. This soil has moderate permeability and medium-to-strong acidity. Organic matter content of this soil is low to moderate. Available water capacity of the Unison soil is moderate and runoff is medium. In disturbed areas, the above soil characteristics are extremely variable. A typical profile of the Unison soil in undisturbed areas consists of a 15-inch thick surface layer of dark brown and brown loam underlain by a 43-inch thick subsoil of yellowish-red sticky and plastic clay. The substratum is red sandy clay loam below a depth of approximately 58 inches. Depth to bedrock is greater than 60 inches. Urban land consists of soil covered by streets, parking lots, buildings, and other structures (URS 2003).

One representative soil sample (35SB7 – 4 to 7 ft) collected from a 3 ft interval below the sludge layer within the drying bed was submitted for physical soil testing at URS' laboratory in Totowa, New Jersey. Test results are summarized in the following table and in Table 2-1. Complete physical test results are summarized in Appendix C.1. As indicated by the test results, this sample was classified as clayey sand (SC) with a nearly neutral pH.

Summary of Physical Soil Test Data

Test Parameter	Range of Parameter Values
Sample Depths (ft below ground surface [bgs])	4-7 ft
Unified Soil Classification Symbol	SC (Clayey Sand)
Sieve Analysis – percent (%) fines (minus 200 Sieve)	35%
Total Organic Carbon	9%
pH – distilled water	6.8
pH – 0.01 M CaCl Solution	6.3
Soil particle density (pounds per cubic foot)	2.710
Soil bulk density (pounds per cubic foot)	126.9
Soil dry density (pounds per cubic foot)	107.9
Coefficient of permeability (centimeters per second)	1.8E-06
Water Content (%)	31%

2.1.6 Site Geology

Site geologic conditions were characterized for the RFI by completing 10 direct push soil borings (10 to 18 ft bgs), installing two groundwater monitoring wells (31 ft bgs), and physical testing of one sludge sample and one soil sample. Six of the direct push borings were completed to refusal (presumed river jack gravel). The remaining four were completed to a predetermined depth of 10 ft bgs. Monitoring wells 35MW1 and 35MW2 were completed to a depth of approximately 9 ft and 5 ft beneath the overburden/bedrock interface, respectively. Monitoring well and soil boring locations are shown on Figure 2-4 and boring data are summarized in Table 2-2. Monitoring well construction data are summarized in Table 2-3 and boring logs/construction diagrams are included in Appendix C.2.

Subsurface data from site borings and monitoring wells were used to construct a geologic cross-section (Figure 2-5). Cross-section A-A' is orientated southwest to northeast across SWMU 35 in the general direction of groundwater flow.

The site area is underlain by approximately 20 to 26 ft of unconsolidated alluvial deposits, except within the drying bed area where 12 to 15 ft of alluvium underlies the bottom of the drying bed sludge. These deposits generally consist of a fining upward sequence of sediment consisting of primarily micaceous silty (SM) and sandy silt (ML) and locally a basal layer of sand and gravel (GM). Carbonate bedrock of the Cambrian Age Elbrook Formation underlies the alluvial deposits in the site area. Rock coring completed in borings at SWMU 10 located adjacent to the site indicated that the upper 10 to 15 ft of bedrock (gray to blue gray limestone) in the site area is argillaceous, variably weathered and fractured.

Within the drying bed, a calcium sulfate sludge layer was identified at boring locations 35SB6, 35SB7, 35SB9, and 35SB10 at thicknesses ranging from 4 to 6 ft.

2.1.7 Site Hydrogeology

Regional hydrogeology and general hydrogeology information for RFAAP is included in Section 3.8 of the MWP. Groundwater conditions at the site were characterized by the installation of two additional monitoring wells (35MW1 and 35MW2), obtaining water level measurements at well locations (35MW1, 35MW2, D-2, and D-4), and completion of slug tests (35MW1 and 35MW2) to provide estimates of the hydraulic conductivity of the uppermost aquifer within the screened intervals.

2.1.7.1 Occurrence of Groundwater and Groundwater Flow Direction

The uppermost zone of groundwater at the site occurs within the lower portion of alluvium and in underlying weathered and fractured bedrock (17 to 21 ft bgs). As shown on Figure 2-5 and in Table 2-3, the thickness of the saturated zone above bedrock decreases with increased distance upgradient (south) of the drying bed area. Groundwater elevation data collected during the groundwater sampling event (February 7, 2008) conducted for the RFI are summarized in Table 2-3 and shown on Figure 2-6 as a potentiometric contour map. The overall groundwater flow direction shown on Figure 2-6 is toward the north and the New River, with a hydraulic gradient of 0.021 feet per foot (ft/ft) for the groundwater flow path shown on Figure 2-6. Hydraulic gradient calculations are presented in the following table.

Hydraulic Gradient for Lateral Groundwater Flow at SWMU 35

Date	Flow Path Contour Lines	Elevation Difference (ft)	Flow Path Distance (ft)	Calculated Hydraulic Gradient (ft/ft)
2/7/2008	1691.5 ft to 1686.0 ft	5.5	266	0.021

2.1.7.2 Hydraulic Conductivity and Groundwater Flow Velocity

Rising and falling head slug tests were conducted at monitoring wells 35MW1 and 35MW2 to provide estimates of the hydraulic conductivity of well screened intervals. Slug testing methods are described in Section 3.3.5 and slug test results are summarized in the following table. Detailed analysis and calculations for the slug tests are included in Appendix C.3. Results of a slug tests conducted for upgradient well D-4 in 1990 as reported in the Verification Investigation (VI) Report for SWMUs 10 and 35 (Dames & Moore 1994) are also summarized below.

Summary of Slug Test Results for SWMU 35

Well ID	Lithology of Screened Interval	Falling Head Test (cm/sec)	Rising Head Test (cm/sec)	Appropriate Test for Well Construction	Final Hydraulic Conductivity (cm/sec)
35MW1	Alluvium/Bedrock	1.56E-03	4.64E-03	Rising Head	4.64E-03
35MW2	Alluvium/Bedrock	5.12E-03	5.48E-03	Rising Head	5.48E-03
D-4	Alluvium/Bedrock	NA	NA	NA	2.80E-03
Average Hydraulic Conductivity Value					4.31E-03

Note: NA = Not Available

Slug test analysis indicated an average hydraulic conductivity of 4.31E-03 centimeters per second (cm/sec) (12.22 ft/day) for screened interval consisting of alluvium and the uppermost portion of bedrock.

Equation 1 below was used to calculate an approximate average velocity of groundwater flow within the uppermost aquifer at SWMU 35.

(1) $V_s = Ki/n_e$

Where:

V_s = average groundwater flow (seepage) velocity (ft/day)

K = hydraulic conductivity (ft/day)

i = hydraulic gradient (ft/ft)

n_e = effective porosity (%)

The following values were substituted into Equation 1:

K =	12.22 ft/day	Average value calculated from slug tests at SWMU 35
i =	0.021 ft/ft	Average value calculated at SWMU 35
n_e =	0.25	Estimated effective porosity for sand and gravel/limestone from Freeze and Cherry 1979 page 37

Using the above values, the average calculated groundwater-flow velocity at SWMU 35 is 1.02 ft/day or 372.3 ft/year.

2.1.8 Previous Investigations

2.1.8.1 RCRA Facility Assessment – USEPA 1987

An assessment was conducted for SWMU 35 to evaluate potential hazardous waste or hazardous chemical releases and implement corrective actions, as necessary. The assessment consisted of a preliminary review and evaluation of available site information, personnel interviews, and a visual inspection of the site. Environmental samples were not collected at SWMU 35 as part of the inspection. The assessment concluded that, "no visual evidence of release from these units was observed during the April 1987 [inspection] (USEPA 1987)." However, site-specific chemical samples were required in accordance with the RFAAP 1989 RCRA permit (USEPA 2000).

2.1.8.2 Geophex Hydrogeologic and Environmental Investigation of the Equalization Basin of the [Biological] Wastewater Treatment Plant – 1990

Geophex, Ltd. performed a hydrogeologic and environmental investigation of the Biological Wastewater Treatment Plant Equalization Basin (SWMU 10), which included the installation of monitoring wells D-

3D and DG-1 (Figure 2-7), performance of pump tests, and the collection of groundwater samples. Each groundwater sample was analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Toxicity Characteristic Leaching Procedure (TCLP) metals, and reactivity. One sample (D-3D) was above the current adjusted USEPA Region III Tap Water Risk-based Concentration (T-RBC) for SVOC dinoseb (Dames & Moore 1994). Boring logs for the monitoring wells installed by Geophex and others are included in Appendix C.2.

2.1.8.3 Bio-Plant (SWMU 10) Environmental Site Investigation – Dames & Moore – 1991

Dames & Moore reported the results of an environmental site investigation of SWMU 10 in 1991 (Dames & Moore 1991). The site investigation was performed at SWMU 10, "to collect data in support of a construction project proposed to replace the existing equalization basin with two new tanks (Dames & Moore 1992)." The following information summarizes the investigation findings relative to SWMU 35.

One soil sample and two sludge samples (referred to as sediment samples in the previous investigation) were collected by Dames & Moore from SWMU 35 in August 1990 to assess possible sources of chemicals detected in groundwater near SWMUs 10 and 35 (Figure 2-7). Sludge samples 35SE1 and 35SE2 were collected from the upper 4 ft of sludge present within the SWMU 35 drying bed. Soil sample 35SS2 was collected from a depth of 6 ft bgs from *in situ* soil underlying the sludge at location 35SE2. The average sludge thickness encountered in the drying bed was 8 ft (Dames & Moore 1992). In August 1990, one groundwater sample was collected upgradient of SWMU 35 from monitoring well D-4 (Figure 2-7). Soil and sludge samples were analyzed for VOCs, SVOCs, Target Analyte List (TAL) metals, TCLP metals, and explosives. The groundwater sample from D-4 was analyzed for VOCs, SVOCs, and explosives.

Soil and Sludge Sample Results

Soil and sludge sample results are summarized in Table 2-4. 2,4-dinitrotoluene (DNT) was detected above the USEPA Region III carcinogenic residential risk-based concentration (R-RBC) for DNT mix in sample 35SE1. Phenanthrene was detected at a concentration above the USEPA Region III Biological Technical Assistance Group (BTAG) screening level in sample 35SE2. Chromium was detected in samples 35SE1 and 35SE2 at concentrations above the adjusted R-RBC, RFAAP background point estimate, and Draft BTAG screening level. Silver was detected in sample 35SE1 at a concentration above its adjusted R-RBC and Draft BTAG screening level (when analyzed by SW-846 Method 6010). Lead was detected above its residential and industrial action levels, background estimate, and Draft BTAG screening level in samples 35SE1 and 35SE2. Other metals were not detected at concentrations above both their background point estimates and an adjusted risk-based concentration (RBC).

Groundwater Sample Results

Groundwater sample results (August 1990) are summarized in Table 2-5 for sample D-4. VOCs and SVOCs were not detected in sample D-4. Cyclo-1,3,5,7-tetramethylene 2,4,6,8-tetranitramine; Octogen (HMX) was detected in sample D-4 at a concentration below its adjusted T-RBC.

2.1.8.4 Verification Investigation – Dames and Moore - 1992/1994

The results of a VI were reported by Dames & Moore in 1992 and 1994. The objective of the VI was to evaluate whether toxic or hazardous constituents, "are present and are, or have the potential of, migrating beyond the boundaries of the identified SWMUs (Dames & Moore 1992)." Because of their proximity, SWMU 35 and SWMU 10 were combined for activities conducted during the VI.

For SWMU 35, the VI included the collection of one additional sludge sample (35SL1) from the SWMU 35 drying bed and the collection of groundwater samples from upgradient monitoring wells D-2 and D-4, and downgradient monitoring well D-5 (Figure 2-7). Sample 35SL1 was analyzed for VOCs, SVOCs, and TCLP metals. Groundwater samples collected in 1991 were analyzed for VOCs, SVOCs, explosives, TAL metals (total and dissolved), general water quality parameters, and indicator parameters.

Groundwater samples collected in 1993 were analyzed for chromium and lead (total and dissolved), explosives, general groundwater parameters, and indicator parameters.

Sludge Sample Results

Sludge results for sample 35SL1 are summarized in Table 2-4. Chemical concentrations in sample 35SL1 were below their adjusted R-RBCs. Phenanthrene was detected at a concentration above its Draft BTAG screening level in sample 35SL1.

Groundwater Sample Results

Groundwater sample results (1991 and 1993) for SWMU 35 are summarized in Table 2-5. Total chromium was detected in samples D-2 and D-4 at concentrations above its adjusted T-RBC and above the USEPA maximum contaminant level (MCL) in sample D-4. Total lead was also detected in samples D-2 and D-4 at levels above the USEPA action level. Chromium and lead were not detected in the corresponding dissolved fractions of these samples. The elevated levels in the total fraction were attributed to sample turbidity, given that the samples were collected using a high flow purge and bailer. The concentrations of nitrite/nitrate in samples D-2 and D-5 were above its adjusted T-RBC and USEPA MCL.

2.1.8.5 Installation Assessment – EPIC Aerial Photographic Analysis – USEPA 1992

The Environmental Photographic Interpretation Center (EPIC), through the USEPA and U.S. Army Toxic and Hazardous Material Agency (USATHAMA), provided aerial photographic analysis of 42 known SWMUs at RFAAP (USEPA 1992). Aerial photographs from 1937 through 1986 were analyzed to identify features that may have represented potential groundwater or surface water constituent sources at RFAAP. USATHAMA requested photograph enlargements for six SWMUs including SWMU 35. Specifically, photograph enlargements were requested from 1971 and 1975 for SWMU 35.

The aerial photographic analysis of SWMU 35 indicated that activity was first noted at the site in 1962, where one lagoon was visible in the photograph (Figure 2-8). The SWMU 35 lagoon remained present on the 1986 photography (Figure 2-9).

2.1.8.6 Closure Documentation for SWMU 10 – ATK 1998

Closure Documentation for SWMU 10 (ATK 1998), Biological Treatment Plant Equalization Basin (VAID # VA1210020730), was submitted to the VDEQ on August 7, 1998. Based on a closure inspection and the closure certifications and report, clean closure by background comparison was achieved for all constituents, except fluoranthene. Clean closure to a residential risk-based determination was achieved for fluoranthene. Therefore, the VDEQ concurred that clean closure for soil only has been achieved for SWMU 10.

2.1.8.7 Soil Screening Report for SWMUs 8 and 36 – URS 2004

The primary objectives of this site screening investigations were to assess the current conditions of soil and calcium sulfate sludge at SWMUs 8 and 36, specifically; the presence or absence of hazardous constituents in soil and calcium sulfate sludge and to assess whether soil and calcium sulfate sludge managed during a construction project would be a RCRA hazardous waste.

Soil sampling at SWMUs 8 and 36 was necessary to properly manage excavated soil that was generated as part of a project to remove and replace the western lagoon of SWMU 8 and the SWMU 36 drying beds with an engineered tank structure. The Site Screening Investigation results assisted RFAAP with proper management of the excavated material during removal and construction and prevented the need to sample under the new tank after construction. Based upon the results and conclusions of the Soil Screening Report (URS 2004), no further action was necessary to ensure protection of human health or the environment. Decision documents concurring with no further action were approved by the USEPA and VDEQ for the sites in 2005 (URS 2005a and URS 2005b).

2.2 SWMU 37, SWMU 38, AND AOC Q – CALCIUM SULFATE DRYING BEDS

2.2.1 Site Description

SWMU 37 and SWMU 38 (Calcium Sulfate Drying Beds), and AOC Q (Calcium Sulfate Treatment and Disposal Area) are located along the New River in the northwestern section of the MMA (Figure 2-1). SWMU 37 is densely vegetated area comprising approximately 0.62 acres (Figure 2-10). It is located immediately southwest of, and adjacent to, the SWMU 9 Calcium Sulfate Settling Lagoons. SWMU 38 (see photograph inset) is a smaller, densely vegetated area comprising approximately 0.23 acres (Figure 2-10). It is located immediately north-northeast of, and adjacent to, SWMU 9. AOC Q is a densely wooded depression comprising approximately 0.076 acres (Figure 2-10). It is located immediately to the west and adjacent to the northwestern corner of SWMU 38. Each unit is surrounded by an earthen berm and has an approximate depth of 4 to 8 ft. (URS 2007a). In addition to SWMU 9, other tanks and structures near the sites include a control house for the settling lagoons and other associated piping and appurtenances. Other tanks or structures are not located in or near the site area.

2.2.2 Site History

SWMU 37 and SWMU 38 are inactive units previously used for the drying of sludge removed from SWMU 9 (USEPA 1987). SWMU 9 consists of two below-grade unlined earthen lagoons listed in the RFAAP Virginia Pollution Discharge Elimination System (VPDES) permit. These lagoons formerly received neutralized wastewater from the Acidic Wastewater Treatment Plant and now receive stormwater. The wastewater containing the calcium sulfate was gravity-fed into SWMU 9 via an underground process sewer pipe (Dames and Moore 1992). Calcium sulfate precipitated and settled in the lagoons was removed and placed in SWMU 37, SWMU 38, and AOC Q.

AOC Q was reportedly used as a sludge drying bed when SWMU 38 was full. Sludge was reportedly pumped from SWMU 38 to AOC Q via pipes that ran through a depression in the berm surrounding the drying bed (Dames and Moore 1992). However, specific diagrams or site maps were not available to verify this information. The presence of pipes was not noted during the site inspection conducted for the RCRA Facility Investigation in 1987 (USEPA 1987), during the VI investigation conducted at the site in 1992 (Dames & Moore 1992), or during subsequent site screening process (SSP) investigations. Any pipes may have been removed at the time that use of AOC Q ceased; these pipes would have been of limited length given that AOC Q is located immediately adjacent to SWMU 38.

Based on aerial photographs the drying beds were in use from sometime after 1949, likely in the early 1950's due to the use of the drying beds for sludge from SWMU 9 which began operation during the Korean War (1950-1953) (Dames and Moore 1992). SWMU 37 and SWMU 38 have been inactive since the 1980's. Activity at AOC Q appeared to cease in 1971 based on aerial photographic analysis (USEPA 1992) and observations during conduct of the RFA and VI confirmed that this disposal unit area was not in use.

2.2.3 Physiography

SWMU 37 and SWMU 38 (Calcium Sulfate Drying Beds), and AOC Q (Calcium Sulfate Treatment and Disposal Area) are located along the New River in the northwestern section of the MMA. Each unit is unlined and excavated into natural grade. The elevation at these units is approximately 1,710 ft msl. A gravel road and railroad tracks are located to the east of the sites. Dense woods surround the area to the north, south, and west where the topography slopes downward towards the New River (Figure 2-10). Each unit is surrounded by an earthen berm and has an approximate depth of 4 to 8 ft. (URS 2007a).

2.2.4 Surface Water

Figure 2-11 shows surface-water drainage patterns in the site area. Based on topography, each of the sites has internal drainage (i.e., surface runoff does not flow out of the immediate site areas). A well-defined drainage ditch is located approximately 100 ft down slope of SWMU 9 and another is located approximately 50 ft to the west of SWMU 37. Other surface water bodies, drainage ditches, manholes, catch basins, or other flow paths are not present in the immediate area. The New River is located approximately 300 to 400 ft northwest of the sites (Figure 2-11) and flows toward the northeast.

2.2.5 Site Soil

The sites are underlain by Unison-Urban land complex soil, which has moderate permeability and medium-to-strong acidity. Organic matter content of this soil is low to moderate. Available water capacity of the Unison soil is moderate and runoff is medium. In disturbed areas, the above soil characteristics are extremely variable. A typical profile of the Unison soil in undisturbed areas consists of a 15-inch thick surface layer of dark brown and brown loam underlain by a 43-inch thick subsoil of yellowish-red sticky and plastic clay. The substratum is red sandy clay loam below a depth of approximately 58 inches. Depth to bedrock is greater than 60 inches. Urban land consists of soil covered by streets, parking lots, buildings, and other structures (URS 2003).

Two representative subsurface soil samples from each site were submitted for physical soil testing at URS' laboratory in Totowa, New Jersey. Test results are summarized in the following table and in Table 2-1. Complete physical test results are summarized in Appendix C.1. The predominant soil type identified by the testing consisted of silty sand (SM) that ranges from slightly acidic to neutral, with low organic content. One sample representative of slightly finer grained material was classified as sandy clay (CL) with nearly 50% sand size particles. A representative sample of the sand and gravel layer generally present at depths greater than 20 ft was classified as sandy gravel (GP).

Summary of Physical Soil Test Data for RFI

Test Parameter	Range of Parameter Values
Sample Depths (ft bgs)	6-24
Unified Soil Classification Symbol	SM (silty sand) – 3 samples SC-SM (clayey sand-silty sand) –1 sample CL (sandy clay) - 1 sample GP (sandy gravel) – 1 sample
Sieve Analysis - % fines (minus 200 Sieve)=	3.9 to 52.6%
Organic Content	0.6 to 1.8%
pH – distilled water	5.1 to 7.1
pH – 0.01 M CaCl Solution	5.4 to 6.6
Soil particle density (pounds per cubic foot)	2.677 – 2.746
Soil bulk density (pounds per cubic foot)	116.0 to 130.1
Soil dry density (pounds per cubic foot)	97.9 to 111.9
Coefficient of permeability (centimeters per second)	1.2E-07 to 2.0E-03
Water Content (%)	3.7 to 26.4%

Borings indicate that the sites are underlain by 20 ft or more of unconsolidated soil (alluvial deposits) overlying carbonate bedrock of the Elbrook Formation. These deposits generally consist of 15 to 20 ft of silty sand (SM) with occasional sandy clay (CL) overlying silty gravel (GM) and/or gravel with silt (GP) (URS 2007a). Calcium sulfate sludge is present within SWMU 37 (2 ft thick) and AOC Q (0.5 ft thick). Sludge was not encountered within SWMU 38 at the locations sampled although it was reported present during the 1992 VI. During the RFI within the drying beds, a calcium sulfate sludge layer was identified at SMWU 37 (thickness ranging from 1 to 4.5 ft), SWMU 38 (thickness ranging from 0.25 to 0.75 ft), and at AOC Q (thickness of 0.75 ft).

2.2.6 Site Geology

In addition the soil borings and physical testing completed for the SSP, site geologic conditions were characterized for the RFI by completing 15 direct push soil borings (8 to 10 ft bgs), installing six groundwater monitoring wells (36 to 41 ft bgs), and physical testing of two soil samples from each site. Monitoring well and soil boring locations are shown on Figure 2-12 and boring data are summarized in Table 2-2. Monitoring well construction data are summarized in Table 2-3 and boring logs/construction diagrams are included in Appendix C.2.

Subsurface data from site borings and monitoring wells were used to construct two geologic cross sections. Cross-section B-B' is orientated northwest to southeast across SWMU 37 (Figure 2-13) and cross-section C-C' is orientated northwest to southeast across SWMU 38 and AOC Q, (Figure 2-14).

The area of SWMU 37, SWMU 38, and AOC Q is underlain by approximately 27 to 34 ft of unconsolidated alluvial deposits. These deposits generally consist of a fining upward sequence of sediment comprising a bottom layer of sand and gravel approximately 2 to 20 ft thick. Fine to medium, micaceous silty sand (SM) with lesser amounts of sandy silt (ML) and sandy clay (CL) is present above the gravelly zone. A 1 to 5 ft thick transitional zone of highly weathered and fractured limestone bedrock was encountered at 5 of 6 monitoring well locations between the sand and gravel layer and the underlying competent gray limestone bedrock. A sand-filled void was encountered within a fractured zone of bedrock at boring 38MW2 at a depth of 33 ft.

2.2.7 Site Hydrogeology

Regional hydrogeology and general hydrogeology information for RFAAP is included in Section 3.8 of the MWP (URS 2003). Groundwater conditions at the site were characterized by the installation of six monitoring wells obtaining water level measurements at well locations and completion of slug tests to provide estimates of the hydraulic conductivity of the uppermost aquifer within of the uppermost aquifer within the screened intervals.

2.2.7.1 Occurrence of Groundwater and Groundwater Flow Direction

The uppermost zone of groundwater at the site occurs within the lower portion of alluvium and in underlying weathered and fractured bedrock (24 to 30 ft bgs). As shown on the geologic cross-sections on Figures 2-13 and 2-14, the thickness of the saturated zone above bedrock increases with increased distance away from the New River (toward the east). Groundwater elevation data collected during the RFI (February 2008, August 2008, November 2009, and June 2010) are summarized in Table 2-3 and groundwater elevation data collected in November 2009 and June 2010 are shown on Figures 2-15 and 2-16 as potentiometric contour maps. The groundwater flow direction at SWMU 38 and AOC Q shown on these figures is primarily toward the north and northeast with a hydraulic gradient of 0.010 ft/ft for the groundwater flow paths shown. As shown in Figures 2-15 and 2-16, the groundwater flow is radial at SWMU 37. Hydraulic gradient calculations are presented in the following table.

Hydraulic Gradient for Lateral Groundwater Flow at SWMU 37

Date	Flow Path Contour Lines	Elevation Difference (ft)	Flow Path Distance (ft)	Average Calculated Hydraulic Gradient (ft/ft)
11/10/2009	1687.5 ft to 1685.0 ft	2.5	105/180	0.024/0.014
6/16/2010	1687.5 ft to 1685.0 ft	2.5	135/150	0.019/0.017

Hydraulic Gradient for Lateral Groundwater Flow at SWMU 38 and AOC Q

Date	Flow Path Contour Lines	Elevation Difference (ft)	Flow Path Distance (ft)	Calculated Hydraulic Gradient (ft/ft)
11/10/2009	1684.0 ft to 1683.0 ft	1.0	120	0.008
6/16/2010	1684.0 ft to 1683.0 ft	1.0	195	0.005

2.2.7.2 Hydraulic Conductivity and Groundwater Flow Velocity

Rising and falling head slug tests were conducted at monitoring wells 37MW1 through 37MW3 and 38MW1 through 38MW3 to provide estimates of the hydraulic conductivity of well screened intervals. Slug testing methods are described in Section 3.3.5 and slug test results are summarized in the following table. Detailed analysis and calculations for the slug tests are included in Appendix C.3.

Summary of Slug Test Results

Well ID	Lithology of Screened Interval	Falling Head Test (cm/sec)	Rising Head Test (cm/sec)	Appropriate Test for Well Construction	Final Hydraulic Conductivity (cm/sec)
37MW1	Alluvium/Bedrock	1.48E-03	1.48E-03	Rising Head	1.48E-03
37MW2	Alluvium/Bedrock	6.51E-04	5.37E-04	Rising Head	5.37E-04
37MW3	Alluvium/Bedrock	6.52E-03	5.27E-03	Rising Head	5.27E-03
38MW1	Alluvium/Bedrock	2.33E-03	1.64E-03	Rising Head	1.64E-03
38MW2	Alluvium/Bedrock	1.79E-03	2.44E-03	Rising Head	2.44E-03
38MW3	Alluvium/Bedrock	2.93E-03	3.18E-03	Rising Head	3.18E-03
Average Hydraulic Conductivity Value					2.43E-03

Slug test analysis indicated an average hydraulic conductivity of 2.43E-03 centimeters per second (cm/sec) (6.89 ft/day) for screened interval consisting of alluvium and the uppermost portion of bedrock.

The following equation was used to calculate an approximate average velocity of groundwater flow within the uppermost aquifer in the area of SWMU 37, SWMU 38, and AOC Q.

$V_s = Ki/n_e$

Where:

V_s = average groundwater flow (seepage) velocity (ft/day)
K = hydraulic conductivity (ft/day)
i = hydraulic gradient (ft/ft)
n_e = effective porosity (%)

The following values were substituted into this equation:

K =	6.89 ft/day	Average value calculated from slug tests at SWMUs 37 and 38
i =	0.010 ft/ft	Average value calculated across monitored area
n_e =	0.25	Estimated effective porosity for sand and gravel/limestone from Freeze and Cherry 1979 page 37

Using the above values, the average calculated groundwater-flow velocity at SWMU 37, SWMU 38, and AOC Q is 0.28 ft/day or 102.2 ft/year.

2.2.8 Previous Investigations

2.2.8.1 Verification Investigation – Dames and Moore 1992

In 1992, as part of a VI, Dames and Moore collected and analyzed three samples of waste (sludge) from SWMU 37, SWMU 38, and AOC Q to "evaluate whether hazardous chemical concentrations exceed[ed] the [then current] health based numbers (HBNs) in the [Facility] permit" (Dames and Moore 1992). One sample (38SL1) was collected from the top one foot of sludge present in SWMU 38. Because the calcium sulfate drying beds at SWMU 37 and Area Q were dry at the time of sampling, a 5-ft hand-auger composite hole was advanced in the central part of each bed (Figure 2-17). One sample was composited from each 5-ft hole (samples 37SL1 and QSL1) to ensure a representative sample of numerous sludge-drying episodes (Dames and Moore 1992). Waste characterization samples were analyzed for VOCs, SVOCs, and TCLP metals.

Chemical concentrations detected in samples 37SL1, 38SL1, and QSL1 were below adjusted RBCs and Draft BTAG screening levels (Table 2-6).

2.2.8.2 Installation Assessment (Air Photo Interpretation)

The 1949 photograph indicates the drying beds were not in use at this time as the area is tree covered and no depressions are evident (Figure 2-18). Activity at SWMU 37, SWMU 38, and AOC Q was first noted on a 1962 photograph (Figure 2-19). The 1962 photograph reportedly depicts a lagoon containing "possible liquid" at AOC Q. The 1971 photograph reportedly depicts AOC Q as re-vegetated (Figure 2-20). SWMU 37 and 38 reportedly consisted of one "lagoon" each, although the lagoons did not appear to contain liquid (USEPA 1992). USEPA noted that both lagoons were present on the 1986 photograph; SWMU 37 contained "a small amount of reddish liquid" and SWMU 38 appeared empty (Figure 2-21).

2.2.8.3 Site Screening Process Investigation – URS 2007a

The SSP was designed using specific human health and ecological screening processes to assess: 1) whether releases of hazardous substances, pollutants, hazardous wastes, or hazardous constituents have occurred to the environment at the sites evaluated, and 2) whether further investigation or action (i.e., risk assessment, RFI, interim action), or no further action (NFA) is appropriate at a site.

For the SSP investigation conducted September-October 2003, nine borings were advanced in and around SWMU 37, SWMU 38, and AOC Q to evaluate for the presence or absence of chemicals in soil potentially associated with sludge deposition (Figure 2-12). Three soil samples were collected from each boring and analyzed for target compound list (TCL) VOCs, TCL SVOCs, polynuclear aromatic hydrocarbons (PAHs), explosives (including nitroglycerin and pentaerythiritol tetranitrate [PETN]), and TAL metals. One selected surface soil sample for each site was also analyzed for TCL pesticides, TCL polychlorinated biphenyls (PCBs), and TCL herbicides.

Two samples (from each site) were collected for physical testing including: percent moisture, grain size, pH, total organic content (TOC), specific gravity, and bulk density. Additional testing on selected

samples was conducted for Atterberg limits and/or hydraulic conductivity. Analytical results for these samples are summarized in Appendix C.1.

Detected chemicals for the sites included the following: SWMU 37 – VOCs, SVOCs, PAHs, Aroclor 1254, dieldrin, explosives, and metals; SWMU 38 – VOCs, SVOCs, PAHs, Aroclor 1254, explosives, and metals; and AOC Q – VOCs, SVOCs, PAHs, Aroclor 1254, explosives, and metals. (Note that the COPCs identified in the SSP investigation may differ from the COPCs identified in the RFI based on updated RBC screening levels and additional soil data collected during the RFI used in the screening.)

The human health risk screening portion of the SSP consisted of the following components:

1. Identification of chemicals of potential concern (COPCs) via comparison of maximum detected concentrations (MDCs) to adjusted R-RBCs and industrial risk-based concentrations (I-RBCs);
2. Cumulative human health risk screening;
3. Chemical specific screening for lead and iron;
4. MDC comparison to soil to groundwater site screening levels (SSLs) (dilution attenuation factor [DAF] 20); and
5. Metals MDC comparison to background point estimates.

The human health risk screening resulted in the identification of the following COPCs for the sites: SWMU 37 – VOCs (SSL only), 2,4-DNT (as DNT Mixture), and metals, SWMU 38 – Aroclor 1254 and metals, and AOC Q – none.

The ecological risk screening portion of the SSP consisted of the following components:

1. Problem formulation including identification of chemicals of potential ecological concern (COPECs);
2. Exposure assessment;
3. Ecological effects assessment; and
4. Risk characterization.

The ecological risk screening portion of the SSP resulted in the identification of the following COPECs for the sites: SWMU 37 – Aroclor 1254 and metals; SWMU 38 –Aroclor 1254, fluoranthene (direct contact only), and metals, and AOC Q – none. Although fluoranthene was identified as a COPEC for invertebrates at SWMU 38, the two detections were at low concentrations slightly above the BTAG direct contact screening value resulting in hazard quotient (HQs) of 1.1 and 1.8. Since fluoranthene was not identified as a COPEC for wildlife food chain modeling and was determined to pose negligible potential risk (HQ<2) to invertebrates at SWMU 38, further investigation of SVOCs/PAHs is not proposed for the sites.

The SSP (URS 2007a) resulted in the recommendation of a focused RFI for soil and groundwater media at the sites based on detected concentrations above the site-specific SSL for trichloroethene (TCE) at SWMU 37, the lack of groundwater data for the sites, and the results of the human health and ecological risk screening. The RFI was to focus on metals, explosives (in sludge), PCBs, pesticides, and VOCs (groundwater only).

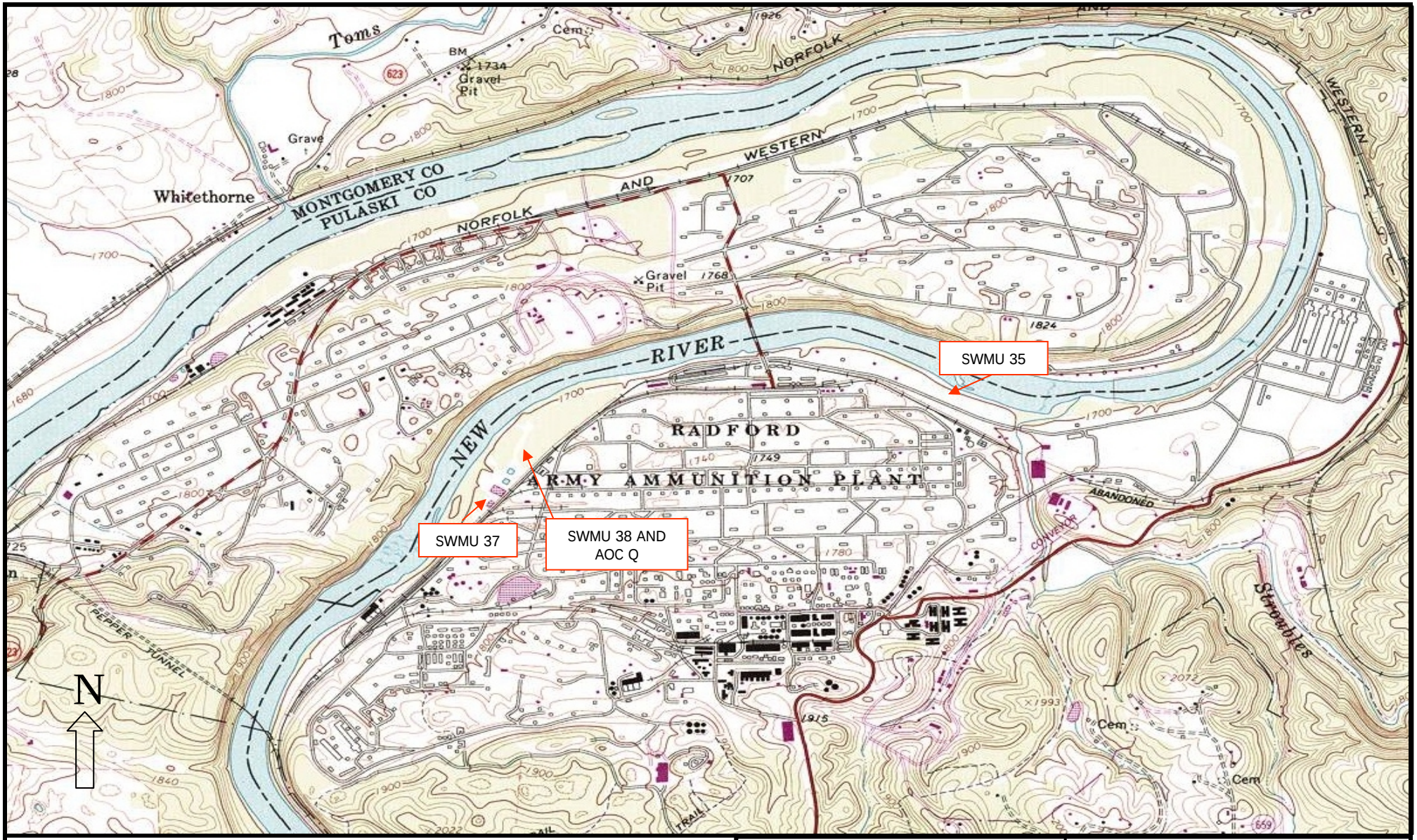

FIGURE 2-1
Site Location Map

Date: *May 2008*	**URS Project#:** *21354887*
Prepared by: *CLD*	**Approved by:** *JOS*
Scale: *1" = 2000'*	**File Name:** *Fig.2-1 SiteLoc Map*

SWMUs 35, 37, 38, and AOC Q
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Radford, Virginia

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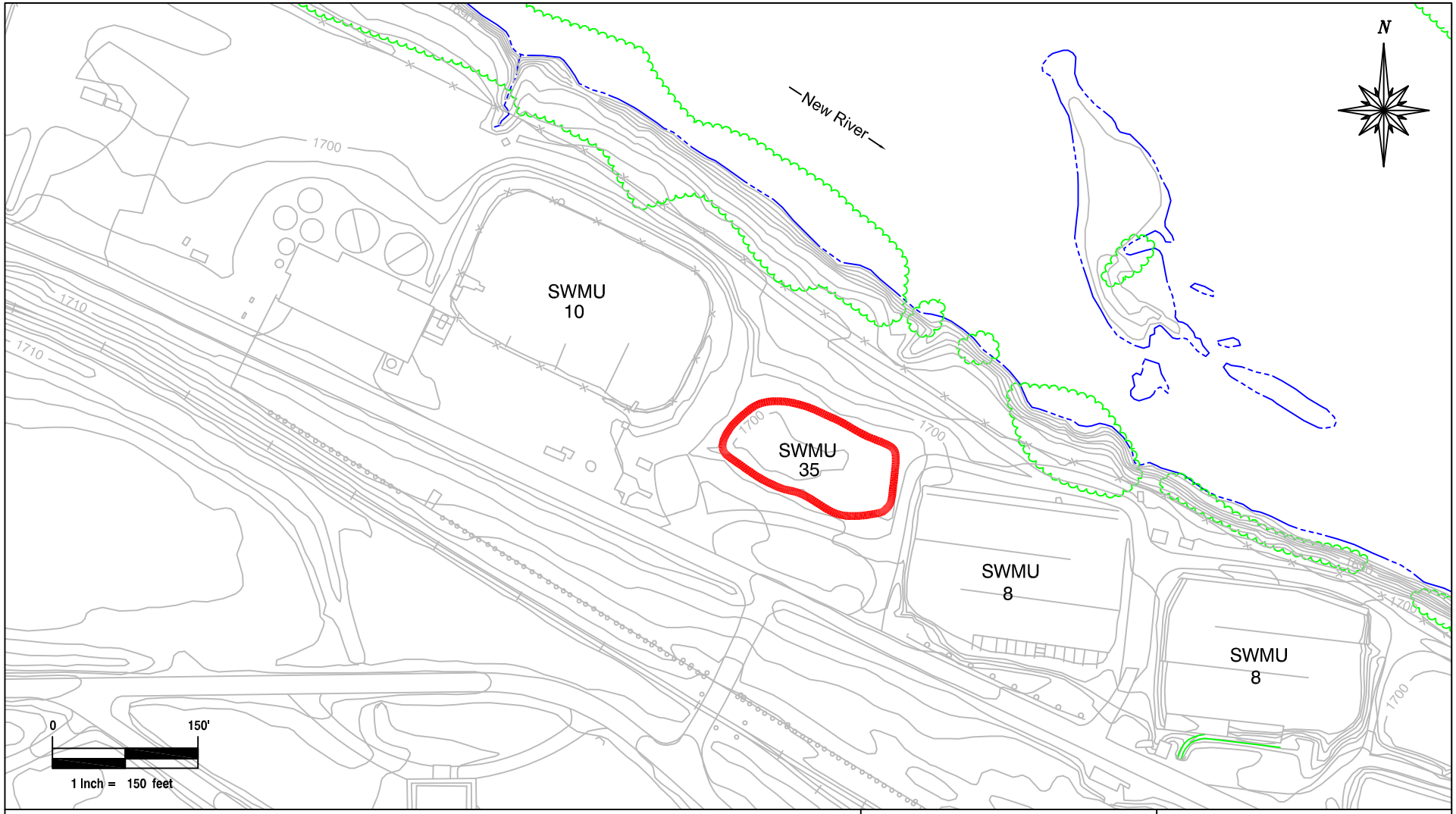
Richmond, VA 23230



Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Vegetation
- Aboveground Piping

FIGURE 2-2

Site Topographic Map - SWMU 35

Date: May 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1" = 150'	File Name: Fig. 2-2 Topo Map

SWMUs 35, 37, 38, and AOC Q
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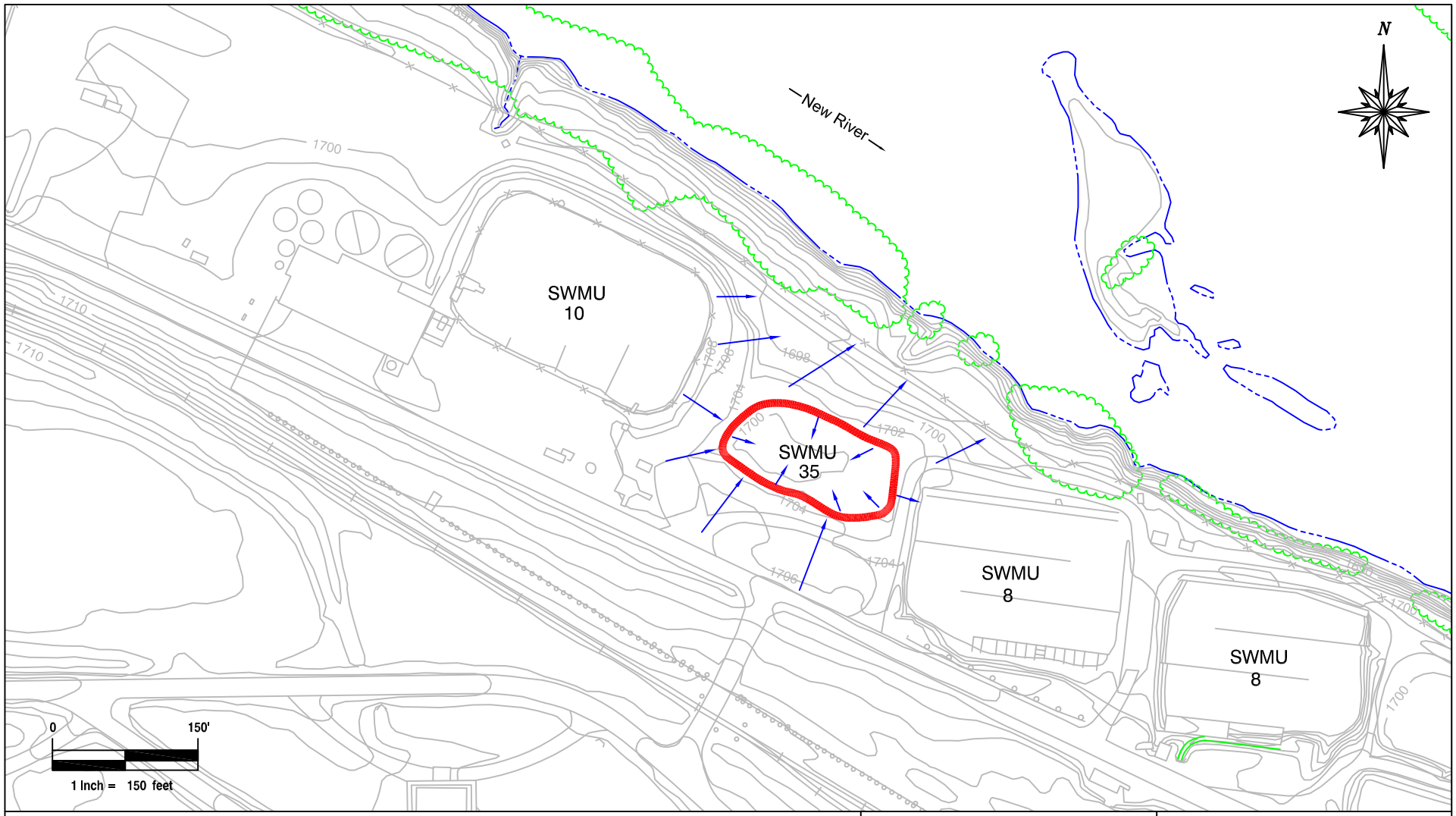

Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Vegetation
- Aboveground Piping
- Surface Water Flow Direction

FIGURE 2-3

Surface Water Drainage - SWMU 35

Date: May 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1" = 150'	File Name: Fig. 2-3 SWDrainage

SWMUs 35, 37, 38, and AOC Q
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Radford, Virginia

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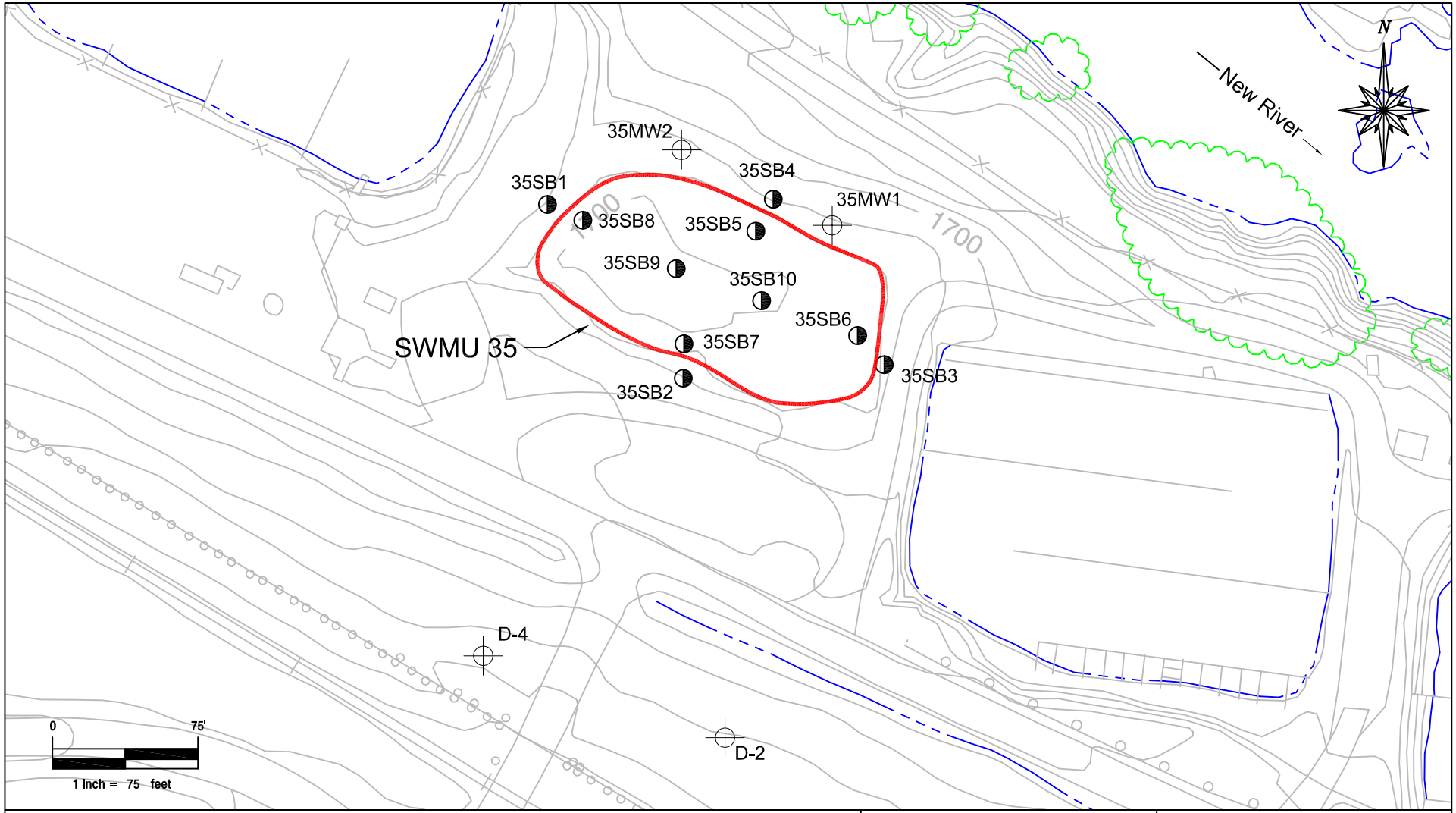

Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Vegetation
- Aboveground Piping
- Monitoring Well
- Soil Boring Location

FIGURE 2-4

RFI Sample Locations - SWMU 35

Date: May 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1" = 75'	File Name: Fig. 2-4 RFI Locs

SWMUs 35, 37, 38, and AOC Q
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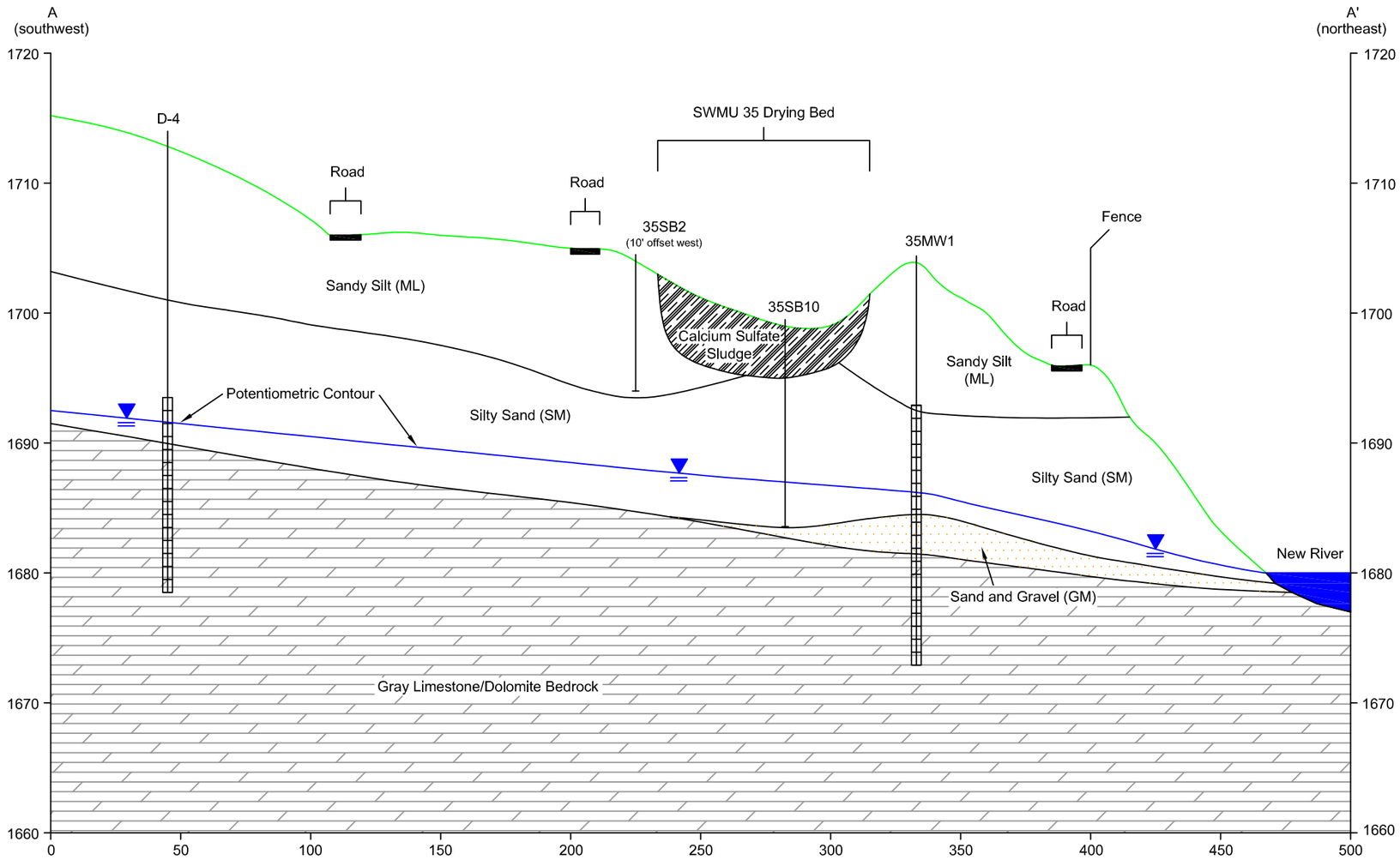

1" = 10'

1" = 50'

Vertical Exaggeration = 5

Note: Groundwater Elevation Data from February 7, 2008

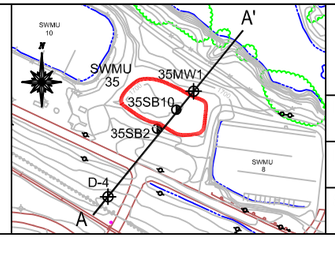

FIGURE 2-5
SWMU 35 Cross Section - A-A'

Date: April 2010	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: As Shown	File Name: Fig.2-5 35CrossSecA-A'

SWMUs 35, 37, 38 and AOC Q
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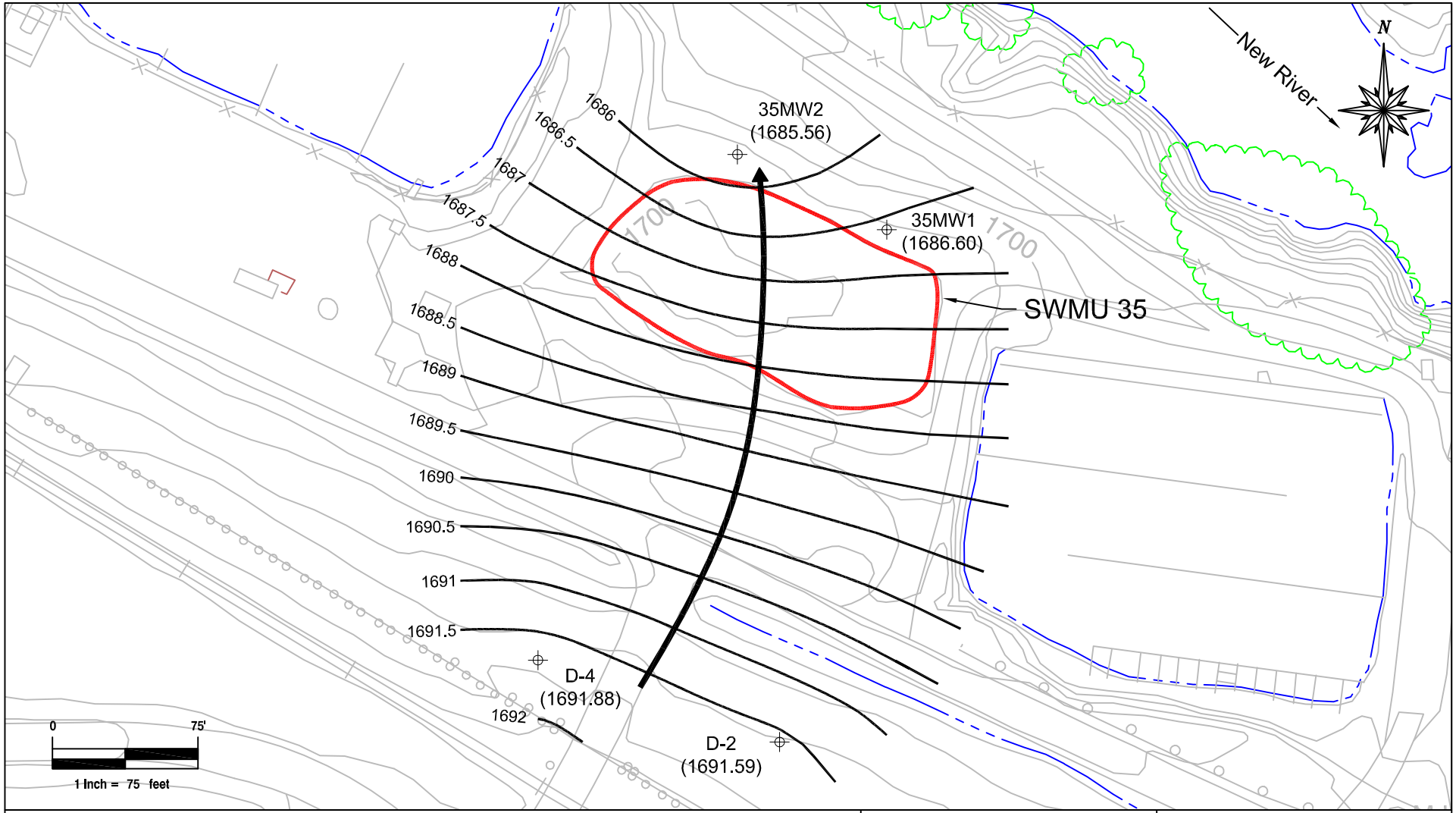

Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Vegetation
- Aboveground Piping
- Monitoring Well
- Potentiometric Contour
- (1686.56) Groundwater Elevation (feet, mean sea level)
- Groundwater Flow Direction

Note: Groundwater Elevation Data from February 7, 2008

FIGURE 2-6

Potentiometric Contour Map - SWMU 35

Date: April 2010	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1" = 75'	File Name: Fig. 2-6 PotMap

SWMUs 35, 37, 38, and AOC Q
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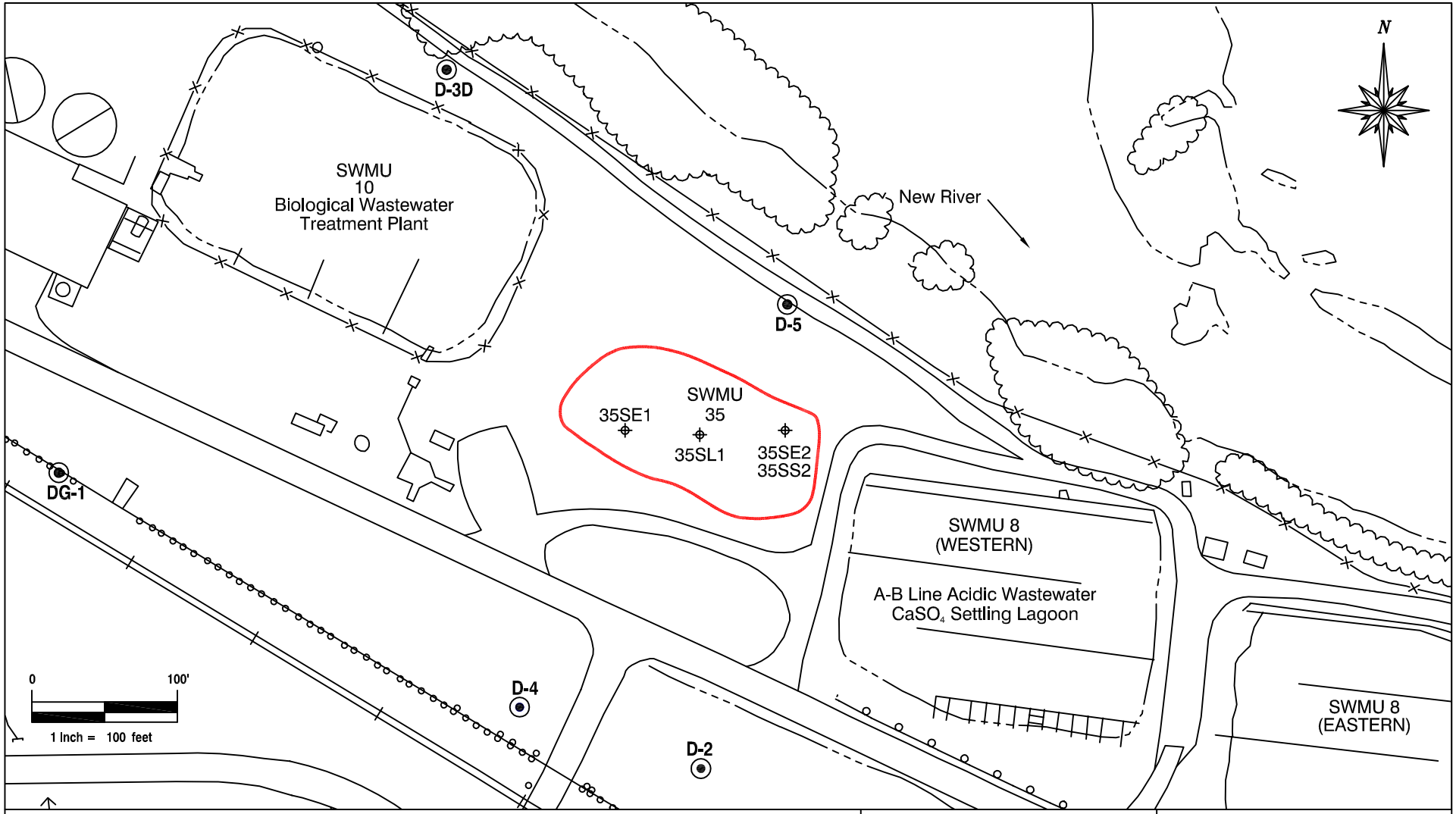

Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Vegetation
- Aboveground Piping
- Soil Boring Location
- Monitoring Well Location

FIGURE 2-7

Previous Investigation Sampling Locations - SWMU 35

Date: May 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1" = 100'	File Name: Fig. 2-7 PrevSampleLocs

SWMUs 35, 37, 38, and AOC Q
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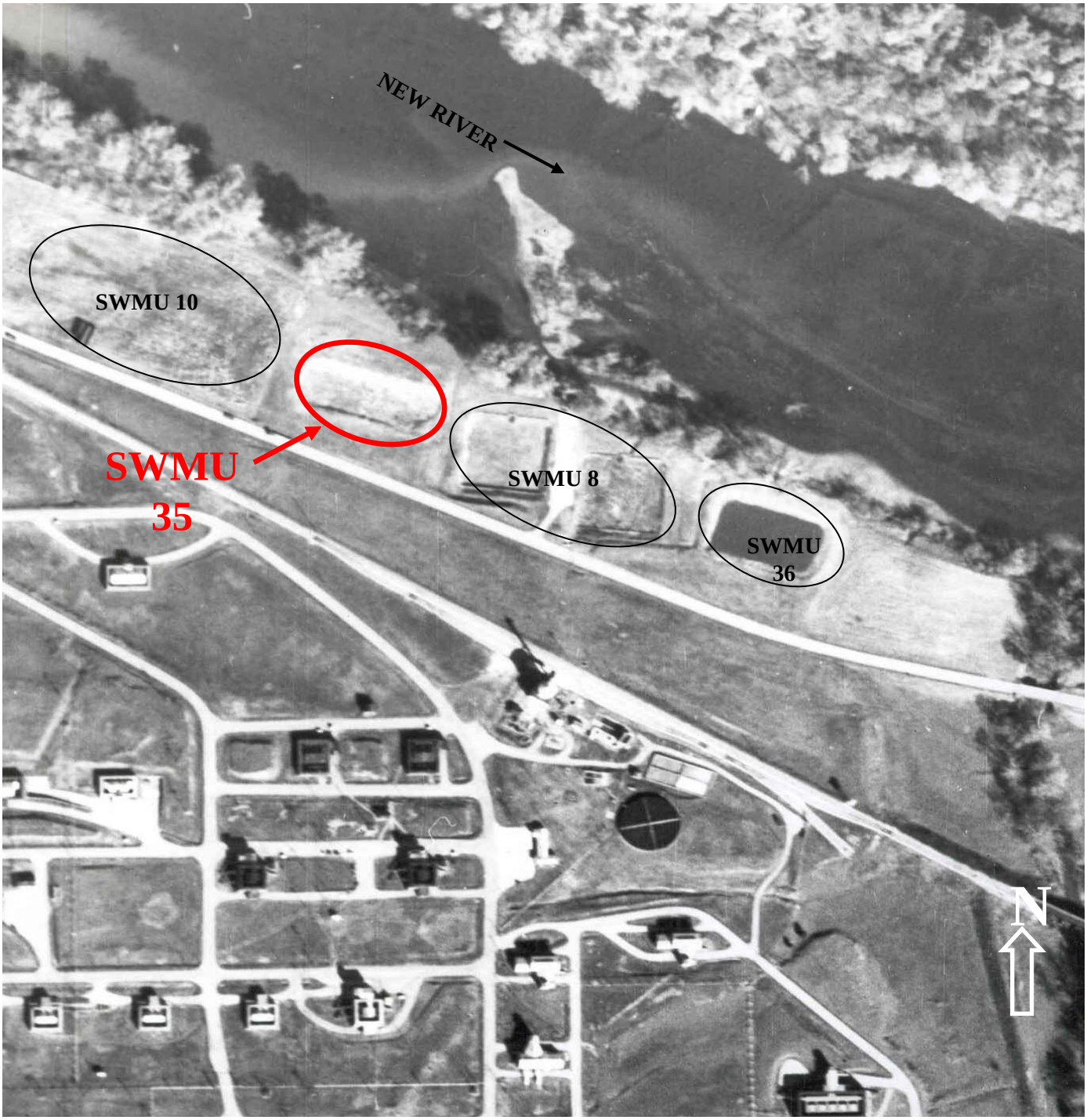

FIGURE 2-8
Aerial Photograph – 1962
SWMU 35

Date: May 2008	URS Project #:: 21354887
Prepared by:: DBC	Approved by:: JOS
Scale: Not to Scale	File Name:: Fig.2-8 Aerial 1962

SWMUs 35, 37, 38, and AOC Q
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FIGURE 2-9

Aerial Photograph – 1986
SWMU 35

Date: May 2008	URS Project #:: 21354887
Prepared by:: DBC	Approved by:: JOS
Scale: Not to Scale	File Name:: Fig.2-9 Aerial 1986

SWMUs 35, 37, 38, and AOC Q
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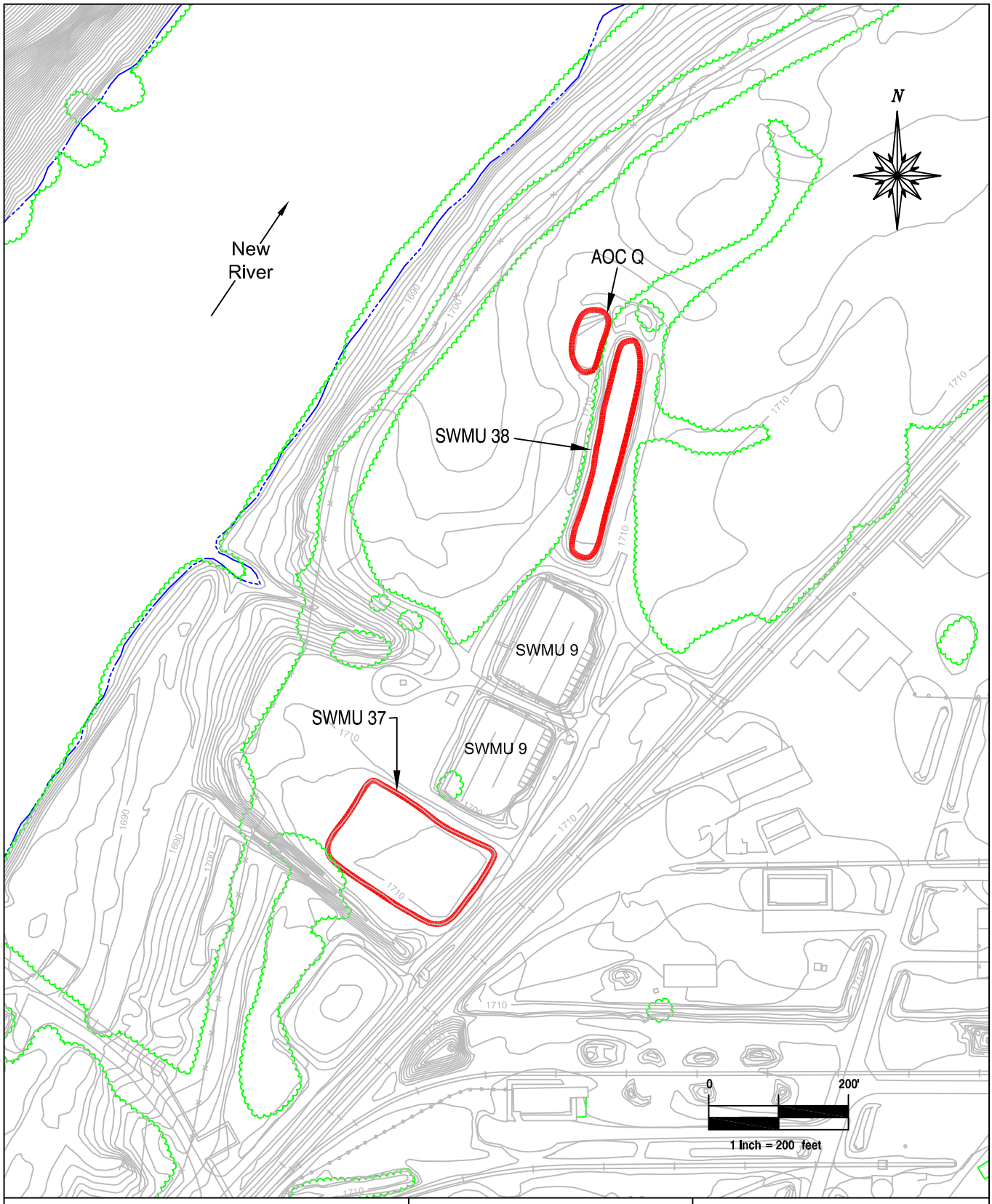

Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Vegetation
- Aboveground Piping

FIGURE 2-10

Site Topographic Map - SWMUs 37, 38, and AOC Q

Date: June 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 200 feet	File Name: Fig.2-10 SiteTopo

SWMUs 35, 37, 38, and AOC Q
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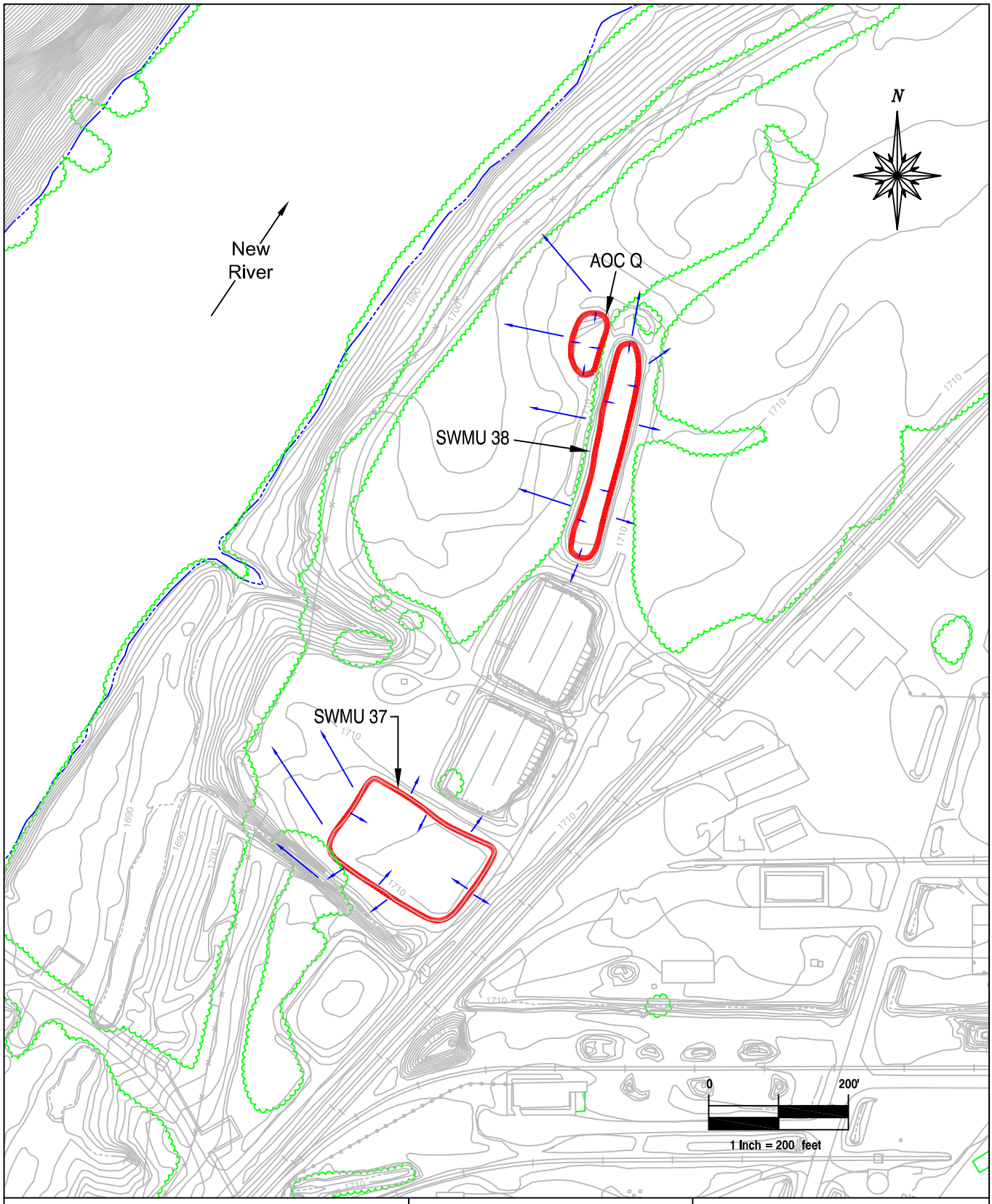

Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Vegetation
- Aboveground Piping
- Surface Water Flow Direction

FIGURE 2-11

Surface Water Drainage - SWMU 37, 38, and AOC Q

Date: June 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 200 feet	File Name: Fig.2-11 SWDrainage

SWMUs 35, 37, 38, and AOC Q
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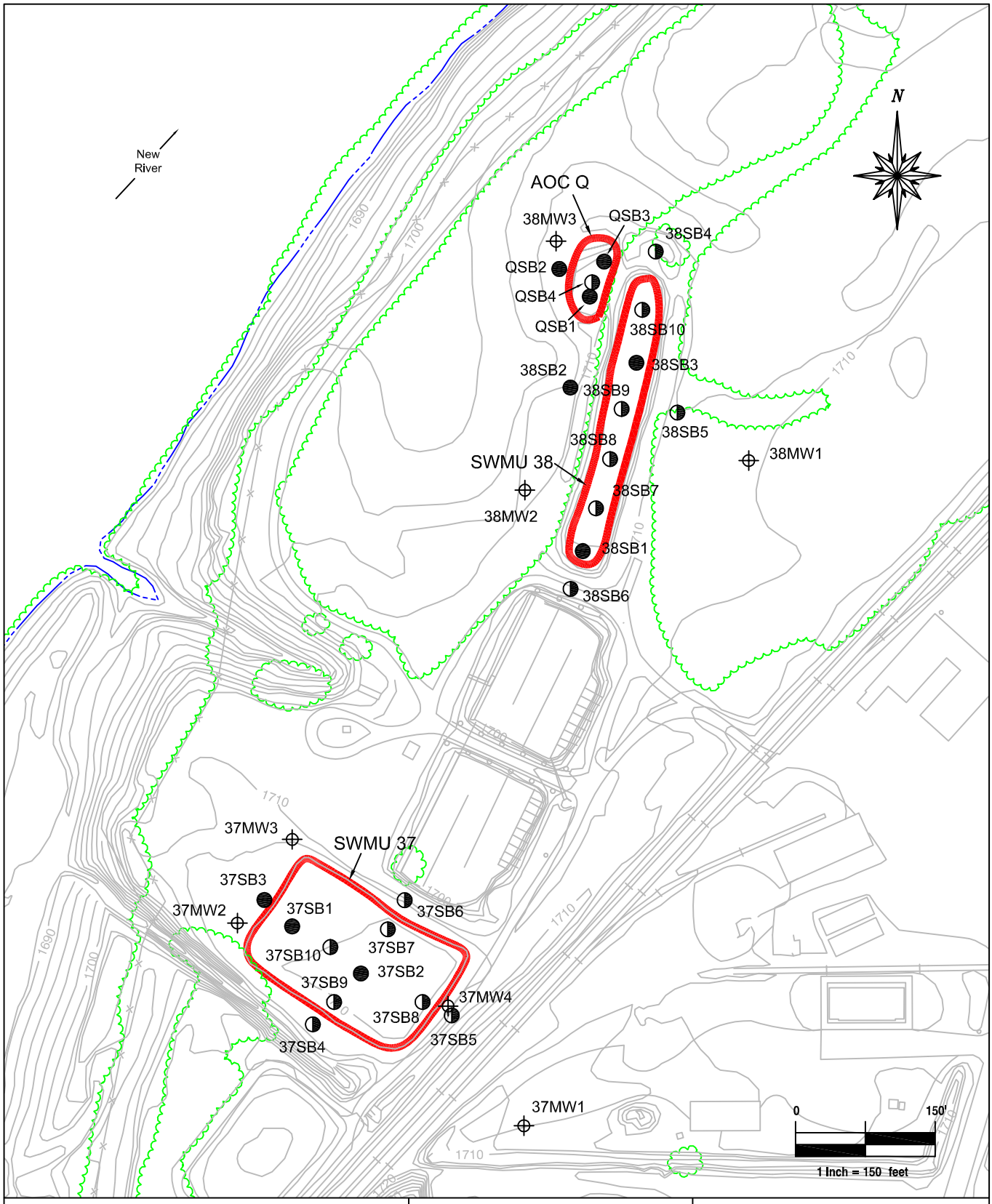

Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Vegetation
- Aboveground Piping
- Monitoring Well
- RFI Soil Boring Location
- SSP Soil Boring Location

FIGURE 2-12

Sample Locations - SWMUs 37, 38, and AOC Q

Date: July 2010	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 150 feet	File Name: Fig.2-12 RFI Locs

SWMUs 35, 37, 38, and AOC Q
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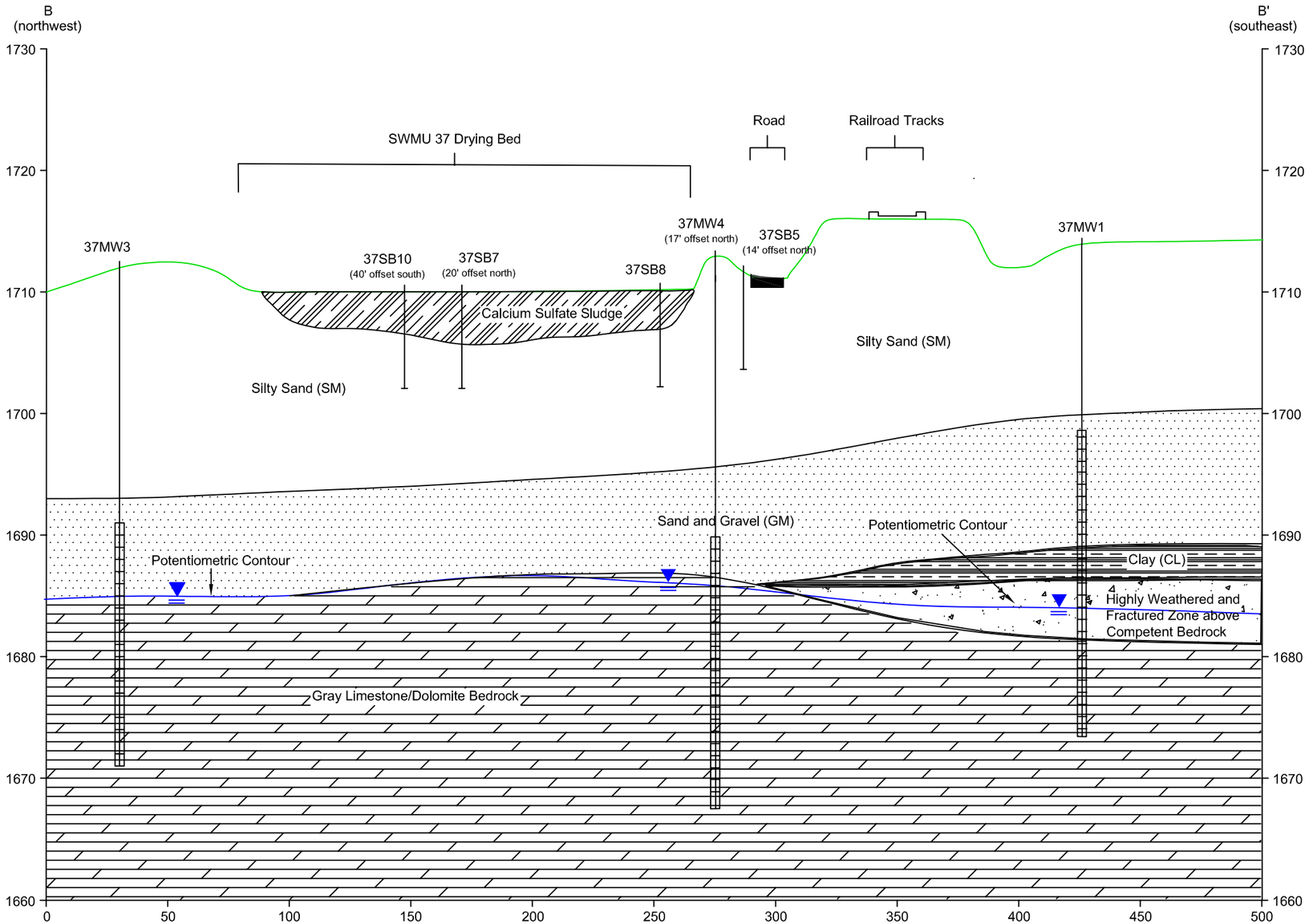

1" = 10'

1" = 50'

Vertical
Exaggeration = 5

Note: Groundwater Elevation Data from
June 16, 2010

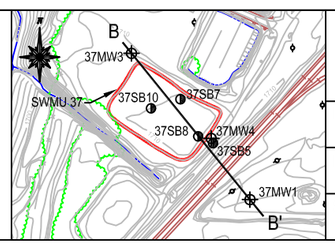

FIGURE 2-13
SWMU 37 Cross Section - B-B'

Date: July 2010	URS Project #: 21354887
Prepared by: CDM	Approved by: JOS
Scale: As Shown	File Name: Fig.2-13 37CrossSecB-B'

SWMUs 35, 37, 38 and AOC Q

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Radford, Virginia

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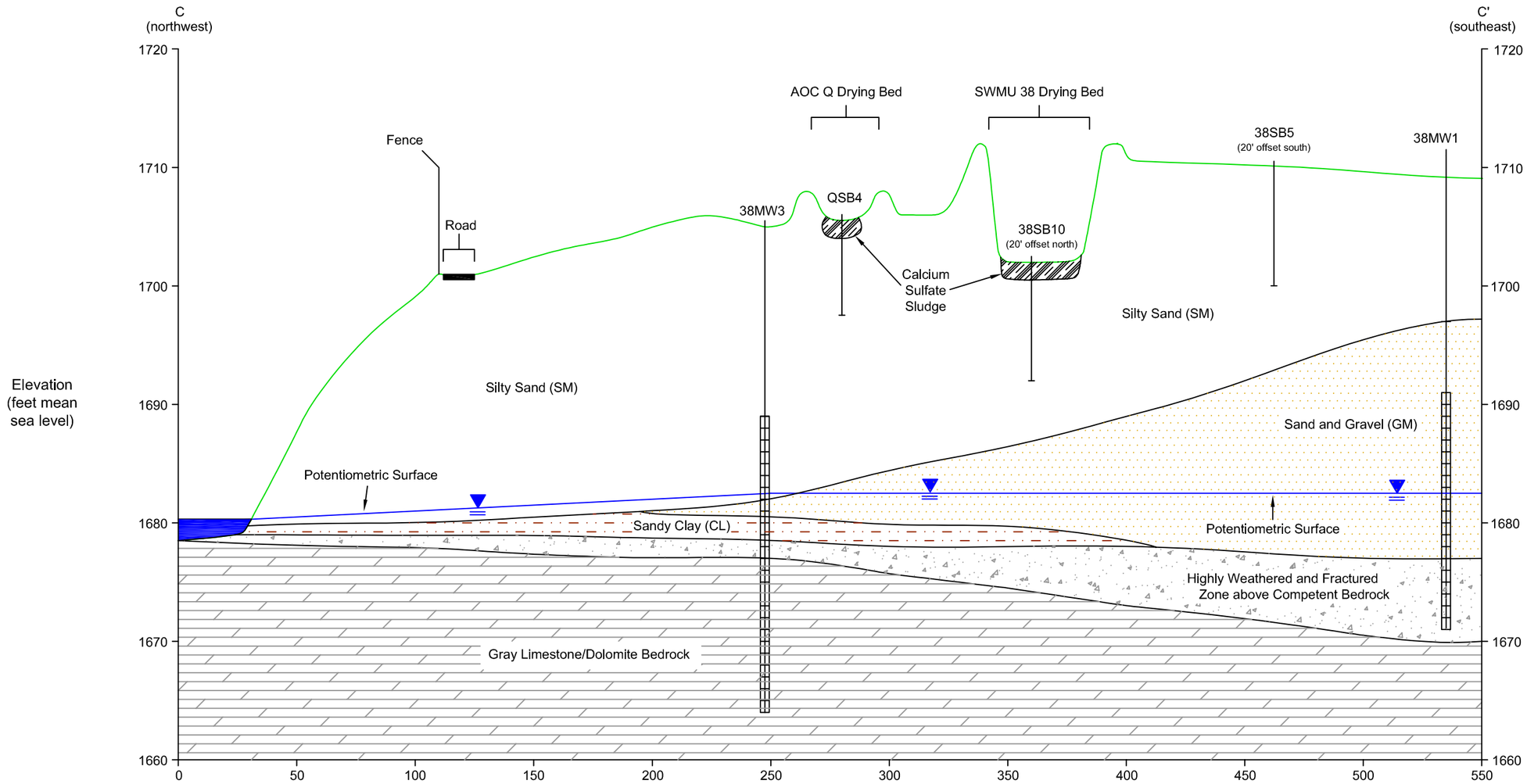

1" = 10'

1" = 50'

Vertical
Exaggeration = 5

Note: Groundwater Elevation Data from
February 7, 2008

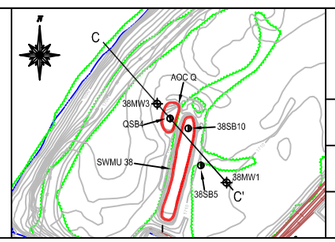

FIGURE 2-14
SWMU 38 and AOC Q Cross Section - C-C'

Date: April 2010	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: As Shown	File Name: Fig.2-14 38/QCrossSecC-C'

SWMUs 35, 37, 38 and AOC Q
RFI Report
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Radford, Virginia

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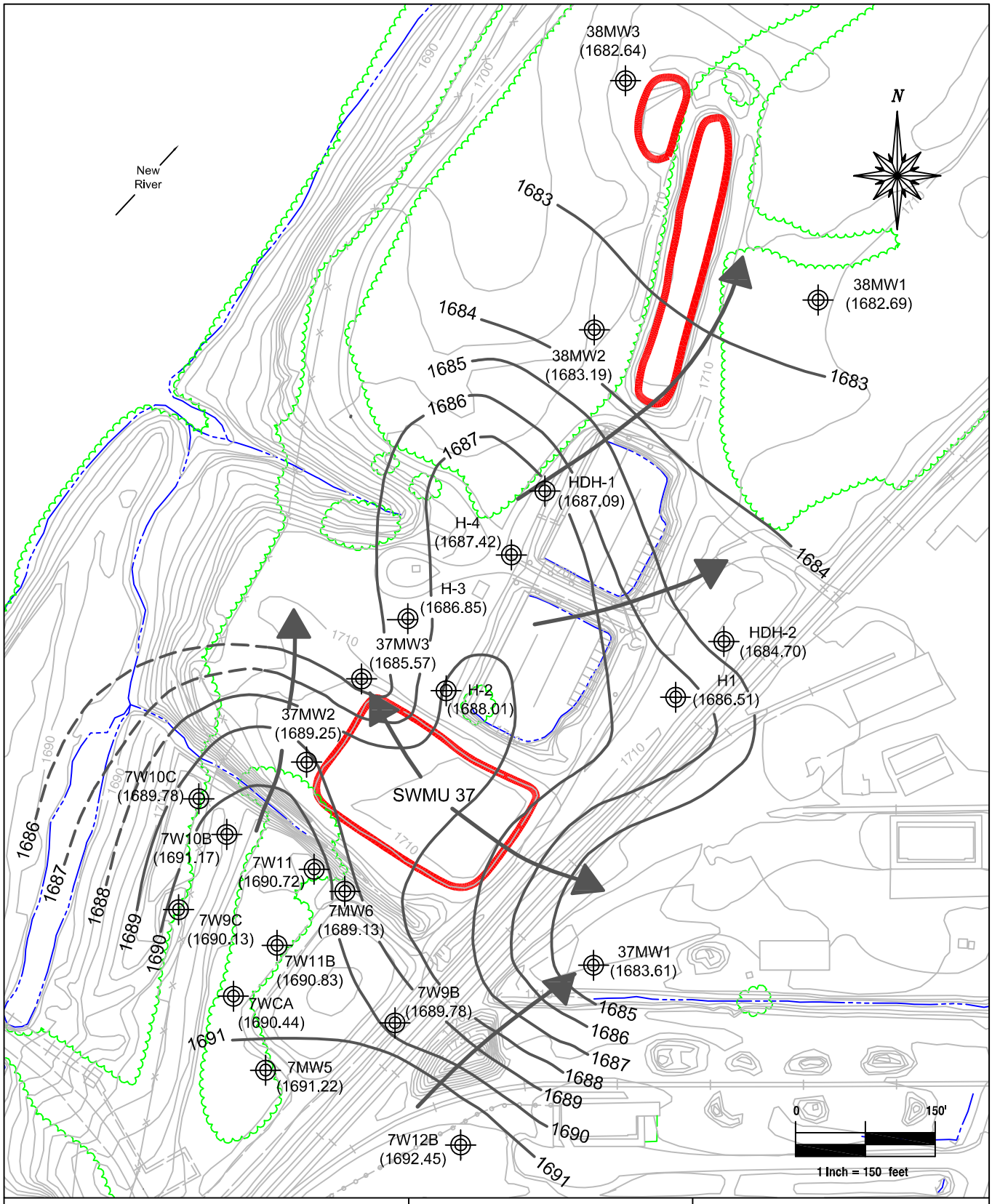

Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Groundwater Flow Direction
- Monitoring Well
- Potentiometric Contour
- (1688.96) Groundwater Elevation (feet, mean sea level)

FIGURE 2-15

Potentiometric Contour Map for November 2009

Date: February 2010	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 150 feet	File Name: Fig.2-15 PotMap

SWMUs 35, 37, 38, and AOC Q
RFI Report
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Radford, Virginia

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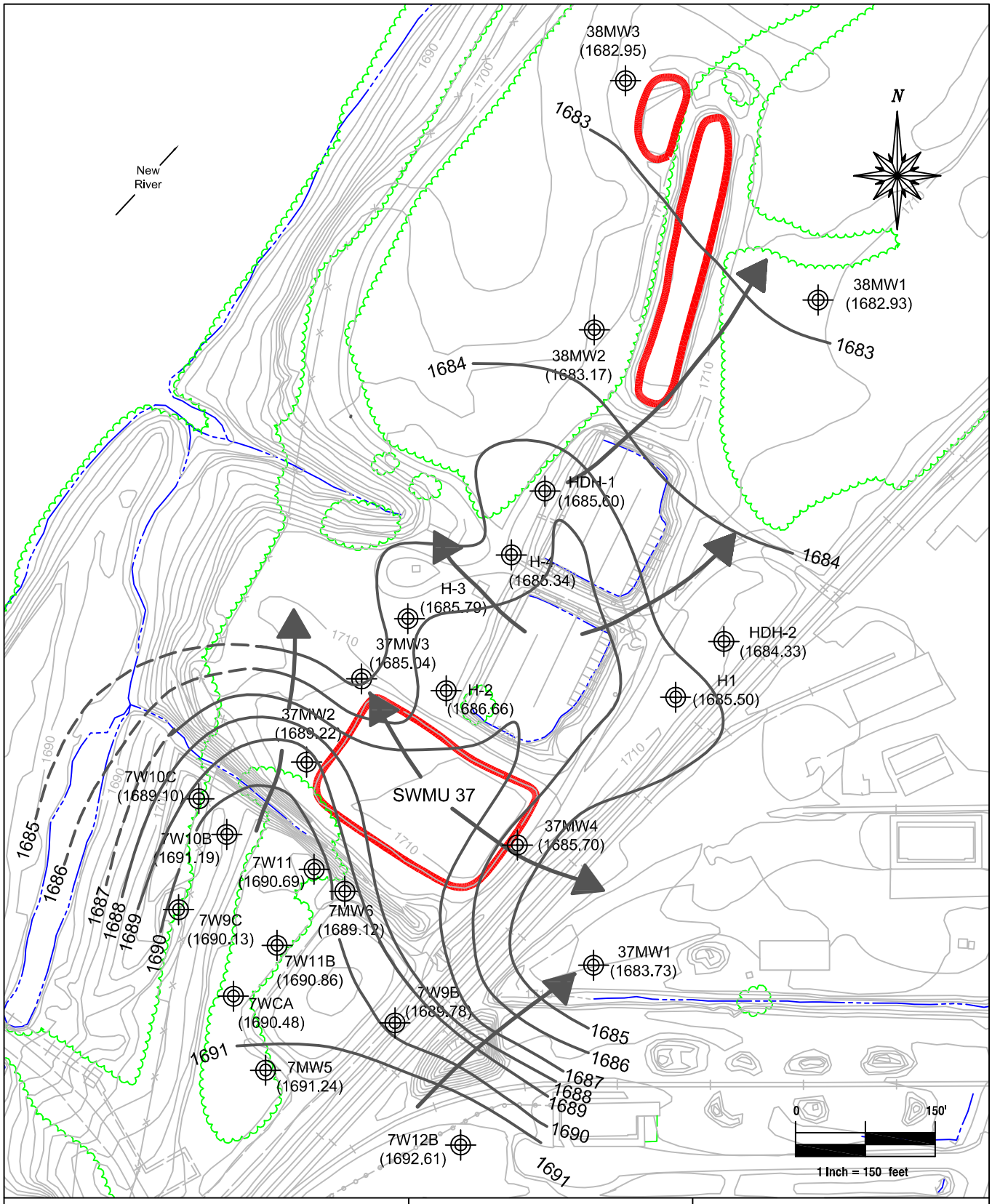

Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Groundwater Flow Direction
- Monitoring Well
- Potentiometric Contour
- (1688.96) Groundwater Elevation (feet, mean sea level)

FIGURE 2-16

Potentiometric Contour Map for June 2010

Date: July 2010	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 150 feet	File Name: Fig.2-15 PotMap

SWMUs 35, 37, 38, and AOC Q
RFI Report
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Radford, Virginia

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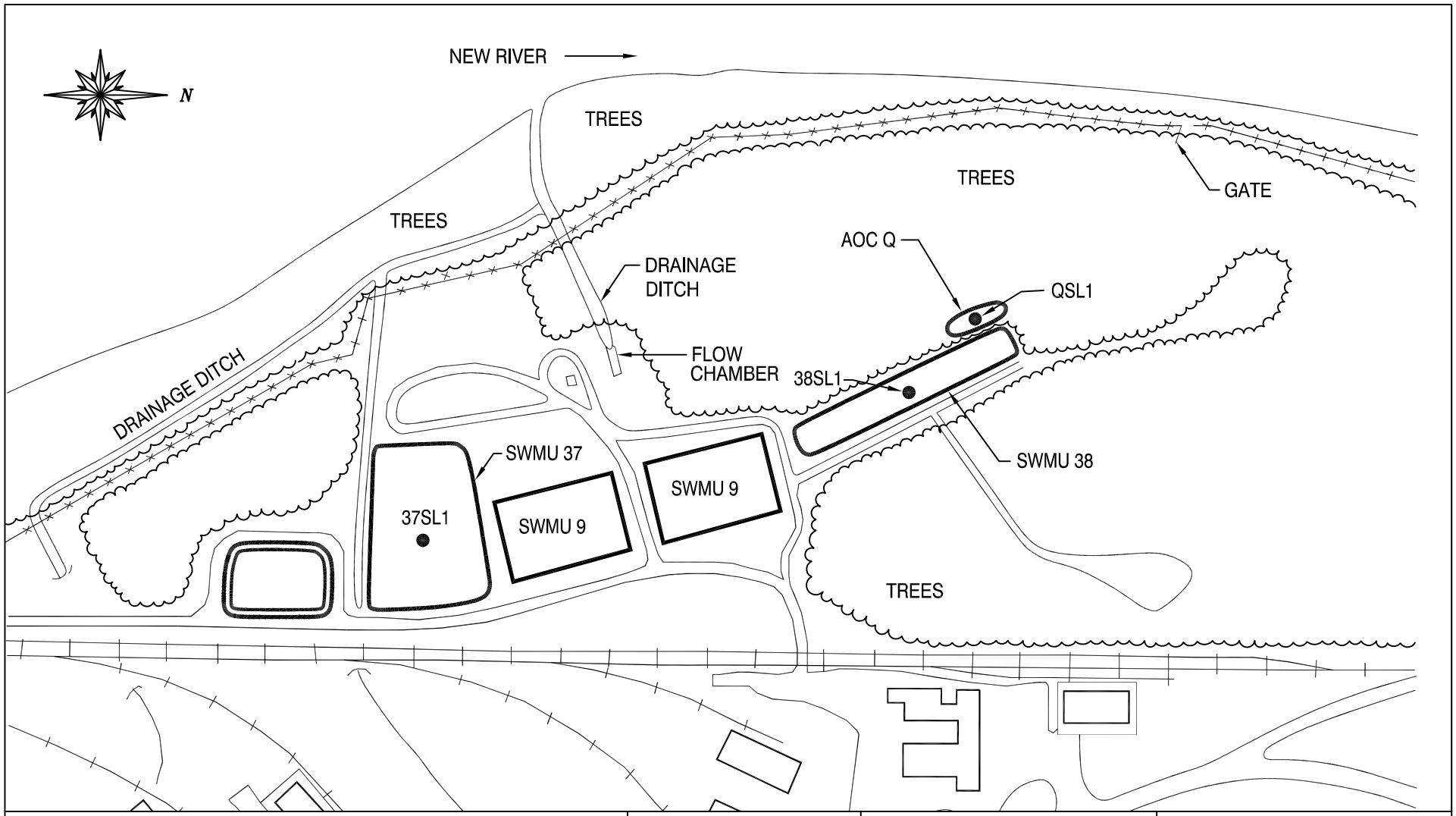

Legend

- Soil Boring Location
- SWMU Boundary
- Perimeter Fence
- Vegetation

0 200'

1 Inch = 200 feet

FIGURE 2-17

VI Sample Locations - SWMU 37, 38, and AOC Q

Date: June 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1" = 200'	File Name: Fig. 2-17 VI Locs

SWMUs 35, 37, 38, and AOC Q
RFI Report
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Radford, Virginia

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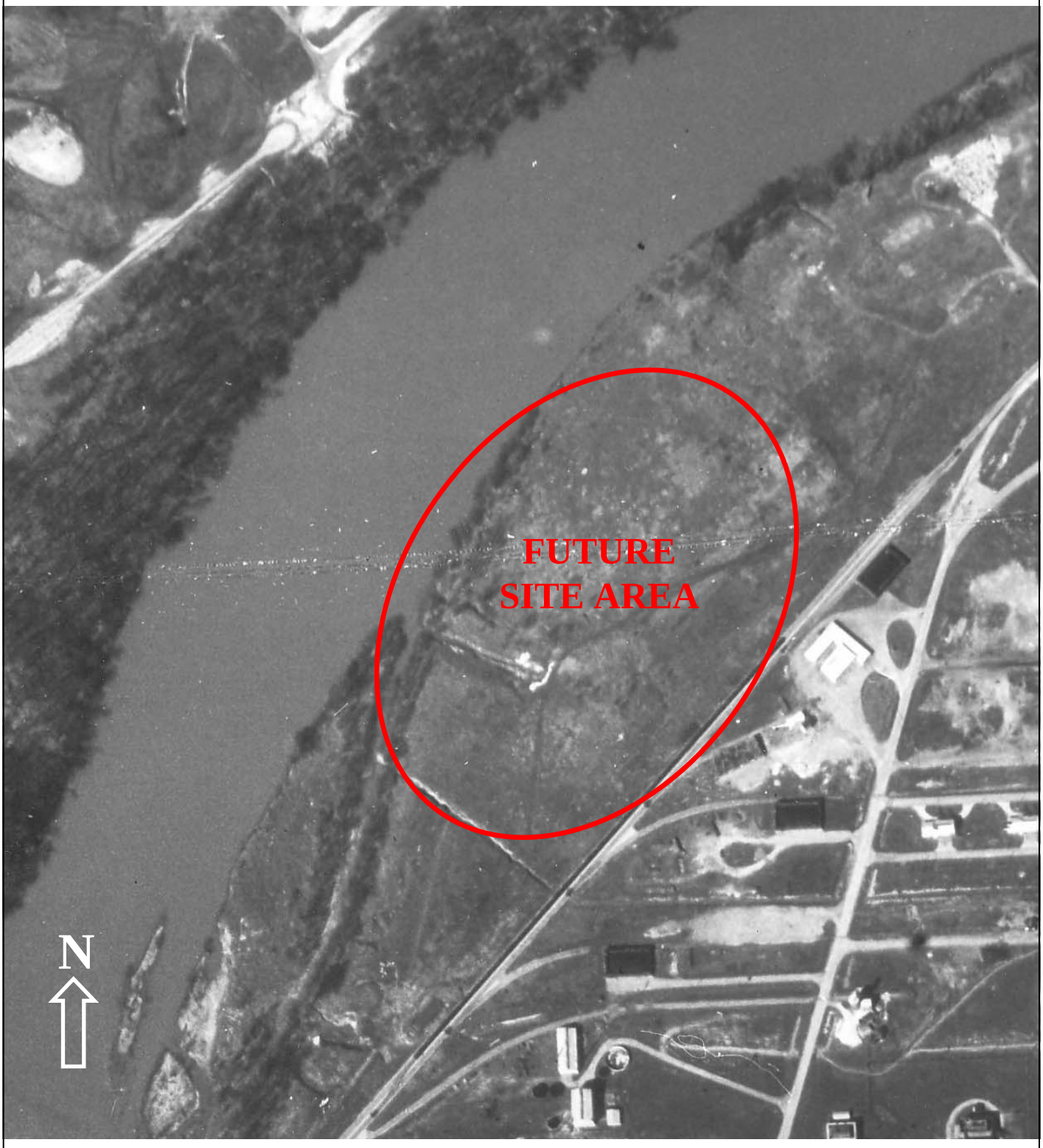

FIGURE 2-18

Aerial Photograph – 1949
SWMU 37, 38, and AOC Q

Date: May 2008	URS Project #:: 21354887
Prepared by:: DBC	Approved by:: JOS
Scale: Not to Scale	File Name:: Fig.2-18 Aerial 1949

SWMUs 35, 37, 38, and AOC Q
RFI Report
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Radford, Virginia

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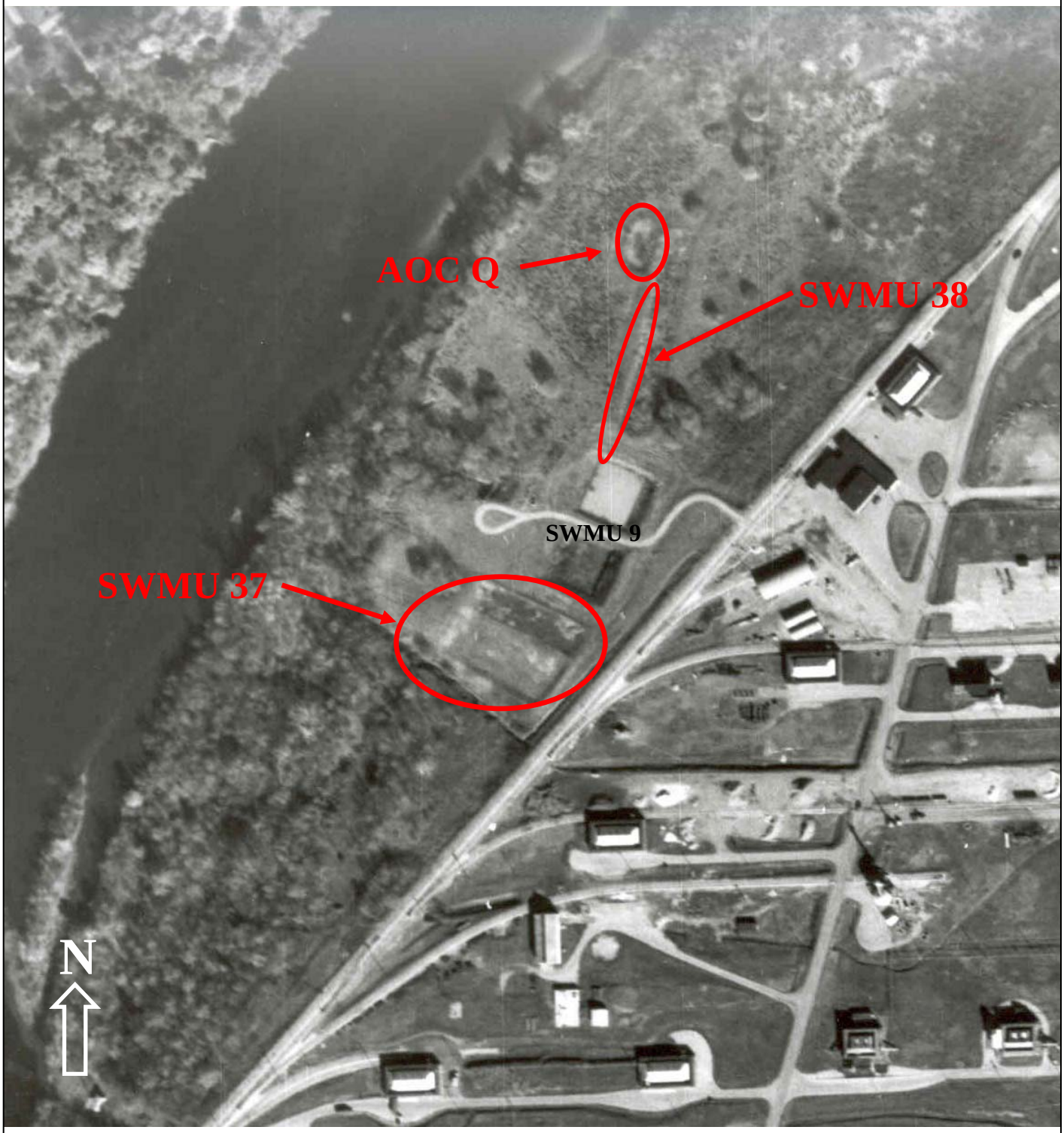

FIGURE 2-19

Aerial Photograph – 1962
SWMU 37, 38, and AOC Q

Date: May 2008	URS Project #:: 21354887
Prepared by:: DBC	Approved by:: JOS
Scale: Not to Scale	File Name:: Fig.2-19 Aerial 1962

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

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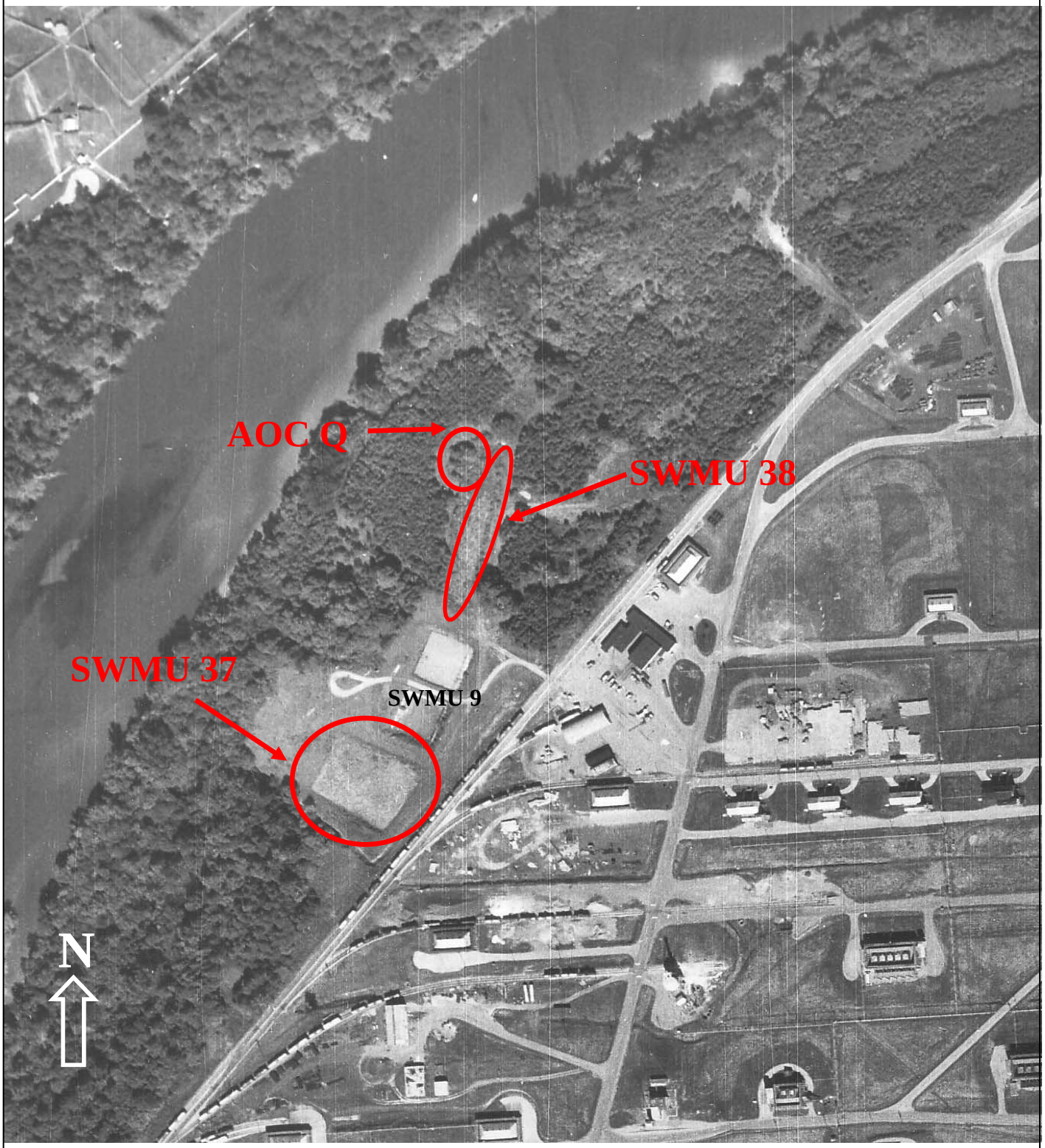

FIGURE 2-20

Aerial Photograph – 1971
SWMU 37, 38, and AOC Q

Date: May 2008	URS Project #:: 21354887
Prepared by:: DBC	Approved by:: JOS
Scale: Not to Scale	File Name:: Fig.2-20 Aerial 1971

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

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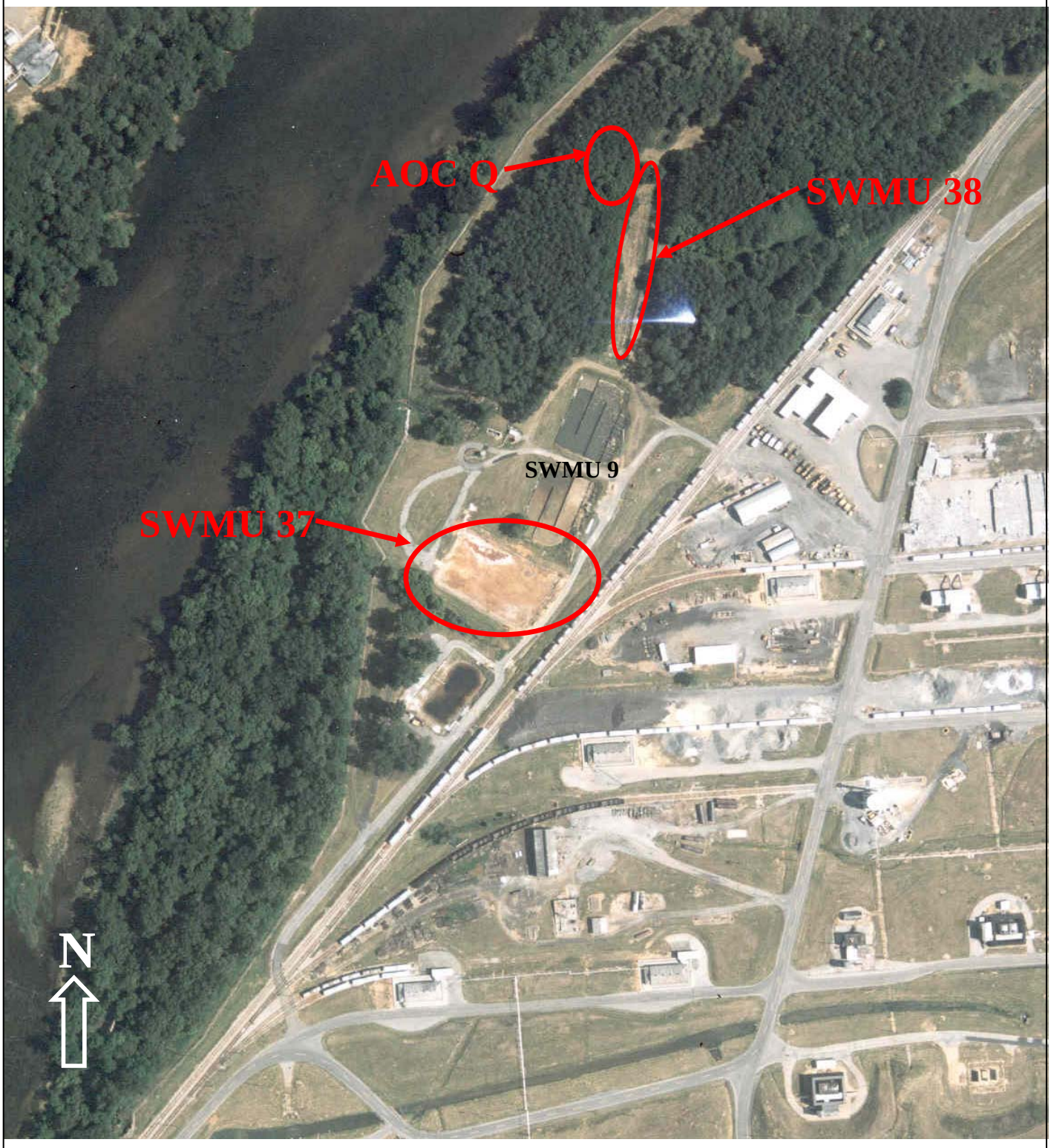

FIGURE 2-21

Aerial Photograph – 1986
SWMU 37, 38, and AOC Q

Date: May 2008	URS Project #:: 21354887
Prepared by:: DBC	Approved by:: JOS
Scale: Not to Scale	File Name:: Fig.2-21 Aerial 1986

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

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Table 2-1
Physical Soil Testing Results
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Soil Sample			Physical Soil Testing Results											
Location	Depth Collected (ft bgs)	USCS Soil Type	Water Content (D2216)	Liquid Limit (D4318)	Plastic Limit (D4318)	Plastic Ind. (D4318)	Grain Size Minus No. 200 (D422-63)	pH Distilled Water (D4972)	pH 0.01 M CaCl Solution (D4972)	Organic Content (D2974)	Specific Gravity (D854)	Total Bulk Density (D2937)	Dry Bulk Density (D2937)	Hydraulic Conductivity (D5084)
			%	--	--	--	%	SU	SU	%	--	pcf	pcf	cm/sec
SWMU 35														
35SB7[1]	0-2	SM	33.0	104	63	41	44.7	7.6	7.2	4*	2.225	46.7	57.3	1.2E-04
35SB7	4-7	SC	31.0	29	20	9	35.0	6.8	6.3	9*	2.710	125.8	107.9	1.8E-06
SWMU 37, SWMU 38, and AOC Q														
37SB1	6 - 6.5	SC-SM	21.8	22	18	4	43.0	6.3	6.0	1.5	2.677	130.1	106.8	1.6E-07
37SB2	15.5 - 16	SM	17.0	nt	nt	nt	33.7	5.1	5.4	1.6	2.746	122.7	104.9	2.3E-04
38SB1	7	SM	20.9	nt	nt	nt	34.8	7.1	6.6	1.7	2.713	125.8	104.1	nt
38SB2	15.5	SM	3.7	nt	nt	nt	13.8	6.8	6.3	1.1	2.702	116.0	111.9	2.0E-03
QSB1	9.5 - 10	CL	26.4	31	21	10	52.6	6.4	6.5	1.8	2.717	123.8	97.9	1.2E-07
QSB2	24	GP	6.2	nt	nt	nt	3.9	6.4	6.2	0.6	2.692	121.6	114.6	nt

Notes:
[1] = Sample collected from calcium sulfate sludge
ft bgs = Feet below ground surface
pcf = Pounds per cubic foot
cm/sec = centimeters per second
USCS = Unified Soil Classification System
(D2216) = ASTM Test Method

SU = Standard Units
-- = Unitless
nt = Not tested
* = total organic carbon

SM = Sand with silty fines
SC = Sand with clayey fines
CL = Clay low plasticity
GP = Gravel poorly graded

Table 2-2
Boring Data Summary Table
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Boring	Depth Below Ground Surface			Elevation - Mean Sea Level					Coordinates	
	Top of Bedrock (bgs)	Borehole Termination (ft bgs)	DTW During Drilling (bgs)	Ground Surface (msl)	Top of Well Casing (msl)	Top of Bedrock (msl)	Borehole Termination (msl)	Groundwater During Drilling (msl)	Northing	Easting
SWMU 35										
RFI Borings										
35SB1	--	10.0	--	--	--	--	--	--	3599746.41	10890831.93
35SB2	--	10.0	--	--	--	--	--	--	3599656.89	10890901.91
35SB3	--	10.0	--	--	--	--	--	--	3599663.88	10891005.49
35SB4	--	10.0	--	--	--	--	--	--	3599749.09	10890948.27
35SB5	--	18.0	16.0	--	--	--	--	--	3599732.62	10890939.34
35SB6	--	16.5	16.0	--	--	--	--	--	3599678.87	10890991.75
35SB7	--	16.0	15.5	--	--	--	--	--	3599674.58	10890902.29
35SB8	--	16.5	16.0	--	--	--	--	--	3599740.42	10890856.35
35SB9	--	16.0	16.0	--	--	--	--	--	3599713.33	10890898.31
35SB10	--	16.0	16.0	--	--	--	--	--	3599696.83	10890942.30
35MW1	22.0	31.0	19.0	1703.72	1706.42	1681.72	1672.72	1684.72	3599735.69	10890978.62
35MW2	26.0	31.0	19.0	1703.91	1706.88	1677.91	1672.91	1684.91	3599774.50	10890901.00
Previous Investigation Borings										
D-2	35.0	23.5	13	1712.41	1715.10	1677.41	1688.91	1702.10	3599471.76	10890923.42
D-4	35.0	23.0	14.5	1712.45	1714.78	1677.45	1689.45	1700.28	3599513.97	10890798.69
SWMU 37										
SSP Borings										
37SB1	--	24.0	20.5	--	--	--	--	--	3598736.43	10885030.02
37SB2	--	22.9	--	--	--	--	--	--	3598912.08	10885016.76
37SB3	--	28.0	25.5	--	--	--	--	--	3598938.76	10885087.68
RFI Borings										
37SB4	--	8.0	--	--	--	--	--	--	3598230.50	10884719.50
37SB5	--	8.0	--	--	--	--	--	--	3598233.50	10884859.50
37SB6	--	8.0	--	--	--	--	--	--	3598348.50	10884803.50
37SB7	--	8.0	--	--	--	--	--	--	3598322.90	10884798.87
37SB8	--	8.0	--	--	--	--	--	--	3598244.76	10884836.17
37SB9	--	8.0	--	--	--	--	--	--	3598244.76	10884741.13
37SB10	--	8.0	--	--	--	--	--	--	3598303.77	10884737.07
37MW1	32.0	40.0	23.0	1713.35	1716.02	1681.35	1673.35	1690.35	3598111.58	10884944.96
37MW2	27.0	41.0	25.0	1714.38	1716.82	1687.38	1673.38	1689.38	3598329.53	10884637.07
37MW3	27.0	41.0	23.5	1712.00	1714.55	1685.00	1671.00	1688.50	3598419.40	10884695.97
37MW4	26.0	45.5	43.0	1713.38	1716.01	1687.38	1667.88	1670.38	3598240.78	10884863.39
SWMU 38										
SSP Borings										
38SB1	--	7.5	--	--	--	--	--	--	3598333.22	10884717.78
38SB2	--	22.0	--	--	--	--	--	--	3598282.56	10884791.68
38SB3	--	6.0	--	--	--	--	--	--	3598361.60	10884687.98
RFI Borings										
38SB4	--	10.0	--	--	--	--	--	--	3599051.00	10885086.69
38SB5	--	10.0	--	--	--	--	--	--	3598878.02	10885109.86
38SB6	--	10.0	--	--	--	--	--	--	3598688.61	10884995.15
38SB7	--	10.0	--	--	--	--	--	--	3598775.17	10885022.46
38SB8	--	10.0	--	--	--	--	--	--	3598828.08	10885037.65
38SB9	--	10.0	--	--	--	--	--	--	3598881.88	10885049.97
38SB10	--	10.0	--	--	--	--	--	--	3598988.39	10885072.20
38MW1	34.0	40.0	26.5	1709.40	1712.00	1675.40	1669.40	1682.90	3598826.51	10885186.56
38MW2	26.5	36.0	22	1707.58	1710.30	1681.08	1671.58	1685.58	3598794.79	10224946.04
38MW3	28.0	41.0	22.75	1705.03	1707.69	1677.03	1664.03	1682.28	3599062.07	10884979.73

Table 2-2
Boring Data Summary Table
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	Depth Below Ground Surface			Elevation - Mean Sea Level					Coordinates	
Boring	Top of Bedrock (bgs)	Borehole Termination (ft bgs)	DTW During Drilling (bgs)	Ground Surface (msl)	Top of Well Casing (msl)	Top of Bedrock (msl)	Borehole Termination (msl)	Groundwater During Drilling (msl)	Northing	Easting
Soil Characterization Borings										
38SC1	--	2.0	--	--	--	--	--	--	3598908.30	10885113.16
38SC2	--	2.0	--	--	--	--	--	--	3598894.30	10885141.88
38SC3	--	2.0	--	--	--	--	--	--	3598897.62	10885177.27
38SC4	--	2.0	--	--	--	--	--	--	3598887.27	10885177.60
38SC5	--	2.0	--	--	--	--	--	--	3598879.60	10885177.27
38SC6	--	2.0	--	--	--	--	--	--	3598870.59	10885177.60
38SC7	--	2.0	--	--	--	--	--	--	3598890.61	10885191.29
38SC8	--	2.0	--	--	--	--	--	--	3598883.60	10885191.63
38SC9	--	2.0	--	--	--	--	--	--	3598875.93	10885191.29
38SC10	--	2.0	--	--	--	--	--	--	3598867.58	10885191.29
38SC11	--	2.0	--	--	--	--	--	--	3598887.27	10885204.31
38SC12	--	2.0	--	--	--	--	--	--	3598880.60	10885204.31
38SC13	--	2.0	--	--	--	--	--	--	3598870.25	10885204.31
38SC14	--	2.0	--	--	--	--	--	--	3598880.27	10885216.00
38SC15	--	2.0	--	--	--	--	--	--	3598883.27	10885231.02
AOC Q										
SSP Borings										
QSB1	--	20.6	19.5	--	--	--	--	--	3599009.88	10885037.49
QSB2	--	28	23	--	--	--	--	--	3599047.51	10885052.95
QSB3	--	20	19.7	--	--	--	--	--	3599039.54	10885004.78
RFI Borings										
QSB4	--	8	--	--	--	--	--	--	3599017.96	10885018.36

Notes:
bgs = Below ground surface
msl = Mean sea level
DTW = Depth to water
SSP = Site Screening Process
RFI = RCRA Facility Investigation

Table 2-3
Monitoring Well and Groundwater Elevation Data
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Well Identification	Date Installed	Screened Zone	Boring Depth (ft bgs)	Depth to Bedrock (ft bgs)	Bedrock Elevation (ft msl)	Screened Interval (ft bgs)	Elevation Ground Surface (ft msl)	Elevation TOC (inner) (ft msl)	RFI											
									DTW (ft BTOC) 02/07/08	Groundwater Elevation (ft msl)	Thickness of Saturated Interval Above Bedrock (ft)	DTW (ft BTOC) 08/12/08	Groundwater Elevation (ft msl)	Thickness of Saturated Interval Above Bedrock (ft)	DTW (ft BTOC) 11/10/09	Groundwater Elevation (ft msl)	Thickness of Saturated Interval Above Bedrock (ft)	DTW (ft BTOC) 06/16/10	Groundwater Elevation (ft msl)	Thickness of Saturated Interval Above Bedrock (ft)
35MW1	12/14/2007	unconsolidated/bedrock	31.0	22.0	1681.72	11.0-31.0	1703.72	1706.42	19.82	1686.60	4.88	--	--	--	--	--	--	--	--	--
35MW2	12/17/2007	unconsolidated/bedrock	31.0	26.0	1677.91	11.0-31.0	1703.91	1706.88	21.32	1685.56	7.65	--	--	--	--	--	--	--	--	--
D-2	8/7/1980	unconsolidated/bedrock	35.0	23.5	1688.91	20.0-35.0	1712.41	1715.10	23.51	1691.59	2.68	--	--	--	--	--	--	--	--	--
D-4	8/7/1980	unconsolidated/bedrock	35.0	23.0	1689.45	20.0-35.0	1712.45	1714.78	22.90	1691.88	2.43	--	--	--	--	--	--	--	--	--
37MW1	12/13/2007	unconsolidated/bedrock	40.0	32.0	1681.35	15.0-40.0	1713.35	1716.02	32.61	1683.41	2.06	33.07	1682.95	1.60	32.41	1683.61	2.26	32.29	1683.73	2.38
37MW2	12/11/2007	unconsolidated/bedrock	41.0	27.0	1687.38	21.0-41.0	1714.38	1716.82	27.86	1688.96	1.58	27.95	1688.87	1.49	27.57	1689.25	1.87	27.60	1689.22	1.84
37MW3	12/12/2007	unconsolidated/bedrock	41.0	27.0	1685.00	21.0-41.0	1712.00	1714.55	29.51	1685.04	0.04	29.96	1684.59	-0.41	28.98	1685.57	0.57	29.51	1685.04	0.04
37MW4	5/25/2010	unconsolidated/bedrock	45.5	26.0	1687.38	20.0-45.0	1713.38	1716.01	--	--	--	--	--	--	--	--	--	30.31	1685.70	-1.68
38MW1	12/20/2007	unconsolidated/bedrock	40.0	34.0	1675.40	20.0-40.0	1709.40	1712.00	29.25	1682.75	7.35	30.50	1681.50	6.10	29.31	1682.69	7.29	29.07	1682.93	7.53
38MW2	12/21/2007	unconsolidated/bedrock	36.0	26.5	1681.08	16.0-36.0	1707.58	1710.30	27.13	1683.17	2.09	28.37	1681.93	0.85	27.11	1683.19	2.11	27.13	1683.17	2.09
38MW3	12/18/2007	unconsolidated/bedrock	41.0	28.0	1677.03	16.0-41.0	1705.03	1707.69	24.95	1682.74	5.71	26.48	1681.21	4.18	25.05	1682.64	5.61	24.74	1682.95	5.92
H-1	7/23/1980	unconsolidated/bedrock	40.0	26.0	1686.48	25.0-40.0	1712.48	1715.53	--	--	--	--	--	--	29.02	1686.51	0.03	30.03	1685.50	-0.98
H-2	7/24/1980	unconsolidated	40.0	--	--	25.0-40.0	1709.90	1712.70	--	--	--	--	--	--	24.69	1688.01	--	26.04	1686.66	--
H-3	7/25/1980	unconsolidated/bedrock	40.0	23.0	1686.66	25.0-40.0	1709.66	1712.98	--	--	--	--	--	--	26.13	1686.85	0.19	27.19	1685.79	-0.87
H-4	7/25/1980	unconsolidated/bedrock	40.0	32.0	1678.90	25.0-40.0	1710.90	1713.90	--	--	--	--	--	--	26.48	1687.42	8.52	28.56	1685.34	6.44
HDH-1	7/14/1980	unconsolidated/bedrock	40.0	24.0	1686.60	20.0-40.0	1710.60	1713.60	--	--	--	--	--	--	26.51	1687.09	0.49	28.00	1685.60	-1.00
HDH-2	7/11/1980	unconsolidated/bedrock	45.0	35.0	1678.00	25.0-40.0	1713.00	1716.00	--	--	--	--	--	--	31.30	1684.70	6.70	31.67	1684.33	6.33
7W12B	NA	NA	35.0	NA	--	19.5-34.5	1714.81	1717.31	--	--	--	--	--	--	24.86	1692.45	--	24.70	1692.61	--
7WCA	5/12/1987	unconsolidated/bedrock	40.8	28.9	1683.50	31.6-38.6	1712.40	1715.40	--	--	--	--	--	--	24.96	1690.44	6.94	24.92	1690.48	6.98
7MW6	1/11/1989	unconsolidated	64.5	--	--	47.5-52.5	1712.80	1715.30	--	--	--	--	--	--	26.17	1689.13	--	26.18	1689.12	--
7W11B	2/10/1983	unconsolidated/bedrock	35.0	30.0	1682.90	20.0-35.0	1712.90	1715.90	--	--	--	--	--	--	25.07	1690.83	7.93	25.04	1690.86	7.96
7W9C	NA	NA	40.0	NA	--	20.0-40.0	1703.70	1704.45	--	--	--	--	--	--	14.32	1690.13	--	14.32	1690.13	--
7W10B	NA	NA	32.0	NA	--	20.0-30.0	1704.65	1706.65	--	--	--	--	--	--	15.48	1691.17	--	15.46	1691.19	--
7W10C	NA	NA	50.0	NA	--	30.0-50.0	1701.50	1709.30	--	--	--	--	--	--	19.52	1689.78	--	20.20	1689.10	--
7MW5	1/10/1989	unconsolidated/bedrock	44.5	29.5	1683.70	29.0-39.0	1713.20	1716.20	--	--	--	--	--	--	24.98	1691.22	7.52	24.96	1691.24	7.54
7W11	NA	NA	35.0	NA	--	16.0-26.0	1712.82	1714.82	--	--	--	--	--	--	24.10	1690.72	--	24.13	1690.69	--
7W9B	NA	NA	38.0	NA	--	28.0-38.0	1711.40	1712.49	--	--	--	--	--	--	22.71	1689.78	--	22.71	1689.78	--

Notes:
ft = feet
msl = mean sea level
bgs = below ground surface
TOC = Top of Casing
DTW = Depth to Water
BTOC = Below Top of Casing
RFI = RCRA Facility Investigation
NA = Not Available

Table 2-4
Summary of Historical Analytical Data For Sediment/Soil Samples Collected At SWMU 35
Modified from Dames and Moore Verification Investigation Report 1992
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Field ID Sample Date Sample Depth (ft bgs) Matrix	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	BTAG Screening Level	35SE1 RADS*3 21-Aug-90 4 CSE	35SE2 RADS*5 21-Aug-90 4 CSE	35SL1 RVFS*36 15-Jan-92 5 CSE	35SS2 RADS*6 21-Aug-90 6 CSO
TAL Inorganics (mg/kg)								
ARSENIC	15.8	0.426	1.91	328	**3.62**	**5.76**	NT	**1.23 B**
BARIUM	209	1,564	20,440	440	174	304	NT	184
CHROMIUM[1]	65.3	23.5	307	0.0075	124	122	NT	28.5
LEAD[2]	26.8	400	750	0.01	**> 5,000**	**> 5,000**	NT	11.4
MERCURY[3]	0.13	2.35	30.7	0.058	0.347	0.472	NT	< 0.05
NICKEL	62.8	156.4	2,044	2	52.2	80.4	NT	NT
SILVER (GFAA)	--	39.1	511	0.0000098	29	1.57	NT	0.04
SILVER (ICP)	--	39.1	511	0.0000098	45	< 2.5	NT	NT
Explosives (mg/kg)								
2,4,6-TRINITROTOLUENE	--	3.9	51	--	< 4.6	< 5.9	NT	ND
2,4-DINITROTOLUENE	--	15.64	204.4	--	11	<5.5	NT	< 0.424
DINITROTOLUENE MIX	--	0.94	4.2	--	11	<5.5	NT	< 0.424
HMX	--	391.1	5,110	--	< 6.7	< 8.7	NT	ND
RDX	--	5.8	26	--	< 5.9	< 7.6	NT	ND
VOCs (mg/kg)								
ACETONE	--	7,039	91,980	--	> 0.1	< 0.017	< 0.017	ND
TOLUENE	--	626	8,176	0.1	0.004	0.014	< 0.001 B	0.001
Total Unknown TICs	--	--	--	--	ND	ND	ND	(1) 0.036
SVOCs (mg/kg)								
2-METHYLNAPHTHALENE	--	31.3	408.8	--	ND	ND	ND	< 0.049
2,4-DINITROTOLUENE	--	15.6	204.4	--	< 2.8	< 0.14	< 0.7	< 0.14
ACENAPHTHYLENE[4]	--	234.6	3,066	0.1	ND	ND	ND	< 0.033
ANTHRACENE	--	2,346	30,660	0.1	ND	ND	ND	< 0.033
BENZO(K)FLUORANTHENE	--	2.2	39.2	0.1	ND	ND	ND	< 0.066
CHRYSENE	--	22	392	0.1	ND	ND	ND	< 0.12
DI-N-BUTYL PHTHALATE	--	782.1	10,220	--	18.1	0.47	1.37	< 0.061
DIBENZOFURAN	--	7.8	102.2	--	ND	ND	ND	< 0.035
FLUORANTHENE	--	312.9	4,088	0.1	< 1.36	< 0.068	< 0.068	< 0.068
FLUORENE	--	312.9	4,088	0.1	ND	ND	ND	< 0.033
NAPHTHALENE	--	156.4	2,044	0.1	ND	ND	ND	< 0.037
N-NITROSODIPHENYLAMINE	--	130.4	584	--	40	1.23	4.55	ND
PHENANTHRENE[4]	--	234.6	3,066	0.1	< 0.66	0.13	0.531	< 0.033
PYRENE	--	234.6	3,066	0.1	ND	ND	ND	< 0.033
TIC Heptadecane	--	--	--	--	ND	0.418 S	ND	ND
TIC Toluene	--	--	--	--	ND	0.209 S	ND	ND
Total Unknown TICs	--	--	--	--	(1) 21.2	(5) 2.3	(2) 776	ND

Table 2-4
Summary of Historical Analytical Data For Sediment/Soil Samples Collected At SWMU 35
Modified from Dames and Moore Verification Investigation Report 1992
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

USEPA = U.S. Environmental Protection Agency
ft bgs = Feet Below Ground Surface
(A) = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001)
RBC = Risk-Based Concentration
USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007 Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
BTAG = Biological Technical Assistance Group Screening Level (USEPA 1995)
mg/kg = Milligram Per Kilogram
TAL = Target Analyte List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
CSE = Chemicals in Sediment
CSO = Chemicals in Soil
GFAA = Graphite Furnace Atomic Absorption
ICP = Inductively Coupled Plasma
-- = No Risk Criteria Available
ND = Not Detected
NT = Not Tested
TIC = Tentatively Identified Compound
HMX = Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine
B = Analyte was detected in corresponding method blank; values are flagged if the sample concentration is less than 10 times the method blank concentration for common laboratory constituents and 5 times for all other constituents.

= Concentration Exceeds Soil Residential RBC

bold = Concentration Exceeds Soil Industrial RBC

= Concentration Exceeds BTAG Screening Level

underline = Concentration Exceeds Site Background Values

(1) = Chromium VI RBC value was used
(2) = Lead criteria are Action Levels; see USEPA Region III guidance
(3) = Mercuric chloride soil RBC value used
(4) = RBC value for pyrene was used for these compounds

( ) = Parenthesis are used to indicate the number of unknown TICs that were detected in either the volatile or semivolatile GC/MS library scans. The number beside the parenthesis is the total concentration of all TICs detected in each respective scan

Table 2-4 (Continued)
Summary of Historical Analytical Data For Sediment/Soil Samples Collected At SWMU 35
Modified from Dames and Moore Verification Investigation Report 1992
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Field ID Sample Date Sample Depth (ft bgs) Matrix	TCLP Regulatory Threshold	35SE1 RADS*3 21-Aug-90 4 CSE	35SE2 RADS*5 21-Aug-90 4 CSE	35SL1 RVFS*36 15-Jan-92 5 CSE	35SS2 RADS*6 21-Aug-90 6 CSO
TCLP Metals (µg/L)					
ARSENIC	5,000	< 2.54	< 2.54	< 2.54	ND
BARIUM	100,000	586	255	266	238
CADMIUM	1,000	7.91	< 4.01	4.12	ND
CHROMIUM	5,000	27.9	< 6.02	< 6.02	ND
LEAD	5,000	1,800	99.8	42.8	6.94 B
NICKEL	--	121	56.6	NT	NT
SILVER	5,000	< 4.6	< 4.6	12.9	ND

Notes:

ft bgs = Feet Below Ground Surface
µg/L = Microgram Per Liter
SWMU = Solid Waste Management Unit
CSE = Chemicals in Sediment
CSO = Chemicals in Soil
TCLP = Toxicity Characteristic Leaching Procedure
= Concentration Above TCLP Regulatory Threshold
B = Analyte was detected in corresponding method blank; values are flagged if the sample concentration is less than 10 times the method blank concentration for common laboratory constituents and 5 times for all other constituents.

Table 2-5
Summary of Historical Analytical Groundwater Data for SWMU 35
Modified from Bio-Plant (SWMU 10) Environmental Site Investigation (Dames and Moore 1991) and Verification Investigation Report (Dames and Moore 1992 and 1994)
SMWUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Field ID Sample Date Sample Depth (ft bgs) Fraction Matrix	Adjusted Tap Water RBC	USEPA MCL	D-4 RADW*3 22-Aug-90 24.0 CGW	D-4 (+) RDWAU*4 20-Sep-91 28.0 Total CGW	D-4 RDWA*4 20-Sep-91 28.0 Dissolved CGW	D-4 (+) RDWAU*4 20-Sep-91 28.0 CGW	D-2 RDWX*1 20-Jun-93 32.0 Total CGW	D-2 RDWX*1 21-Jun-93 32.0 Dissolved CGW	D-4 RDWX*9 20-Jun-93 30.0 Total CGW	D-4 RDWX*9 20-Jun-93 30.0 Dissolved CGW	D-4(dup) RDWX*10 20-Jun-93 30.0 Total CGW	D-4(dup) RDWX*10 20-Jun-93 30.0 Dissolved CGW	D-5 RDWX*2 21-Jul-93 30.0 Total CGW	D-5 RDWX*2 21-Jul-93 30.0 Dissolved CGW
TAL Metals (µg/L)														
ALUMINUM	3,650	--	NT	23,800	< 141	23,800	NT	NT	NT	NT	NT	NT	NT	NT
ARSENIC	0.0446	10	NT	4.16	< 2.54	4.16	NT	NT	NT	NT	NT	NT	NT	NT
BARIUM	730	2,000	NT	285	99.1	285	NT	NT	NT	NT	NT	NT	NT	NT
CALCIUM	--	--	NT	88,700	37,900	88,700	NT	NT	NT	NT	NT	NT	NT	NT
CHROMIUM	11	100	NT	92.1	< 6.02	92.1	73	<6.02	255	<6.02	172	<6.02	<6.02	<6.02
COPPER [1]	--	1,300	NT	47.9	< 8.09	47.9	NT	NT	NT	NT	NT	NT	NT	NT
IRON	2,555	--	NT	66,100	< 38.8	66,100	NT	NT	NT	NT	NT	NT	NT	NT
LEAD [2]	15	--	NT	100	<1.26	100	23.4	<1.26	80.3	<1.26	63.2	<1.26	4.34	<1.26
MAGNESIUM	--	--	NT	61,800	19,600	61,800	NT	NT	NT	NT	NT	NT	NT	NT
MANGANESE	73	--	NT	528	13.6	528	NT	NT	NT	NT	NT	NT	NT	NT
POTASSIUM	--	--	NT	6,320	1,180	6,320	NT	NT	NT	NT	NT	NT	NT	NT
SODIUM	--	--	NT	8,160	8,240	8,160	NT	NT	NT	NT	NT	NT	NT	NT
VANADIUM	4	--	NT	83.6	< 11	83.6	NT	NT	NT	NT	NT	NT	NT	NT
ZINC	1,095	--	NT	115	< 21.1	115	NT	NT	NT	NT	NT	NT	NT	NT
Explosives (µg/L)														
HMX	183	--	2.27 C	NT	4.24	NT	<1.21	NT	5.07	NT	NT	NT	<1.21	<1.21
VOCs (µg/L)														
CHLOROFORM	0.1546	--	< 0.5	NT	8.51	NT	NT	NT	NT	NT	NT	NT	NT	NT
CHLOROMETHANE	19	--	< 0.5	NT	5.67	NT	NT	NT	NT	NT	NT	NT	NT	NT
SVOCs (µg/L)														
Total Unknown TICs	--	--	ND	NT	(1) 5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Other (µg/L)														
Chloride	--	--	NT	NT	17,800	NT	NT	NT	NT	NT	NT	NT	NT	NT
Nitrite, Nitrate	365	10,000	NT	NT	110	NT	11,000	NT	1,200	NT	1,300	NT	45,000	45,000
Nitrogen by Kjeldahl Method	--	--	NT	NT	667	NT	2,480	NT	1,710	NT	2,100	NT	286	286
Phosphate	--	--	NT	NT	1,500	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sulfate	--	--	NT	NT	13,900	NT	73,200	NT	15,900	NT	15,800	NT	750,000	750,000
TOC	--	--	NT	NT	6,280	NT	3,870	NT	5,820	NT	4,440	NT	3,850	3,850
TOH	--	--	NT	NT	68.4	NT	242	NT	167	NT	218	NT	204	204
pH (Standard Units)	--	--	NT	NT	6.99 K	NT	6.86	NT	7.15	NT	7.06	NT	7.26	7.26

Notes:

USEPA = U.S. Environmental Protection Agency
RBC = Risk-Based Concentration
USEPA Region III Risk-Based Concentration (RBC) values from the October 2007 RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
MCL = Maximum Contaminant Level
CGW = Chemical in groundwater
ft bgs = Feet below ground surface
µg/L = Microgram Per Liter
TAL = Target Analyte List
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
TOC = Total Organic Carbon
TOH = Total Organic Halogen
-- = No Risk Criteria Available
NT = Not Tested

ND = Not detected
TIC = Tentatively Identified Compound
C = Carcinogenic
(dup) = Duplicate sample

= Concentration above Tap Water RBC

= Concentration above USEPA MCL

[1] = Copper MCL value is an action level
[2] = Lead RBC value is an action level

( ) = Parenthesis are used to indicate the number of unknown TICs that were detected. The number beside the parenthesis is the total concentration of all TICsdetected in each respective scan.

Table 2-6
Summary of Analytical Data For Sediment/Sludge Samples
Collected at SWMU 37, SWMU 38, and AOC Q
Modified from Dames and Moore Verification Investigation Report
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

SITE ID FIELD ID SAMPLE DATE DEPTH (ft bgs) MATRIX UNITS	PQLs mg/kg	37SL1 RVFS*34 15-Jan-92 5.0 CSE mg/kg	38SL1 RVFS*35 15-Jan-92 5.0 CSE mg/kg	QSL1 RVFS*87 15-Jan-92 5.0 CSE mg/kg	Adjusted Soil Industrial RBC mg/kg	Adjusted Soil Residential RBC mg/kg	BTAG Screening Level mg/kg
Volatiles							
1,1,1-Trichloroethane	0.005	< 0.004	< 0.004	< 0.004	204,400	15,643	0.3
Acetone	0.1	< 0.017	< 0.017	< 0.017	91,980	7,039	--
Chloroform	0.005	< 0.001	< 0.001	<0.001	1,022	78	0.3
Semivolatiles							
2-Methylnaphthalene	0.3	< 0.245	< 0.049	< 0.049	408.8	31.3	--
Di-N-Butyl-Phthalate	0.3	41.5	1.48	3.01	10,220	782.1	--
N-Nitrosodiphenylamine	0.3	5.71	0.702	<0.19	584	130.4	--
Naphthalene	0.3	< 0.185	< 0.037	<0.037	2,044	156.4	0.1
Phenanthrene[(1)]	0.5	< 0.165	< 0.033	<0.033	3,066	234.6	0.1

Notes:

ft bgs = Feet below ground surface

mg/kg = Milligrams per kilogram

CSE = Chemical Sediment

PQL = Practical quantitation limit; the lowest concentration that can be reliably detected at a defined level of precision for a given analytical method

RBC = Risk-Based Concentration

USEPA = United States Environmental Protection Agency

USEPA Region III Risk-Based Concentration (RBC) values from the October 2007 RBC Table

Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

(1) = RBC value for pyrene used

BTAG = Biological Technical Assistance Group Screening Level (USEPA 1995)

Table 2-6 (Continued)
Summary of Analytical Data For Sediment/Sludge Samples
Collected at SWMU 37, SWMU 38, and AOC Q
Modified from Dames and Moore Verification Investigation Report
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Field ID Sample Date Sample Depth (ft bgs) Matrix	TCLP Regulatory Threshold	37SL1 RVFS*34 15-Jan-92 5.0 CSE	38SL1 RVFS*35 15-Jan-92 5.0 CSE	QSL1 RVFS*87 15-Jan-92 5.0 CSE
TCLP Metals (µg/L)				
BARIUM	100,000	180	756	196
CHROMIUM	5,000	15.50	9.60	< 6.02
SILVER	5,000	4.95	< 4.60	8.17

Notes:

ft bgs = Feet Below Ground Surface

TCLP = Toxicity Characteristic Leaching Procedure

µg/L = Microgram Per Liter

SWMU = Solid Waste Management Unit

= Concentration Above TCLP Regulatory Threshold

CSE = Chemicals in Sediment

B = Analyte was detected in corresponding method blank; values are flagged if the sample concentration is less than 10 times the method blank concentration for common laboratory constituents and 5 times for all other constituents.

3.0 FIELD INVESTIGATION PROGRAM

3.1 SAMPLING AND ANALYSIS

The RFI sampling and analysis program is summarized in Table 3-1; this table identifies the boring locations, chemical and physical sample locations and depths, and analytical methods and parameters. Figures 3-1, 3-2, and 3-3 show the soil sample locations and the monitoring well locations for SWMU 35, SWMU 37, and SWMU 38/AOC Q, respectively.

3.1.1 Soil Borings and Soil Sampling

Direct push soil borings with chemical sampling were used to: characterize the nature and extent of constituents in soil at the sites, identify the lateral and vertical extent of calcium sulfate material present, and characterize soil lithology and depth to groundwater and/or bedrock. For the SSP and RFI investigations, ten direct push borings were completed at SWMU 35, ten direct push borings were completed at SMWU 37, eight direct push borings and two hand auger borings were completed at SWMU 38, and four direct push borings were completed at AOC Q, as summarized below and in Table 3-1.

Figures 3-1, 3-2, and 3-3 show the boring locations for SWMU 35, SWMU 37, and SWMU 38/AOC Q, respectively. The SSP and RFI soil investigations and associated samples are summarized in the following table.

Soil Sampling and Analysis for SWMU 35

Date/Event	Soil Sample Locations	Analytical Parameters	Comments
November 2007 (RFI)	***Within Drying Bed:*** 35SB5 through 35SB10	TAL Metals, TCL VOCs, TCL SVOCs, TCL PCBs, TCL Pesticides, Explosives, and Nitroglycerin/PETN	Assess the nature and extent of constituents within the drying bed. Assess extent and volume of sludge inside the drying bed.
	35COMP	Full TCLP and pH	Assess hazardous waste characteristics of sludge within the drying bed.
	Outside Drying Bed: 35SB1 through 35SB4	TAL Metals, TCL VOCs, TCL SVOCs, TCL PCBs, TCL Pesticides, Explosives, and Nitroglycerin/PETN	Assess the nature and extent of constituents outside the drying bed. Assess presence/absence of sludge outside the drying bed.

Soil Sampling and Analysis for SWMU 37

Date/Event	Soil Sample Locations	Analytical Parameters	Comments
October 2003 (SSP)	***Within Drying Bed:*** 37SB1 and 37SB2	TAL Metals, TCL VOCs, TCL SVOCs, TCL PCBs (37SB1A), TCL Pesticides (37SB1A), Explosives, and Nitroglycerin/PETN	Assess the nature and extent of constituents within the drying bed. Assess extent and volume of sludge inside the drying bed.

Date/Event	Soil Sample Locations	Analytical Parameters	Comments
	Outside Drying Bed: 37SB3	TAL Metals, TCL VOCs, TCL SVOCs, Explosives, and Nitroglycerin/PETN	Assess the nature and extent of constituents outside the drying bed. Assess presence/absence of sludge outside the drying bed.
November 2007 (RFI)	***Within Drying Bed:*** 37SB7 through 37SB10 37COMP	TAL Metals, TCL PCBs, TCL Pesticides, Explosives, and Nitroglycerin/PETN Full TCLP and pH	Assess the nature and extent of constituents within the drying bed. Assess extent and volume of sludge inside the drying bed. Assess hazardous waste characteristics of sludge within the drying bed.
	Outside Drying Bed: 37SB4 through 37SB6	TAL Metals, TCL PCBs, TCL Pesticides, Explosives, and Nitroglycerin/PETN	Assess the nature and extent of constituents outside the drying bed. Assess presence/absence of sludge outside the drying bed.

Soil Sampling and Analysis for SWMU 38

Date/Event	Soil Sample Locations	Analytical Parameters	Comments
October 2003 (SSP)	***Within Drying Bed:*** 38SB1 and 38SB3	TAL Metals, TCL VOCs, TCL SVOCs, TCL PCBs (38SB1A), TCL Pesticides (38SB1A), Explosives, and Nitroglycerin/PETN	Assess the nature and extent of constituents within the drying bed. Assess extent and volume of sludge inside the drying bed.
	Outside Drying Bed: 38SB2	TAL Metals, TCL VOCs, TCL SVOCs, Explosives, and Nitroglycerin/PETN	Assess the nature and extent of constituents outside the drying bed. Assess presence/absence of sludge outside the drying bed.
November 2007 (RFI)	***Within Drying Bed:*** 38SB7 through 38SB10 38COMP	TAL Metals, TCL PCBs, TCL Pesticides, Explosives, and Nitroglycerin/PETN Full TCLP and pH	Assess the nature and extent of constituents within the drying bed. Assess extent and volume of sludge inside the drying bed. Assess hazardous waste characteristics of sludge within the drying bed.
	Outside Drying Bed: 38SB4 through 38SB6	TAL Metals, TCL PCBs, TCL Pesticides, Explosives, and Nitroglycerin/PETN	Assess the nature and extent of constituents outside the drying bed. Assess presence/absence of sludge outside the drying bed.
	Outside Drying Bed: 38SC1 through 38SC15	Not Applicable Visual Sludge Identification	Stratigraphic borings to delineate the nature and extent of sludge identified in an area outside of the drying bed during well installation (See Section 3.4).

Soil Sampling and Analysis for AOC Q

Date/Event	Soil Sample Locations	Analytical Parameters	Comments
October 2003 (SSP)	***Within Drying Bed:*** QSB1 and QSB3	TAL Metals, TCL VOCs, TCL SVOCs, TCL PCBs (QSB1A), TCL Pesticides (QSB1A), Explosives, and Nitroglycerin/PETN	Assess the nature and extent of constituents within the drying bed. Assess extent and volume of sludge inside the drying bed.
	Outside Drying Bed: QSB2	TAL Metals, TCL VOCs, TCL SVOCs, Explosives, and Nitroglycerin/PETN	Assess the nature and extent of constituents outside the drying bed. Assess presence/absence of sludge outside the drying bed.
November 2007 (RFI)	***Within Drying Bed:*** QSB4	TCL PCBs, TCL Pesticides, Explosives, and Nitroglycerin/PETN	Assess the nature and extent of constituents within the source area. Assess extent and volume of sludge inside the drying bed.

RFI soil samples were collected from each boring within the drying beds from the following depth intervals: (1) surface, (2) immediately below sludge (if present) or intermediate depth, (3) terminal depth at specified depth. A surface soil sample was collected from the boring located outside the drying beds. As stated in WPA 020 (URS 2007), the terminal depths of the RFI borings within the drying beds of 8 ft below grade was established since additional delineation of impacted soil is not required below this depth given that concentrations of metals detected in subsurface soil samples collected from inside the drying beds are below background point estimates and the vertical organic constituent concentrations has been appropriately characterized in the SSP. In addition, the depth of the drying bed areas is 4 to 8 ft below the outside grade and therefore, samples collected from depths of 8 ft or less will provide data from the same soil strata for sample collected inside and outside of the SWMUs.

Additionally, two samples from each area were collected for physical testing of pH, TOC, grain size, Atterberg Limits (selected samples), bulk density, hydraulic conductivity, and moisture content. Refer to Table 3-1 for boring and analyses information.

One composite sample was collected from within the drying bed at each SWMU and analyzed for corrosivity (pH) and toxicity (full TCLP analysis) to assess the hazardous waste characteristics of the sludge (see Appendix C.6).

- Sludge samples had pH levels in the range of 7.5 to 7.9 and therefore this material does not exhibit the characteristic of corrosivity as defined in 40 CFR §261.22 (USEPA 2010);
- TCLP levels of sludge samples are below regulatory limits specified in 40 CRF §261.24 (USEPA 2010), and therefore this material does not exhibit the characteristic of toxicity;
- TCLP detections are limited to low levels of barium, silver, and chromium (one sample) at levels approximately three orders of magnitude below regulatory limits; and
- Explosives and cyanide are present in some of the sludge samples at low concentrations below human health risk-based screening levels and therefore this material does not exhibit the characteristic of reactivity as defined in 40 CFR §261.23 (USEPA 2010).

3.1.2 Monitoring Well Installation and Groundwater Sampling

In December 2007, monitoring wells 35MW1 and 35MW2 were installed at SWMU 35 (Figure 3-1), monitoring wells 37MW1, 37MW2, and 37MW3 were installed at SWMU 37 (Figure 3-2), and monitoring wells 38MW1, 38MW2, and 38MW3 were installed at SWMU 38/AOC Q (Figure 3-3) to evaluate potential releases to groundwater. A groundwater sampling event was completed at the sites in February 2008. Based on the results of the initial groundwater sampling event, additional confirmation groundwater sampling was conducted in June 2008 for pesticides at monitoring well 37MW2 and for manganese at 38MW3. An additional groundwater well was installed in May 2010 to assess groundwater flow in the SWMU 37 area and sampled in June 2010 for VOCs to assess migration of VOCs from soil to groundwater. The groundwater sampling analytical parameters are summarized below and in Table 3-1. Monitoring well construction data are summarized in Table 2-3.

Monitoring Well Sampling and Analysis (February 2008)

Site	Monitoring Wells Sampled	Analytical Parameters
SWMU 35	35MW1 (D), 35MW2 (D), D-2 (U), and D-4(U)	TAL metals (total and dissolved), TCL pesticides, TCL PCBs, TCL VOCs, TCL SVOCs, explosives with nitroglycerin, and perchlorate. Field water quality parameters: pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity.
SWMU 37	37MW1 (U), 37MW2 (D), and 37MW3 (D)	TAL metals (total and dissolved), TCL pesticides, TCL PCBs, TCL VOCs, explosives with nitroglycerin, and perchlorate. Field water quality parameters: pH, temperature, specific conductance, dissolved oxygen, ORP, and turbidity.
SWMU 38/ AOC Q	38MW1 (C), 38MW2 (D), and 38MW3 (D)	TAL metals (total and dissolved), TCL pesticides, TCL PCBs, TCL VOCs, explosives with nitroglycerin, and perchlorate. Field water quality parameters: pH, temperature, specific conductance, dissolved oxygen, ORP, and turbidity.

Note: (U) = Upgradient, (D) = Downgradient, and (C) = Crossgradient

Monitoring Well Sampling and Analysis (June 2008)

Site	Monitoring Wells Sampled	Analytical Parameters
SWMU 37	37MW2 (D)	TCL pesticides
SWMU 38/ AOC Q	38MW3 (D)	Manganese (total and dissolved)

Note: (D) = Downgradient

Monitoring Well Sampling and Analysis (June 2010)

Site	Monitoring Wells Sampled	Analytical Parameters
SWMU 37	37MW4 (D)	TCL VOCs

Note: (D) = Downgradient

3.1.3 Aquifer Testing

Rising head and falling head slug tests were conducted in monitoring wells 35MW1, 35MW2, 37MW1 through 37MW3, and 38MW1 through 38MW3 to assess hydraulic conductivity of the screened intervals of the uppermost aquifer at the site. Aquifer test data and analysis are presented in Appendix C.4 and results are discussed in Sections 2.1.7.1 and 2.2.7.1 for SWMU 35 and SWMUs 37, 38 and AOC Q, respectively. Slug test methods are discussed in Section 3.3.5.

3.2 QUALITY ASSURANCE

Quality Assurance (QA) planning defined the overall system of activities for assuring the reliability of data produced. The system integrated the quality planning, assessment, and corrective actions of various groups in the organization to provide the independent QA program necessary to establish and maintain an effective system for collection and analysis of environmental samples and related activities. The program encompasses the generation of complete data with its subsequent review, validation, and documentation.

The accuracy and integrity of RFI data were ensured through the implementation of internal quality control (QC) measures consistent with MWP Addendum 020 (URS 2007c). QA and QC procedures, including field QC, laboratory QC, data management, and data validation, were integrated into the investigation program to meet data quality objectives (DQOs) established and approved for the RFI. The data were evaluated for each of the DQO indicators and the results of this evaluation are presented in Appendix G.1. DQOs for the RFI were met.

3.3 INVESTIGATION METHODOLOGY

3.3.1 Soil Sampling for Chemical Analysis

Surface and subsurface soil samples were collected for chemical analysis following the procedures outlined in standard operating procedure (SOP) 30.1 included in Appendix B and as described in Section 5.2 of the MWP (URS 2003).

The soil core interval was examined and classified by the site geologist and recorded in the field logbook and on the boring log consistent with SOPs 10.1 and 10.3, respectively (Appendix B). Soil was then extracted from the appropriate interval; sample containers were filled, labeled, and placed into coolers with ice and maintained at 4 degrees Celsius (°C).

Soil samples were collected from the borings using a tractor-mounted direct push rig (Geoprobe®) and skid steer mounted direct push rig. These rigs were equipped with 1.25-inch diameter push rods, 4-ft long, 2-inch diameter, stainless steel closed solid barrel sampler (Macro-Core®) with a disposable liner and stainless steel cutting shoes. A percussion hammer was used to advance the sampling assembly. Following withdrawal of the Macro-Core® and removal of the liner, a cutting device was used to open the liner before inspection and processing of the sample cores. Soil sampling field data sheets are included in Appendix C.4.1.

Once the termination depth of the boring was reached and sample collection was completed, the borehole was backfilled with hydrated bentonite chips. Excess soil cuttings were temporarily accumulated in 55-gallon drums at the Installation-approved area for disposal as discussed in Section 3.3.7. Soil boring logs are included in Appendix C.2.1.

3.3.2 Monitoring Well Installation and Development

Monitoring wells 35MW1, 35MW2, 37MW1, 37MW2, 37MW3, 37MW4, 38MW1, 38MW2, and 38MW3 were installed following the procedures outlined in SOP 20.1 (Appendix B) and as described in Section 5.2 of the MWP (URS 2003). These monitoring wells were installed using a truck or track mounted drill rig using 4.25-inch inner diameter hollow stem augers for overburden drilling and a 4-inch diameter air rotary drill bit for drilling into bedrock. Boring logs were completed as described in SOP 10.3 and drilling activities were documented in the field logbook as described in SOP 10.1 (Appendix B). Downhole drill rig tools and equipment were decontaminated before use at each location following SOP 80.1 (Appendix B).

Monitoring wells were constructed with 2-inch diameter, Schedule 40 polyvinyl chloride (PVC) 0.01-inch factory slotted screen and riser pipe with threaded joints. Each monitoring well was screened across the overburden and bedrock interface to monitor the uppermost zone of groundwater at the site. Boring logs and construction diagrams for the monitoring wells are included in Appendix C.2.2. Monitoring well construction data are summarized in Table 2-3.

Prior to sampling, each of the monitoring wells was developed consistent with SOP 20.2 (Appendix B) and as described in Section 5.2 of the MWP (URS 2003) by using a surge block, disposable bailer, and stainless steel, adjustable flow rate submersible pump with new disposable tubing. Development was continued at each monitoring well until a minimum of three equivalent well volumes were purged, water quality indicator parameters had stabilized, development water was clear to the unaided eye, and any remaining sediment had been removed from the well. Well development field data sheets are provided in Appendix C.4.2.

3.3.3 Groundwater Sampling

Groundwater samples were collected for chemical analysis in accordance with SOP 30.2 (Appendix B) and as described in Section 5.2.10 of the MWP (URS 2003). Groundwater sampling information was recorded in the field logbooks as described in SOPs 10.1 and 10.2 (Appendix B). Groundwater sampling field data sheets are included in Appendix C.4.3.

Low flow purging and sampling techniques were used to collect the groundwater samples from the permanent monitoring wells following the procedure outlined in Section 3.3 of SOP 30.2 (Appendix B). Equipment used to purge and sample wells was thoroughly decontaminated before and after use following SOP 80.1 (Appendix B). All equipment used for monitoring water quality parameters was calibrated before use according to the manufacture's instructions and SOP 40.1 (Appendix B). Prior to the sampling round, the depth to water was measured at each well to the nearest 0.01 ft using an electronic water level indicator in accordance with SOP 40.2. Calibration and measurement data were recorded in the field logbook.

A stainless steel, adjustable flow rate submersible pump and/or a peristaltic pump, and new disposable tubing were used to collect the groundwater samples. The pump tubing was connected to an in-line flow-through cell and the multi-parameter meter probe was connected to the flow cell to monitor water quality parameters during purging. The standing water columns at the time of sampling in the RFI wells at SWMUs 35, 37, and 38/Q ranged from approximately 10 to 15 feet, with the exception of 38MW3, which had a standing water column of approximately 18 feet. Pumping was started at the mid point of the water column and the pump rate was adjusted to cause minimal drawdown (less than 0.2 ft if possible). A Horiba Model U-22 multi-parameter water quality meter was used to monitor pH, specific conductance, temperature, ORP, dissolved oxygen, and turbidity during purging. Purging was continued until parameter stabilization was achieved. Once purging was complete, the pumping rate was reduced to its lowest steady rate and the in-line flow cell was disconnected from the tubing to allow for sampling from the tubing directly into sample containers provided the laboratory.

Groundwater samples were collected and containerized in the order of volatilization sensitivity of the parameters. Filtered and unfiltered samples were collected for metals analysis. Metals samples were filtered with an in-line high capacity 0.45-micron disposable filter. The appropriate sample containers were filled, labeled, and placed into coolers with ice and maintained at 4 °C.

3.3.4 Water Quality Measurements

Field water quality measurements were collected consistent with SOP 40.1 (Appendix B) using a Horiba Model U-22 multi-parameter water quality meter. Prior to its use each day, the meter was calibrated according to the manufacturer's instructions.

3.3.5 Aquifer Tests

Rising head and falling head slug tests were conducted at monitoring wells 35MW1, 35MW2, 37MW1 through 37MW3, and 38MW1 through 38MW3 in accordance with SOP 40.3 (Appendix B) and Section 5.9 of the MWP (URS 2003). A 3-inch diameter and 4-ft long solid PVC slug was used for the slug tests to induce instantaneous changes in water levels. Water level changes were recorded using a downhole pressure transducer with an internal data logger (*Insitu* Minitroll Standard P 30 pounds per square inch [PSI]). Slug-test data analysis was performed using AQTESOLV for Windows Pro Version 3.0. Appendix C.3 includes the slug test output and analysis.

3.3.6 Site Surveying

Draper Aden Associates surveyed the locations and vertical elevations for each of the monitoring wells at the sites as part of the RFI. URS surveyed the locations of soil borings and direct push groundwater borings obtained using Trimble Pathfinder Pro XRS® global positioning system (GPS) equipment.

Surveying was conducted using the U.S. State [Virginia (South Zone)] Plane Coordinate System (measured in U.S. survey ft) using the North American Datum 1983. Vertical elevations at the site were surveyed to the nearest 0.01 ft using the National Vertical Datum of 1988. Sample location coordinates and elevations are presented on Table 2-2.

3.3.7 Investigation-Derived Material (IDM) Management

IDM management activities were conducted consistent with the procedures outlined in WPA 020 (URS 2007c) and documented in the field logbook, and conducted as described below.

3.3.7.1 Accumulation

IDM accumulated during field sampling activities included the following materials and containers:

- Soil cuttings – Seventeen (17) 55-gallon drums;
- Personal protective equipment (PPE), probe liners, and plastic sheeting – Three (3) 55-gallon drums; and
- Decontamination and purge water – Sixteen (16) 55-gallon drums.

IDM accumulation and labeling was conducted as outlined in MWP SOP 70.1 (Appendix B). Drums were transferred to the Installation's approved container accumulation area at SWMU 17.

3.3.7.2 Material Characterization

Separate IDM characterization samples were collected from the soil cuttings and the drummed decontamination water. The analytical results for the IDM characterization samples indicated the soil cuttings and the decontamination water were non-hazardous material. IDM sample results are provided in Appendix C.5.

3.3.7.3 Transportation and Disposal

Before disposal, waste analytical results were provided to the Installation, IDM management subcontractor, and the disposal facilities for review and approval. Manifests were reviewed and signed by Installation personnel before loading and transport of the IDM. The Installation maintains a record of the manifests and related information including analytical testing results and waste profiles.

Freehold Cartage, Inc. and First Piedmont Corporation transported the non-hazardous soil IDM to the First Piedmont Corporation Landfill in Chatham, Virginia.

3.3.7.4 Decontamination Water

Following the waste characterization sample analysis, the Installation and RFAAP Process Water Treatment Plant engineers were provided a copy of the water IDM sample results and groundwater sample results. After receiving Plant approval, decontamination water and purge water were discharged into the collection system of the Process Water Treatment Plant.

3.4 WORK PLAN FIELD CHANGES

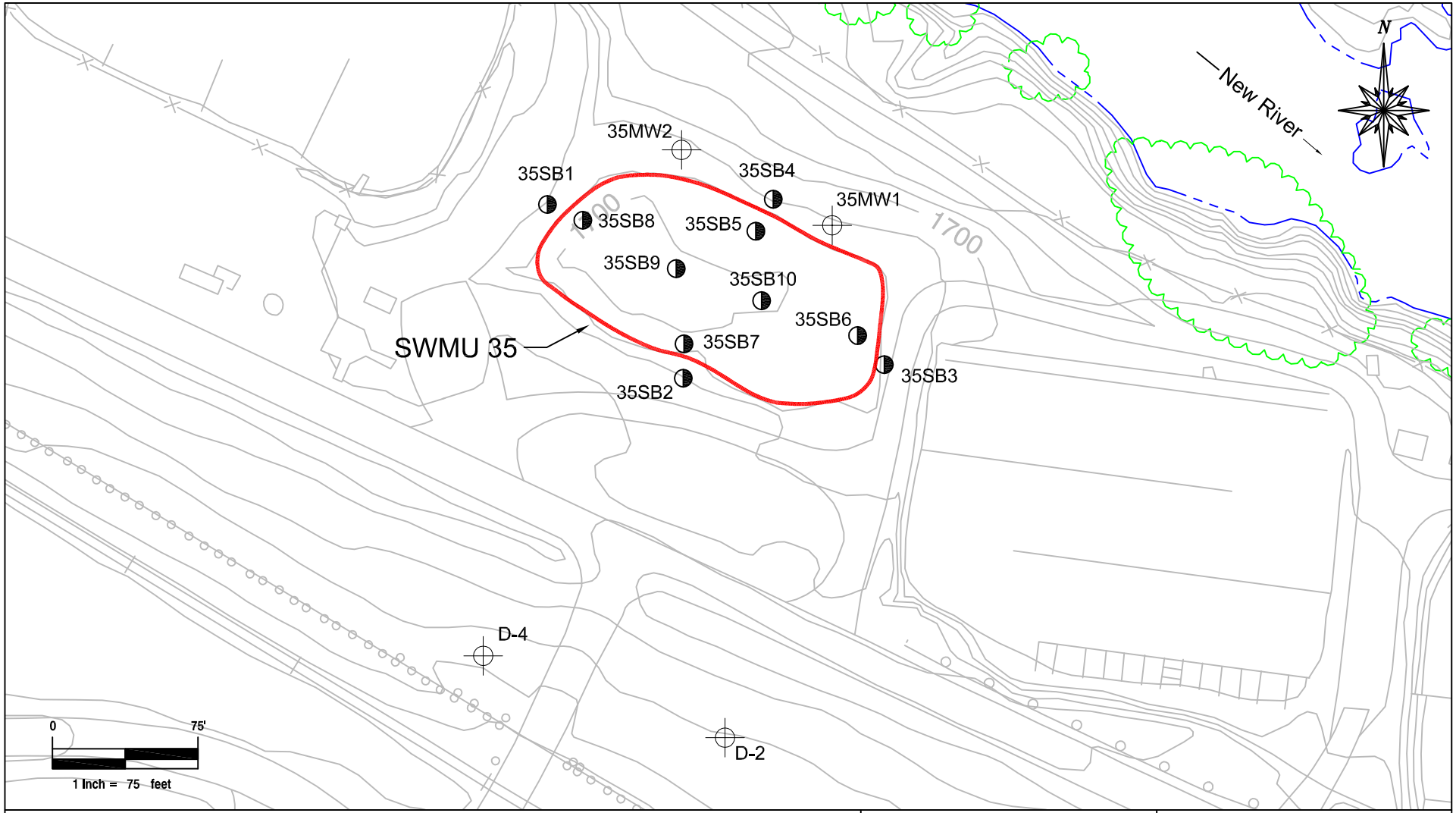
Cyanide analysis was not performed during the RFI soil sampling event as specified in the workplan. The laboratory analysis for Target Analyte List (TAL) inorganics did not include cyanide. Cyanide analysis was performed on 27 soil samples collected at SWMUs 37 and 38/Q for the SSP. Four of these samples were collected from calcium sulfate sludge contained in the drying beds. Cyanide was not identified as a COPC in soil or sludge due to the low level detections (0.296 to 2.2 mg/kg) at concentrations 2 to 3 orders of magnitude below the adjusted risk-based screening levels. Based on representative results of sludge samples at these sites, cyanide is not considered a constituent of concern for these disposal areas and therefore, the lack of additional cyanide data for the RFI is not considered a significant data gap.

Although the work plan indicated that soil samples were to be analyzed for PAHs via SW-846 Method 8310, since the approval of the work plan a method of SW-846 8270 to detect low level SVOCs (including PAHs) has been developed and is used for samples at the facility. This low-level SW-846 method has certain advantages over Method 8310 including more reliability in identifying target PAH compounds with comparable detection limits to Method 8310.

Monitoring well locations 38MW1 and 38MW2 were offset from their planned locations due to access constraints. Background monitoring well 38MW1 was moved to 135 feet west of its original planned location due to heavily wooded conditions to a location approximately 150 feet east of the drying bed. Monitoring well 38MW2 was moved approximately 75 ft south of its original planned location at a similar position outside of the drying bed also due to heavily wooded conditions. The monitoring well offsets did not have a significant effect on the planned assessment of groundwater conditions at SWMU 38/AOC Q because the offset locations were in the same relative position to the drying beds as originally proposed. In addition, the work plan indicated that monitoring wells would be installed with a 15-ft screen but some wells (37MW1 and 38MW3) have screens that are up to 25 ft in length. Given that the monitoring wells were installed during a period of a prolonged drought, additional screen length was installed above the water levels encountered during drilling to ensure that the top of the screen would be above seasonally high groundwater levels in the future.

During well installation at SWMU 38, a limited area of calcium sulfate sludge was identified outside of the SWMU 38 drying bed. Fifteen additional stratigraphic soil borings were completed with a hand auger to delineate the lateral and vertical extent of sludge in this area. As presented on Figure 3-3, three inches of sludge was identified in an approximately 500 square foot area located east of SWMU 38.

Due to radial groundwater flow at SWMU 37, an additional well (37MW4) was installed southeast of the SWMU to assess groundwater flow in the SWMU 37 area. The well also was sampled in June 2010 for VOCs to assess migration of VOCs from soil to groundwater.



Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Vegetation
- Aboveground Piping
- Monitoring Well
- RFI Soil Boring Location

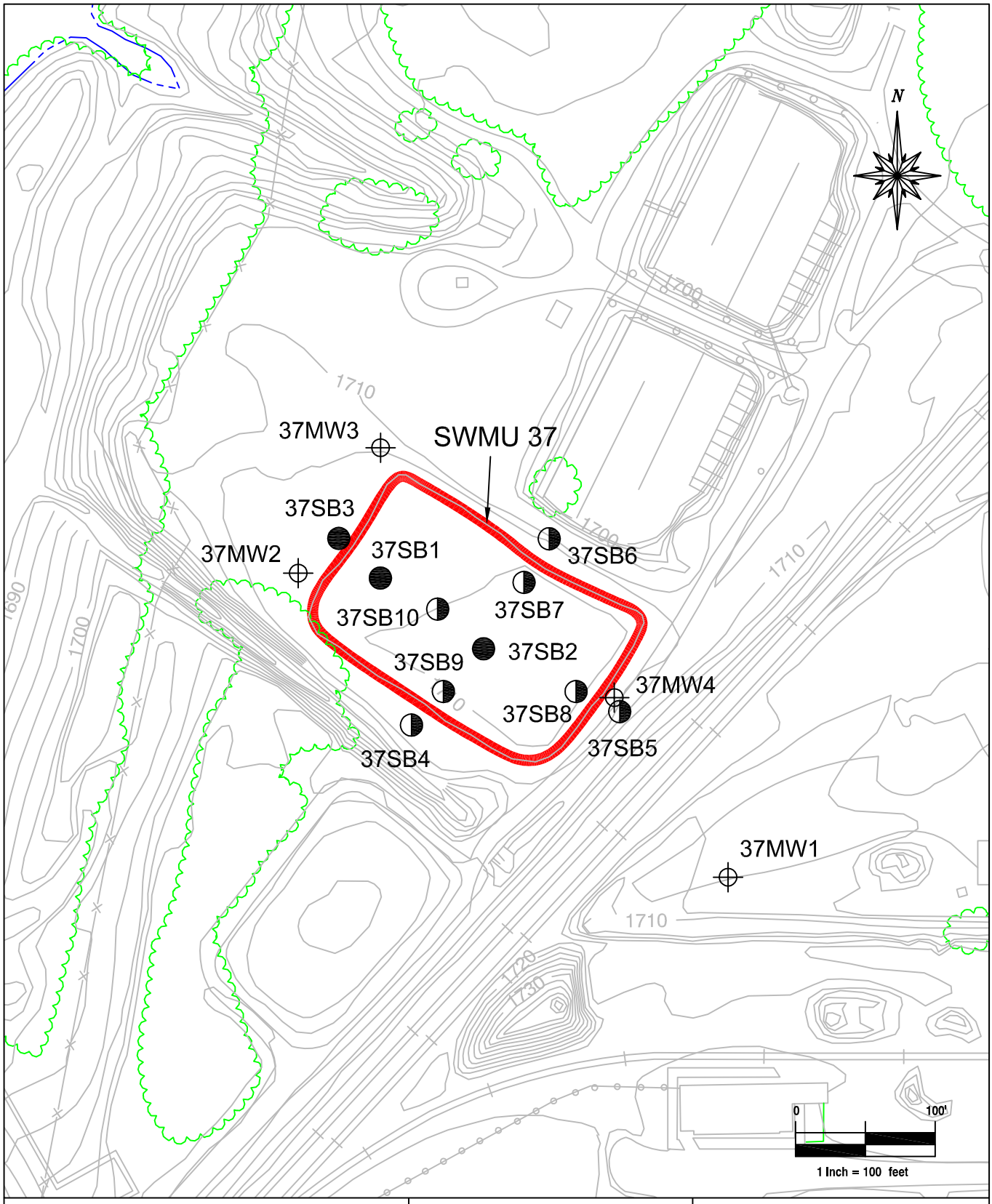
FIGURE 3-1

Sample Locations - SWMU 35

Date: June 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1" = 75'	File Name: Fig. 3-1 RFI Locs

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Vegetation
- Aboveground Piping
- Monitoring Well
- RFI Soil Boring Location
- SSP Soil Boring Location

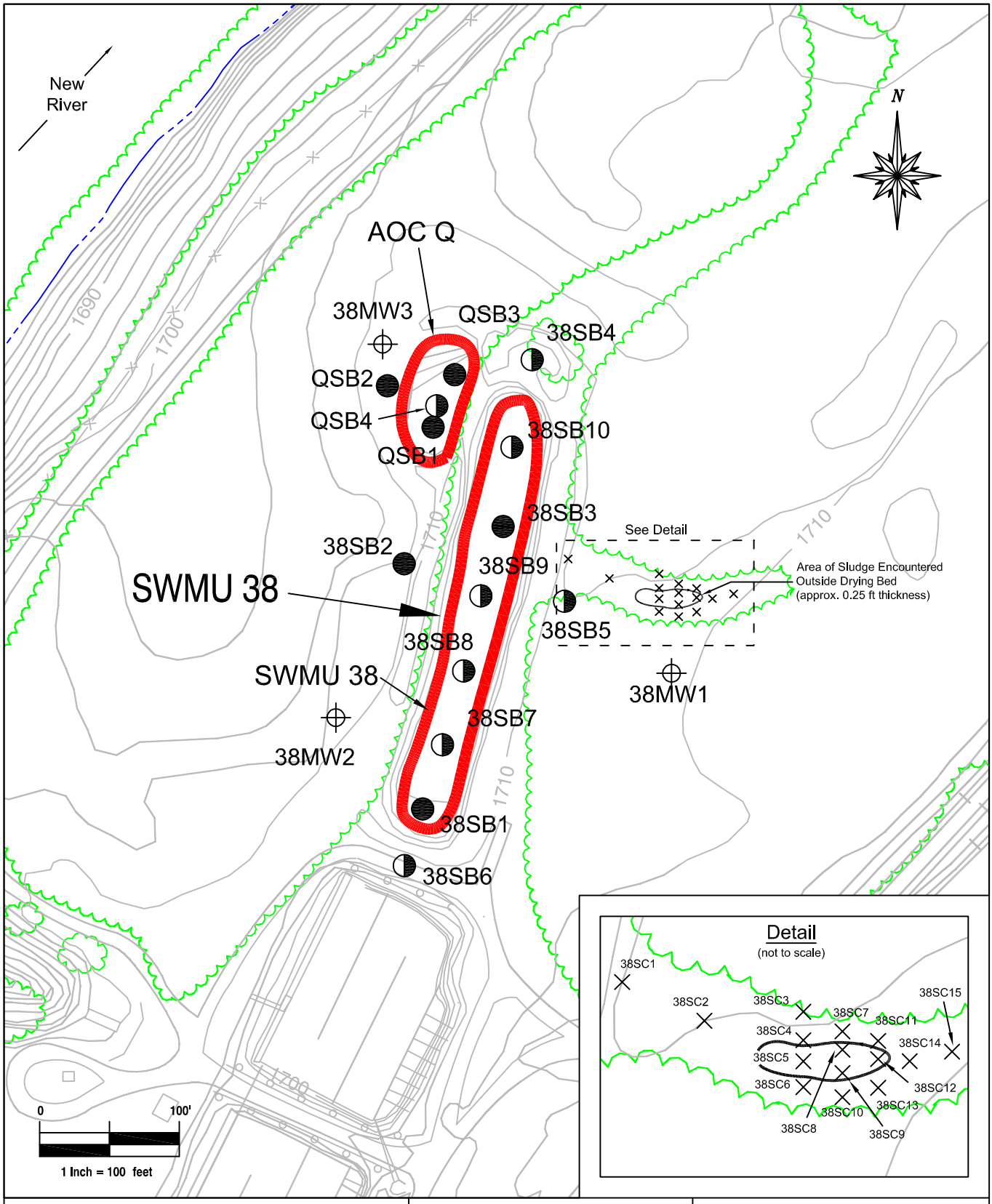
FIGURE 3-2

Sample Locations - SWMU 37

Date: July 2010	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 100 feet	File Name: Fig.3-2 SampleLocs

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Legend

- Topographic Contour
- SWMU Boundary
- Perimeter Fence
- Vegetation
- Aboveground Piping
- Monitoring Well
- RFI Soil Boring Location
- SSP Soil Boring Location
- Stratigraphic Boring Location (38SC1-38SC15)

FIGURE 3-3

Sample Locations - SWMU 38 and AOC Q

Date: July 2010	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 100 feet	File Name: Fig.3-3 SampleLocs

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230

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Table 3-1
Field Sample Identifiers, Depths, and Analytical Methods
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

					Chemical Analysis												Physical Analysis							
Sample ID	Date	Time	Duplicate Location	Depth (ft bgs)	TAL Metals/CV Mercury/Cyanide (Unfiltered) SW-846 Method 6010B/7471A/9012A	TAL Metals/CV Mercury/Cyanide (Filtered) SW-846 Method 6010B/7471A/9012A	Pesticides/PCBs SW-846 Method 8081A/8082	Herbicides SW-846 Method 8151	VOCs SW-846 Method 8260B	SVOCs SW-846 Method 8270C	PAHs SW-846 Method 8310	Explosives/Nitroglycerin/PETN SW-846 Method 8330m/8332	Perchlorate EPA Method 6850	TCLP Full List	Chemical Oxygen Demand EPA Method 410.4	pH (corrosivity) SW-846 Method 9040B	Paint Filter Test SW-846 Method 9095	Total Organic Content ASTM D2974/Walkley Black	Grain Size ASTM D422	Atterburg Limits ASTM D4318	Moisture Content ASTM D2216	pH ASTM D4972	Hydraulic Conductivity ASTM D5084	Soil Porosity ASTM D854 and D2937	Soil Bulk Density ASTM D4253
SWMU 35																								
Soil Borings																								
35SB1A	11/13/2007	8:25		0-1	X		X		X	X		X												
35SB2A	11/13/2007	9:20		0-1	X		X		X	X		X												
35SB3A	11/12/2007	16:06		0-1	X		X		X	X		X												
35SB4A	11/13/2007	7:50		0-1	X		X		X	X		X												
35SB5A	11/14/2007	10:10		0-1	X		X		X	X		X												
35SB5B[1]	11/14/2007	10:23		9-11	X		X		X	X		X												
35SB5C	11/14/2007	10:27		14-16	X		X		X	X		X												
35SB6A	11/13/2007	14:45		0-1	X		X		X	X		X												
35SB6B[1]	11/13/2007	14:55		6-8	X		X		X	X		X												
35SB6C	11/13/2007	15:05		14-16	X		X		X	X		X												
35SB7A	11/14/2007	8:00		0-1	X		X		X	X		X												
35SB7B[1]	11/14/2007	8:08		6-8	X		X		X	X		X												
35SB7C	11/14/2007	8:25		13.5-15.5	X		X		X	X		X												
35SB8A	11/14/2007	11:05		0-1	X		X		X	X		X												
35SB8B[1]	11/14/2007	11:15		9-11	X		X		X	X		X												
35SB8C	11/14/2007	11:20		14-16	X		X		X	X		X												
35SB9A	11/13/2007	10:45		0-1	X		X		X	X		X												
35SB9B[1]	11/13/2007	12:00		5-7	X		X		X	X		X						X	X	X	X	X	X	X	X
35SB9C	11/13/2007	12:10		14-16	X		X		X	X		X						X	X	X	X	X	X	X	X
35SB10A	11/13/2007	13:30		0-1	X		X		X	X		X												
35SB10B[1]	11/13/2007	13:38		6-8	X		X		X	X		X												
35SB10C	11/13/2007	13:45		14-16	X		X		X	X		X												
DUP-1	11/13/2007		35SB4A	0-1	X		X		X	X		X												
DUP-2	11/14/2007		35SB5A	0-1	X		X		X	X		X												
35COMP	11/14/2008	11:35		--										X		X								
Groundwater																								
35MW1	2/7/2008	16:20		--	X	X	X		X	X		X	X											
35MW2	2/7/2008	13:50		--	X	X	X		X	X		X	X											
D-2	2/8/2008	9:45		--	X	X	X		X	X		X	X											
D-4	2/8/2008	12:00		--	X	X	X		X	X		X	X											
DUP-3	2/7/2008		35MW2	--	X	X	X		X	X		X	X											
SWMU 37																								
SSP Sampling																								
Soil Borings																								
37SB1A	10/1/2003	15:30		0-1	X		X	X	X	X	X	X												
37SB1	10/1/2003	--		6-6.5	X													X	X	X	X	X	X	X
37SB1B	10/1/2003	16:00		14-16	X				X	X	X	X												
37SB1C	10/1/2003	8:45		18-20	X				X	X	X	X												
37SB2A	10/2/2003	9:30		0-1	X				X	X	X	X												
37SB2B	10/2/2003	9:45		10-12	X				X	X	X	X												
37SB2	10/2/2003	--		15.5-16	X													X	X		X	X	X	X
37SB2C	10/2/2003	10:00		18-20	X				X	X	X	X												
37SB3A	10/2/2003	10:15		0-1	X				X	X	X	X												
37SB3B	10/2/2003	10:30		10-12	X				X	X	X	X												
37SB3C	10/2/2003	10:45		22-24	X				X	X	X	X												
RFI Sampling																								
Soil Borings																								
37SB4A	11/5/2007	8:50		0-1	X		X					X												
37SB5A	11/15/2007	9:30		0-1	X		X					X												
37SB6A	11/15/2007	10:00		0-1	X		X					X												
37SB7A	11/14/2007	15:10		0-1	X		X					X												
37SB7B[1]	11/14/2007	15:15		5.5-6.5	X		X					X												
37SB7C	11/14/2007	15:15		7-8	X		X					X												

Table 3-1
Field Sample Identifiers, Depths, and Analytical Methods
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

					Chemical Analysis													Physical Analysis							
Sample ID	**Date**	**Time**	**Duplicate Location**	**Depth (ft bgs)**	**TAL Metals/CV Mercury/Cyanide (Unfiltered) SW-846 Method 6010B/7471A/9012A**	**TAL Metals/CV Mercury/Cyanide (Filtered) SW-846 Method 6010B/7471A/9012A**	**Pesticides/PCBs SW-846 Method 8081A/8082**	**Herbicides SW-846 Method 8151**	**VOCs SW-846 Method 8260B**	**SVOCs SW-846 Method 8270C**	**PAHs SW-846 Method 8310**	**Explosives/Nitroglycerin/PETN SW-846 Method 8330m/8332**	**Perchlorate EPA Method 6850**	**TCLP Full List**	**Chemical Oxygen Demand EPA Method 410.4**	**pH (corrosivity) SW-846 Method 9040B**	**Paint Filter Test SW-846 Method 9095**	**Total Organic Content ASTM D2974/Walkley Black**	**Grain Size ASTM D422**	**Atterburg Limits ASTM D4318**	**Moisture Content ASTM D2216**	**pH ASTM D4972**	**Hydraulic Conductivity ASTM D5084**	**Soil Porosity ASTM D854 and D2937**	**Soil Bulk Density ASTM D4253**
37SB8A	11/15/2007	7:40		0-1	X		X					X													
37SB8B[1]	11/15/2007	8:00		4-5	X		X					X													
37SB8C	11/15/2007	8:00		7-8	X		X					X													
37SB9A	11/14/2007	14:30		0-1	X		X					X													
37SB9B[1]	11/14/2007	14:30		2-3	X		X					X													
37SB9C	11/14/2007	14:35		7-8	X		X					X													
37SB10A	11/14/2007	13:45		0-1	X		X					X													
37SB10B[1]	11/14/2007	13:47		4-5	X		X					X													
37SB10C	11/14/2007	13:47		7-8	X		X					X													
DUP-3	11/14/2007		37SB9A	0-1	X		X					X													
DUP-4	11/15/2007		37SB8A	0-1	X		X					X													
37COMP	11/15/2008	10:20		--										X		X									
Groundwater																									
37MW1	2/11/2008	12:50		--	X	X	X		X			X	X												
37MW2	2/11/2008	15:30		--	X	X	X		X			X	X												
37MW3	2/12/2008	9:45		--	X	X	X		X			X	X												
37MW4	6/16/2010	12:05		--					X																
DUP-1	6/16/2010		37MW4	--					X																
Groundwater Confirmation Sampling																									
37MW2	6/24/2008	13:30		--			X*																		
DUP-1	6/24/2008		37MW2	--			X*																		
SWMU 38																									
SSP Sampling																									
Soil Borings																									
38SB1A	10/3/2003	10:45		0-1	X		X	X	X	X	X	X													
38SB1B	10/3/2003	11:00		3.5	X				X	X	X	X													
38SB1	10/3/2003			7	X													X	X		X	X			X
38SB1C	10/3/2003	11:20		7-7.5	X				X	X	X	X													
38SB2A	10/3/2003	8:50		0-1	X				X	X	X	X													
38SB2B	10/3/2003	9:00		10-12	X				X	X	X	X													
38SB2	10/3/2003			15.5	X													X	X		X	X	X		X
38SB2C	10/3/2003	9:10		18-20	X				X	X	X	X													
38SB3A	10/3/2003	12:00		0-1	X				X	X	X	X													
38SB3B	10/3/2003	12:15		4	X				X	X	X	X													
38SB3C	10/3/2003	12:30		6	X				X	X	X	X													
SBD-4	10/3/2003		38SB2B	10-12	X				X	X	X	X													
RFI Sampling																									
Soil Borings																									
38SB4A	11/16/2007	8:10		0-1	X		X					X													
38SB5A	11/16/2007	8:35		0-1	X		X					X													
38SB6A	11/16/2007	9:45		0-1	X		X					X													
38SB7A	11/15/2007	14:15		0-1	X		X					X													
38SB7B[1]	11/15/2007	14:15		1.5-3	X		X					X													
38SB7C	11/15/2007	14:20		7-8	X		X					X													
38SB8A	11/15/2007	13:18		0-1	X		X					X													
38SB8B[1]	11/15/2007	13:18		1-3	X		X					X													
38SB8C	11/15/2007	13:22		7-8	X		X					X													
38SB9A	11/15/2007	11:35		0-1	X		X					X													
38SB9B[1]	11/15/2007	11:35		1-3	X		X					X													
38SB9C	11/15/2007	11:40		7-8	X		X					X													
38SB10A	11/16/2007	10:58		0-1	X		X					X													
38SB10B[1]	11/16/2007	10:58		2-4	X		X					X													
38SB10C	11/16/2007	11:10		7-8	X		X					X													
DUP-5	11/15/2007		38SB7A	0-1	X		X					X													
DUP-6	11/16/2007		38SB4A	0-1	X		X					X													
38COMP	11/15/2008	14:10		--										X		X									

Table 3-1
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					Chemical Analysis													Physical Analysis							
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Groundwater																									
38MW1	2/12/2008	11:40		--	X	X	X		X			X	X												
38MW2	2/12/2008			--	X	X	X		X			X	X												
38MW3	2/13/2008			--	X	X	X		X			X	X												
Groundwater Confirmation Sampling																									
38MW3	6/24/2008	16:15		--	X**	X**																			
DUP-2	6/24/2008		38MW3	--	X**	X**																			
AOC Q																									
SSP Soil Sampling																									
QSB1A	10/2/2003	13:00		0-1	X		X	X	X	X	X	X													
QSB1	10/2/2003	--		9.5-10	X													X	X	X	X	X	X		X
QSB1B	10/2/2003	13:15		10-12	X				X	X	X	X													
QSB1C	10/2/2003	13:30		17-19	X				X	X	X	X													
QSB2A	10/2/2003	15:10		0-1	X				X	X	X	X													
QSB2B	10/2/2003	15:20		10-12	X				X	X	X	X													
QSB2C	10/2/2003	15:30		18-20	X				X	X	X	X													
QSB2	10/2/2003	--		20	X													X	X		X	X			X
QSB3A	10/2/2003	14:30		0-1	X				X	X	X	X													
QSB3B	10/2/2003	14:45		10-12	X				X	X	X	X													
QSB3C	10/2/2003	15:00		17-19	X				X	X	X	X													
SBD-3	10/2/2003		QSB1A	0-1	X		X	X	X	X	X	X													
RFI Soil Sampling																									
QSB4A	11/16/2007	10:20		0-1			X					X													

Notes:

ft bgs = Feet Below Ground Surface
SSP = Site Screening Process
RFI = RCRA Facility Investigation
AOC = Area of Concern
SWMU = Solid Waste Management Unit
EPA = U.S. Environmental Protection Agency
ASTM = ASTM International

SB = Soil Boring
MW = Monitoring Well
SBD or DUP = Duplicate sample
COMP = Composite sample
TAL = Target Analyte List
PCB =Polychlorinated Biphenyl
PAH = Polynuclear Aromatic Hydrocarbon

SVOC = Semi-volatile Organic Compound
VOC = Volatile Organic Compound
PETN = Pentaerythritol tetranitrate
TCLP = Toxicity Characteristic Leaching Procedure
(1) = Sample collected 1' below sludge layer
* = Pesticides only
** = Total and Dissolved Manganese only

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4.0 NATURE AND EXTENT OF CHEMICALS

The following sections discuss the results of chemical sampling of soil and groundwater at the sites and assess the nature and extent of detected chemicals in site media. Chemical results are evaluated with respect to the following: USEPA Region III R-RBCs and I-RBCs for soil, and T-RBCs for groundwater (USEPA 2007a), which are adjusted downward for non-carcinogenic chemicals to an HQ of 0.1 to account for potential additive toxicity effects of multiple chemicals; USEPA Region III SSLs, DAF 20 (default values); the most current USEPA Region III ecological soil screening levels (as presented in Section 7.0); USEPA MCLs for groundwater; and facility-wide background concentrations for metals in soil as provided below (IT 2001).

Facility-Wide Point Estimates for Soil

Chemical	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	95% Upper Tolerance Limit (UTL) of the Mean (mg/kg)
Aluminum	3,620	47,900	40,041
Arsenic	1.2	35.9	15.8
Barium	23.4	174	209
Beryllium	0.61	5.4	1.02
Cadmium	0.62	2.5	0.69
Chromium	6.3	75.8	65.3
Cobalt	5.9	130	72.3
Copper	1.6	38.7	53.5
Iron	7,250	67,700	50,962
Lead	2.1	256	26.8
Manganese	16.7	2,040	2,543
Mercury	0.038	1.2	0.13
Nickel	4.6	94.2	62.8
Thallium	1.3	5	2.11
Vanadium	12.2	114	108
Zinc	4.7	598	202

Note: mg/kg = Milligram per kilogram

With the exception of metals in soil, chemicals detected in one or more samples in a given medium at concentrations above their adjusted RBCs, SSL DAF20s, or ecological screening levels are identified in the nature and extent assessment as COPCs. Metals in soil detected at concentrations above their background point estimates and an adjusted RBC, SSL DAF20, or ecological screening value are retained as COPCs in the nature and extent assessment. The facility-wide background concentrations are used in the nature and extent assessment to evaluate the significance of background concentrations in soil and to assist in bounding the lateral and vertical extent of metals concentrations potentially attributable to historical site activities. Additional chemical specific screening information is provided below.

Note that for some explosives (i.e., DNT), the carcinogenic toxicity data available for DNTs (i.e., 2,4-DNT and 2,6-DNT) applies to the DNT mixture; therefore, the concentrations detected for 2,4-DNT and

2,6-DNT for each sample are summed and this value is screened against the carcinogenic RBC. Non-carcinogenic RBCs are available for both 2,4-DNT and 2,6-DNT; therefore, they are screened independently against the adjusted non-carcinogenic RBCs. If one compound is detected in the sample and the other compound is not, one half the detection limit of the non-detect is averaged with the detected result.

Note that if a constituent was measure by two methods, results from the more sensitive analytical method were used for screening. For example if explosives were analyzed as part of the SVOC method (Method 8270C), as well as, by an explosives specific method (Method 8330), the results from the explosives specific method were used.

4.1 NATURE AND EXTENT – SWMU 35 SOIL

4.1.1 Analytical Results

Ten surface soil samples and 12 subsurface soil samples for a total of 22 samples were collected for chemical analysis from SWMU 35 (Figure 3-1 and Table 3-1). Soil samples for chemical analysis were collected from borings from up to three intervals including: a surface soil sample ("A" sample), immediately below sludge (if present) or intermediate sample ("B" sample), and a terminal depth sample ("C" sample). Table 4-1 presents analytical results for chemicals detected in soil samples collected at SWMU 35 and screens these data with respect to adjusted RBCs, SSLs, and background concentrations. Table 4-2 summarizes the screening results for soil data including: constituents detected, minimum and maximum concentrations detected, number of detections, number of samples, and number of samples above human health screening criteria or SSL DAF20 screening levels and background concentrations (inorganics only). COPECs listed below were identified for the site as part of the refined screening level ecological risk assessment presented in Section 7.2.3 and above background point estimates (inorganics only). The screenings resulted in the identification of the following COPCs and COPECs (note that chemicals which were below background point estimates but were identified as hazard drivers for the HHRA are italicized):

TAL Metals (Methods 6010B, 6020A, 7471A) – 23 TAL metals were detected in soil samples with the following metals detected at concentrations above screening levels:

RBC – *aluminum*, chromium, lead;
SSL – chromium; and
Eco – calcium, chromium, lead, and mercury.

TCL Pesticides (Method 8081A) – 2 pesticides were detected in soil samples with the following pesticides detected at concentrations above screening levels:

RBC – none;
SSL – none; and
Eco – none.

TCL PCBs (Method 8082) – 2 PCBs were detected in soil samples with the following PCBs detected at concentrations above screening levels:

RBC – Aroclor 1254 (above R-RBC and I-RBC), Aroclor 1260;
SSL – Aroclor 1254; and
Eco – none.

TCL VOCs (Method 8260B) – 8 VOCs were detected in soil samples with the following VOCs detected at concentrations above screening levels:

RBC – none;
SSL – none; and
Eco – none.

TCL SVOCs (Method 8270C) – 17 SVOCs were detected in soil samples with the following SVOCs detected at concentrations above screening levels:

RBC – none;
SSL – none; and
Eco – none.

Explosives (Method 8330) and Nitroglycerin (Method 8332) – 3 explosives and nitroglycerin were detected in soil samples with the following constituents detected at concentrations above screening levels:

RBC – nitroglycerin (above R-RBC and I-RBC);
SSL – none; and
Eco – none.

4.1.2 Human Health Nature and Extent Assessment

A summary of the human health risk and background screening results for COPCs is presented in the table below.

Summary of COPCs for Soil

Chemical	Total # of Det/# of Samples	Above Adjusted R-RBC		Above Adjusted I-RBC	
		# Above.	Sample IDs	# Above.	Sample IDs
Aluminum*	22/22	0	NA	0	NA
Chromium	22/22	5	35SB5A DUP AVG, 35SB6A, 35SB7A, 35SB9A, 35SB10A	0	NA
Lead	22/22	2	35SB7A, 35SB9A	0	NA
Aroclor 1254	17/22	8	35SB2A, 35SB3A, 35SB5A DUP AVG, 35SB6A, 35SB7A, 35SB8A, 35SB9A, 35SB10A	1	35SB6A
Aroclor 1260	1/22	1	35SB6A	0	NA
Nitroglycerin	1/22	1	35SB6A	1	35SB6A

Notes: NA=Not Applicable, DUP AVG = Duplicate Average, *No sample concentrations were above the background point estimate for aluminum but aluminum was identified as a hazard driver in human health risk assessment

The nature and extent of COPCs identified in the above table, as well as constituents with concentrations above SSL DAF20s (above background concentrations for inorganics) identified in Section 4.1.1 and presented on Table 4-2, is discussed further in the following sections.

4.1.2.1 Aluminum

Aluminum was detected at concentrations above its R-RBC but below its background point estimate and adjusted I-RBC in all samples collected. Although aluminum was not detected at concentrations above its background point estimate, it was identified as a hazard driver for the construction worker in the HHRA; therefore, aluminum is included in the nature and extent assessment for the site (Figure 4-1). Detected aluminum concentrations within the drying bed (12,000 to 25,000 mg/kg) were similar to detected aluminum concentrations outside the drying bed (19,000 to 23,000 mg/kg) where no indications of impacts from site use were noted (i.e., no sludge present). The detected concentrations also were within the mid-range of detected concentrations of aluminum in the background data set (3,620 to 47,900 mg/kg). An SSL DAF20 is not available for aluminum, but the groundwater sample results did not indicate the leaching of aluminum from soil to groundwater at concentrations above its adjusted T-RBC.

4.1.2.2 Chromium

Chromium was detected at concentrations above its R-RBC and background point estimate in five surface soil/sludge samples collected within the drying bed. Detected concentrations in these samples were below the adjusted I-RBC. Detected chromium concentrations in samples collected from 1 foot below the sludge to the boring termination depths were below the R-RBC and background point estimate indicating the vertical extent of concentrations above the adjusted R-RBC and background point estimate is limited to the sludge material and depths less than 6 ft bgs (Figure 4-1). Although five surface soil/sludge samples collected within the drying bed were above chromium's SSL DAF20, the subsurface soil sample results did not indicate leaching of chromium from the sludge to underlying soil at levels above the SSL DAF20 or the background point estimate (Figure 4-2). In addition, groundwater sample results did not indicate the leaching of chromium from soil to groundwater at concentrations above its adjusted T-RBC.

4.1.2.3 Lead

Lead was detected at concentrations above its residential action level (AL) and background point estimate in two surface soil/sludge samples collected within the drying bed. Detected concentrations in these samples were below the industrial AL. Detected lead concentrations in samples collected from 1 foot below the sludge to the boring termination depths were below the residential AL and background point estimate indicating the vertical extent of concentrations above the AL and background point estimate is limited to the sludge material and depth less than 6 ft bgs (Figure 4-1). An SSL DAF20 is not available for lead, but the groundwater sample results did not indicate the leaching of lead from soil to groundwater at concentrations above its action level (15ug/L).

4.1.2.4 Pesticides

Pesticides were detected in samples at concentrations below their adjusted RBCs and SSL DAF20s.

4.1.2.5 PCBs

Aroclor 1254 was detected at concentrations above its adjusted R-RBC in 8 of 22 soil samples. These detections above its adjusted R-RBC are limited to surface soil or sludge. For sample 35SB6A, the Aroclor 1254 concentration was above its adjusted I-RBC and the Aroclor 1260 concentration was above its adjusted R-RBC. The vertical extent of detected concentrations of PCBs above adjusted RBCs is limited to surface soil/sludge within the drying bed and depths less than 6 ft bgs (Figure 4-1).

PCB detections above their SSL DAF20 were limited to one sample (35SB6A) for Aroclor 1254, which was located in surface soil/sludge within the drying bed. Groundwater sample results did not indicate leaching of PCBs from soil to groundwater at detectable levels. Additional discussion and assessment of the soil-to-groundwater migration pathway is presented in Section 4.1.3.

4.1.2.6 VOCs

VOCs were detected in samples at concentrations below their adjusted RBCs and SSL DAF20s.

4.1.2.7 SVOCs

SVOCs were detected in samples at concentrations below their adjusted RBCs and SSL DAF20s.

4.1.2.8 Explosives

Explosives were detected in samples at concentrations below their adjusted RBCs and SSL DAF20s with the exception of nitroglycerin, which was detected in one sample (35SB6A) at a concentration above its adjusted R-RBC and I-RBC. Nitroglycerin was not detected in the sample collected below sample 35SB6A and the sludge; and therefore, the vertical extent of detectable concentrations of nitroglycerin is less than 6 ft bgs at this location. An SSL DAF20 is not available for nitroglycerin, but the groundwater sample results did not indicate the leaching of nitroglycerin from soil to groundwater at detectable concentrations.

4.1.3 Soil-to-groundwater Migration Assessment

As previously discussed in Section 4.1.1 and presented on Table 4-2, the concentrations for each detected chemical at the site were screened against the SSL DAF20 and background point estimate resulting in the identification of the following SSL COPCs: chromium and Aroclor 1254. Sample concentrations that were above SSL DAF20s and background point estimates (inorganics only) are summarized in the table below:

Chemical	Total # of Det/ # of Samples	# of Samples Above SSL DAF20	Sample Identification
Chromium	22/22	5	35SB5A DUP AVG, 35SB6A, 35SB7A, 35SB9A, 35SB10A
Aroclor 1254	17/22	1	35SB6A

Although chromium was detected at a concentration in one or more surface samples above its SSL DAF20 and background point estimate, chromium was not detected in subsurface soil samples collected below the sludge at concentrations above its SSL DAF20 or in groundwater samples at levels above its adjusted T-RBC. Chromium concentrations above its SSL DAF20 are presented on Figure 4-2.

While SSL exceedances indicate a theoretical potential for impact to groundwater, empirical evidence in the form of actual groundwater chemical data, soil boring characterization and chemical analyses, soil characteristics/chemistry, and fate and transport analysis offer more concrete evidence of site conditions and potential impact to groundwater. Given the age of the sludge in the drying bed (>20 years), the high organic content within the sludge, limited detection of Aroclor 1254 above its SSL, no detections in the subsurface soil above SSLs, the lack of detections in groundwater for Aroclor 1254, and the lack of detections in groundwater of chromium at concentrations above its adjusted T-RBC, these chemicals are not a concern at the site with respect to migration from soil to groundwater. Additional fate and transport information for these chemicals is provided in Section 5.1.4.

4.1.4 Ecological Nature and Extent Assessment

As presented in Section 7.2.3, after consideration of the results of the SLERA, background concentrations, site conditions, and nature of the material in place at the site, the scientific management decision point (SMDP) is the following:

There is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk.

4.2 NATURE AND EXTENT – SWMU 35 GROUNDWATER

4.2.1 Monitoring Well Analytical Results

Monitoring well sample results from wells 35MW1, 35MW2, D-2, and D-4, collected in February 2008, are summarized in Table 4-3. Table 4-4 summarizes the screening results for groundwater data including: constituents detected, minimum and maximum concentrations detected, number of detections, number of samples, and number of samples above human health screening criteria. Figure 4-3 shows the monitoring well locations and sample results for COPCs identified from the risk screening. The screening resulted in the identification of the following COPCs:

TAL Metals (Methods 6010B, 6020A, 7470A) – 18 TAL metals were detected in groundwater at concentrations below their adjusted T-RBCs with the exception of manganese (total and dissolved).

TCL Pesticides (Method 8081A) – 2 pesticides were detected in groundwater below their adjusted T-RBCs.

TCL PCBs (Method 8082) – PCBs were not detected in groundwater.

TCL VOCs (Method 8260B) – 2 VOCs were detected in groundwater at concentrations below their adjusted T-RBCs and MCLs with the exception of chloroform which was above its T-RBC but was below the MCL for total trihalomethanes (THMs).

TCL SVOCs (Method 8270C) – 7 SVOCs were detected in groundwater at concentrations below their adjusted T-RBCs.

Explosives (Method 8330) and Nitroglycerin (Method 8332) – 1 explosive (HMX) was detected in groundwater at a concentrations below its adjusted T-RBC. Nitroglycerin was not detected in groundwater.

Perchlorate (Method 6850) – Perchlorate was detected in groundwater at concentrations below its adjusted T-RBC.

4.2.2 Human Health Nature and Extent Assessment

The groundwater risk screening identified manganese and chloroform as COPCs for groundwater. The nature and extent of these COPCs in groundwater is discussed below and presented on Figure 4-3:

Manganese

Dissolved manganese was detected at a concentration above its adjusted T-RBC of 73 micrograms per liter (µg/L) in the sample collected from well 35MW1 (91 µg/L). Dissolved manganese was also detected in upgradient well D-2 at concentration of 160 µg/L. Detected concentrations were below its unadjusted T-RBC of 730 µg/L.

Chloroform

Chloroform was detected at a concentration above its T-RBC of 0.155 µg/L in the sample collected from well 35MW1 (0.36 µg/L). Chloroform was also detected in upgradient well D-4 at concentration of 13 µg/L. Detected concentrations were below the MCL of 80 µg/L for THMs.

4.3 NATURE AND EXTENT – SWMU 37 SOIL

4.3.1 Analytical Results

Ten surface soil samples and 14 subsurface soil samples for a total of 24 samples were collected for chemical analysis from SWMU 37 (Figure 3-2 and Table 3-1). Soil samples for chemical analysis were collected from borings from up to three intervals including: a surface soil sample ("A" sample), immediately below sludge (if present) or intermediate sample ("B" sample), and a terminal depth sample ("C" sample). Table 4-5 presents analytical results for chemicals detected in soil samples collected at SWMU 37 and screens these data with respect to adjusted RBCs, SSLs, and background concentrations. Table 4-6 summarizes the screening results for soil data including: constituents detected, minimum and maximum concentrations detected, number of detections, number of samples, and number of samples above human health screening criteria or SSL DAF20 screening levels and background concentrations (inorganics only). COPECs listed below were identified for the site as part of the refined screening level ecological risk assessment presented in Section 7.3.3 and above background point estimates (inorganics only). The screenings resulted in the identification of the following COPCs and COPECs (note that chemicals which were below background point estimates but were identified as hazard drivers for the HHRA are italicized):

TAL Metals (Methods 6010B, 6020A, 7471A) – 23 TAL metals were detected in soil samples with the following metals detected at concentrations above screening levels:

RBC – *aluminum*, chromium, mercury;
SSL – chromium; and
Eco – calcium, chromium, copper, and mercury.

TCL Pesticides (Method 8081A) – 2 pesticides were detected in soil samples with the following pesticides detected at concentrations above screening levels:

RBC – none;
SSL – dieldrin; and
Eco – none.

TCL PCBs (Method 8082) – 1 PCB was detected in soil samples with the following PCBs detected at concentrations above screening levels:

RBC – Aroclor 1254;
SSL – none; and
Eco – none.

TCL VOCs (Method 8260B) – 8 VOCs were detected in soil samples with the following VOCs detected at concentrations above screening levels:

RBC – none;
SSL – TCE; and
Eco – none.

TCL SVOCs/PAHs– 15 SVOCs/PAHs were detected in soil samples with the following SVOCs/PAHs detected at concentrations above screening levels:

RBC – none;
SSL – none; and
Eco – none.

Explosives (Method 8330) and Nitroglycerin (Method 8332) – 2 explosives were detected in soil samples with the following constituents detected at concentrations above screening levels:

RBC – none;
SSL – 2,4-DNT; and
Eco – none.

4.3.2 Human Health Nature and Extent Assessment

A summary of the human health risk and background screening results for COPCs is presented in the table below.

Summary of COPCs for Soil

Chemical	Total # of Det/ # of Samples	Above Adjusted R-RBC		Above Adjusted I-RBC	
		# Above	Sample IDs	# Above	Sample IDs
Aluminum*	24/24	0	NA	0	NA
Chromium	24/24	6	37SB1A, 37SB2A, 37SB7A, 37SB8A DUP AVG, 37SB9A DUP AVG, 37SB10A	0	NA
Mercury	18/24	2	37SB7A, 37SB10A	0	NA
Aroclor 1254	8/16	5	37SB1A, 37SB7A, 37SB8A DUP AVG, 37SB9A DUP AVG, 37SB10A	0	NA

Notes: NA=Not Applicable, DUP AVG = Duplicate Average, *No sample concentrations were above the background point estimate for aluminum but aluminum was identified as a hazard driver in human health risk assessment

The nature and extent of COPCs identified in the above table, as well as constituents with concentrations above SSL DAF20s (above background concentrations for inorganics) identified in Section 4.3.1 and presented on Table 4-6, is discussed further in the following sections.

4.3.2.1 Aluminum

Aluminum was detected at concentrations above its R-RBC but below its background point estimate and adjusted I-RBC in all samples collected. Although aluminum was not detected at concentrations above its background point estimate, it was identified as a hazard driver for the construction worker in the HHRA; therefore, aluminum is included in the nature and extent assessment for the site (Figure 4-4). Detected aluminum concentrations within the drying bed (13,100 to 29,000 mg/kg) were similar to detected aluminum concentrations outside the drying bed (9,400 to 20,000 mg/kg) where no indications of impacts from site use were noted (i.e., no sludge present). The detected concentrations also were within the mid-range of detected concentrations of aluminum in the background data set (3,620 to 47,900 mg/kg). An SSL DAF20 is not available for aluminum, but the groundwater sample results did not indicate the leaching of aluminum from soil to groundwater at concentrations above its adjusted T-RBC.

4.3.2.2 Chromium

Chromium was detected at concentrations above its R-RBC and background point estimate in six surface soil/sludge samples collected within the drying bed. Detected concentrations in these samples were below the adjusted I-RBC. Detected chromium concentrations in samples collected from 1 foot below the sludge to the boring termination depths were below the R-RBC and background point estimate indicating the vertical extent of concentrations above the adjusted R-RBC and background point estimate is limited to the sludge material and depths less than 6 ft bgs (Figure 4-4). Although 6 surface soil/sludge samples collected within the drying bed were above chromium's SSL DAF20, subsurface soil sample results did not indicate leaching of chromium from the sludge to underlying soil at levels above the SSL DAF20 or the background point estimate (Figure 4-5). In addition, groundwater sample results did not indicate the leaching of chromium from soil to groundwater at concentrations above its adjusted T-RBC.

4.3.2.3 Mercury

Mercury was detected at concentrations above its R-RBC and background point estimate in two surface soil/sludge samples collected within the drying bed. Detected concentrations in these samples were below its adjusted I-RBC. Detected mercury concentrations in samples collected from 1 foot below the sludge to the boring termination depths were below the R-RBC and background point estimate indicating the vertical extent of concentrations above the adjusted R-RBC and background point estimate is limited to the sludge material and depths less than 6 ft bgs (Figure 4-4). An SSL DAF20 is not available for mercury, but the groundwater sample results did not indicate the leaching of mercury from soil to groundwater at detectable concentrations.

4.3.2.4 Pesticides

Pesticides were detected in samples at concentrations below their adjusted RBCs. One pesticide, dieldrin, was detected in one surface soil/sludge sample (37SB1A) at a concentration above its SSL DAF20. Although one surface soil/sludge sample was above dieldrin's SSL DAF20, soil sample results did not indicate leaching of dieldrin to subsurface soil below the sludge (Figure 4-5). In addition, groundwater sample results did not indicate the leaching of dieldrin from soil to groundwater at detectable concentrations. Additional discussion and assessment of the soil-to-groundwater migration pathway is presented in Section 4.3.3.

4.3.2.5 PCBs

Aroclor 1254 was detected at concentrations above its adjusted R-RBC in 5 of 16 soil samples. The sample concentrations above its adjusted R-RBC are limited to surface soil/sludge samples collected within the drying bed (Figure 4-4). Detected concentrations were below its adjusted I-RBC and SSL DAF20. Detected Aroclor 1254 concentrations in samples collected from 1 foot below the sludge to the boring termination depths were below the R-RBC indicating the vertical extent of concentrations above the adjusted R-RBC is limited to the sludge material and depths less than 6 ft bgs (Figure 4-4).

Groundwater sample results did not indicate leaching of PCBs from soil to groundwater at detectable levels.

4.3.2.6 VOCs

VOCs were detected in samples at concentrations below their adjusted RBCs and SSL DAF20s with the exception of TCE, which detected at concentrations above its SSL DAF20 in two samples. Although TCE was detected in two samples at concentrations above its SSL DAF20, groundwater sample results did not indicate leaching of TCE from soil to groundwater at detectable levels. Additional discussion and assessment of the soil-to-groundwater migration pathway is presented in Section 4.3.3.

4.3.2.7 SVOCs

SVOCs were detected in samples at concentrations below their adjusted RBCs and SSL DAF20s.

4.3.2.8 Explosives

Explosives were detected in samples at concentrations below their adjusted RBCs. One explosive, 2,4-DNT, was detected in one surface soil/sludge sample (37SB2A) at a concentration above its SSL DAF20. Although one surface soil/sludge sample was above 2,4-DNT's SSL DAF20, soil sample results did not indicate leaching of 2,4-DNT to subsurface soil below the sludge (Figure 4-5). In addition, groundwater sample results did not indicate the leaching of 2,4-DNT from soil to groundwater at detectable concentrations. Additional discussion and assessment of the soil-to-groundwater migration pathway is presented in Section 4.3.3.

4.3.3 Soil-to-groundwater Migration Assessment

As previously discussed in Section 4.3.1 and presented on Table 4-6, the concentrations for each detected chemical at the site was screened against the SSL DAF20 and background point estimate resulting in the identification of the following SSL COPCs: chromium, dieldrin, TCE, and 2,4-DNT. Sample concentrations that were above SSL DAF20s and background point estimates (inorganics only) are summarized in the table below:

Chemical	Total # of Det/# of Samples	# of Samples Above SSL DAF20	Sample Identification
Chromium	24/24	6	37SB1A, 37SB2A, 37SB7A, 37SB8A DUP AVG, 37SB9A DUP AVG, 37SB10A
Dieldrin	1/16	1	37SB1A
TCE	2/9	2	37SB2B, 37SB2C
2,4-DNT	3/24	1	37SB2A

Although chromium was detected at a concentration in one or more samples at above its SSL DAF20 and background point estimate (Figure 4-5), dissolved chromium was not detected in groundwater samples at levels above its adjusted T-RBC or MCL.

While SSL exceedances indicate a theoretical potential for impact to groundwater, empirical evidence in the form of actual groundwater chemical data, soil boring characterization and chemical analyses, soil characteristics/chemistry, and fate and transport analysis offer more concrete evidence of site conditions and potential impact to groundwater. Given the age of the sludge in the drying bed (>20 years), the organic content within the sludge, limited organic detections above the SSLs, the lack of detections in groundwater for dieldrin, TCE, and 2,4,-DNT, and the lack of detections in groundwater of chromium at concentrations above its adjusted T-RBC, these chemicals are not a concern at the site with respect to

migration from soil to groundwater. Additional fate and transport information for these chemicals is provided in Section 5.1.4.

4.3.4 Ecological Nature and Extent Assessment

As presented in Section 7.3.3, after consideration of the results of the SLERA, site conditions, background concentrations, and nature of the material in place at the site, the SMDP is the following:

There is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk.

4.4 NATURE AND EXTENT – SWMU 37 GROUNDWATER

4.4.1 Monitoring Well Analytical Results

Monitoring well sample results from wells 37MW1, 37MW2, 37MW3, and 37MW4 are summarized in Table 4-7. Table 4-8 summarizes the screening results for groundwater data including: constituents detected, minimum and maximum concentrations detected, number of detections, number of samples, and number of samples above human health screening criteria. Note: Table 4-8 screens the pesticide data from the June 2007 sampling event for 37MW2. The screening resulted in the identification of the following COPCs:

TAL Metals (Methods 6010B, 6020A, 7470A) – 18 TAL metals were detected in groundwater at concentrations below their adjusted T-RBCs with the exception of aluminum (total), arsenic (total), barium, (total), iron (total), vanadium (total), and manganese (total and dissolved).

TCL Pesticides (Method 8081A) – 8 pesticides were detected in groundwater at concentrations below their adjusted T-RBCs with the exception of alpha-BHC, alpha-chlordane, beta-BHC, delta-BHC, and heptachlor epoxide. Heptachlor epoxide and alpha-chlordane were below their MCLs.

TCL PCBs (Method 8082) – PCBs were not detected in groundwater.

TCL VOCs (Method 8260B) – 4 VOCs were detected in groundwater at concentrations below their adjusted T-RBCs and MCLs with the exception of chloroform which was above its T-RBC but was below the MCL for total THMs.

TCL SVOCs (Method 8270C) – SVOCs were not analyzed for in groundwater.

Explosives (Method 8330) and Nitroglycerin (Method 8332) – 4 explosives were detected in groundwater at a concentrations below their adjusted T-RBC. Nitroglycerin was not detected in groundwater.

Perchlorate (Method 6850) – Perchlorate was detected in groundwater at concentrations below its adjusted T-RBC.

4.4.2 Human Health Nature and Extent Assessment

The groundwater risk screening identified manganese, pesticides, and chloroform as COPCs for groundwater. Note that 37MW2 was re-sampled and tested for pesticides in June 2008. The nature and extent of these COPCs in groundwater is discussed below and presented on Figure 4-6:

Manganese

As shown on Figure 4-6, dissolved manganese was detected at a concentration above its adjusted T-RBC of 73 µg/L in the sample collected from well 37MW2 (260 µg/L). Detected concentrations were below the unadjusted T-RBC of 730 µg/L.

Pesticides

For the February 2008 sampling event (Figure 4-6), alpha-BHC, beta-BHC, and delta-BHC were detected in well 37MW2 at concentrations above their adjusted T-RBCs. During this same sampling event

(February 2008), alpha-chlordane and heptachlor epoxide were detected in background well 37MW1 at concentrations above their adjusted T-RBCs but below their MCLs. Groundwater from downgradient well 37MW2 was re-sampled and analyzed for pesticides in June 2008, which resulted in detected concentrations of alpha-BHC and heptachlor epoxide above their adjusted T-RBCs (Figure 4-6). The detected heptachlor epoxide concentration was below its MCL. An MCL is not available for alpha-BHC, but as presented in Section 6.0, alpha-BHC was not identified as a risk or hazard driver in the human health risk assessment.

Chloroform

Chloroform was detected at a concentration above its T-RBC of 0.155 µg/L in the sample collected from well 37MW3 (0.28 µg/L). The detected concentration was below the MCL of 80 µg/L for chloroform (total THMs).

4.5 NATURE AND EXTENT – SWMU 38/AOC Q SOIL

4.5.1 Analytical Results

Thirteen surface soil samples and 20 subsurface soil samples for a total of 33 samples were collected for chemical analysis from SWMU 38/AOC Q (Figure 3-3 and Table 3-1). Soil samples for chemical analysis were collected from borings from up to three intervals including: a surface soil sample ("A" sample), immediately below sludge (if present) or intermediate sample ("B" sample), and a terminal depth sample ("C" sample). Table 4-9 presents analytical results for chemicals detected in soil samples collected at SWMU 38/AOC Q and screens these data with respect to adjusted RBCs, SSLs, and background concentrations. Table 4-10 summarizes the screening results for soil data including: constituents detected, minimum and maximum concentrations detected, number of detections, number of samples, and the number of samples above human health screening criteria or SSL DAF20 screening levels and background concentrations (inorganics only). COPECs listed below were identified for the site as part of the refined screening level ecological risk assessment presented in Section 7.4.3 and above background point estimates (inorganics only). The screenings resulted in the identification of the following COPCs and COPECs (note that chemicals which were below background point estimates but were identified as hazard drivers for the HHRA are italicized):

TAL Metals (Methods 6010B, 6020A, 7471A) – 23 TAL metals were detected in soil samples with the following metals detected at concentrations above screening levels:

RBC – *aluminum*, chromium, *manganese*;
SSL – chromium; and
Eco – calcium.

TCL Pesticides (Method 8081A) – 2 pesticides were detected in soil samples with the following pesticides detected at concentrations above screening levels:

RBC – none;
SSL – none; and
Eco – none.

TCL PCBs (Method 8082) – 1 PCB was detected in soil samples with the following PCB detected at concentrations above screening levels:

RBC – Aroclor 1254;
SSL – none; and
Eco – none.

TCL VOCs (Method 8260B) – 9 VOCs were detected in soil samples with the following VOCs detected at concentrations above screening levels:

RBC – none;
SSL – none; and
Eco – none.

TCL SVOCs (Method 8270C) – 12 SVOCs were detected in soil samples with the following SVOCs detected at concentrations above screening levels:

RBC – none;
SSL – none; and
Eco – none.

Explosives (Method 8330) and Nitroglycerin (Method 8332) – 1 explosive was detected in soil samples with the following constituents detected at concentrations above screening levels:

RBC –none;
SSL – none; and
Eco – none.

4.5.2 Human Health Nature and Extent Assessment

A summary of the human health risk and background screening results for COPCs is presented in the table below.

Summary of COPCs for Soil

Chemical	Total # of Det/ # of Samples	Above Adjusted R-RBC		Above Adjusted I-RBC	
		# Above	Sample IDs	# of Above	Sample IDs
Aluminum*	33/33	0	NA	0	NA
Chromium	33/33	3	38SB1A, 38SB3A, 38B10A	0	NA
Manganese*	33/33	0	NA	0	NA
Aroclor 1254	9/18	3	38SB1A, 38SB7A DUP AVG, QSB4A	0	NA

Notes: NA=Not Applicable, DUP AVG = Duplicate Average, *No sample concentrations were above the background point estimate for aluminum and manganese, but aluminum and manganese were identified as a hazard driver in human health risk assessment

The nature and extent of COPCs identified in the above table, as well as constituents with concentrations above SSL DAF20s (above background concentrations for inorganics) identified in Section 4.5.1 and presented on Table 4-10, is discussed further in the following sections.

4.5.2.1 Aluminum

Aluminum was detected at concentrations above its R-RBC but below its background point estimate and adjusted I-RBC in all samples collected. Although aluminum was not detected at concentrations above its background point estimate, it was identified as a hazard driver for the construction worker in the HHRA; therefore, aluminum is included in the nature and extent assessment for the site (Figure 4-7). Detected aluminum concentrations within the drying bed (3,360 to 26,400 mg/kg) were similar to detected aluminum concentrations outside the drying bed (7,820 to 18,150 mg/kg) where no indication of impacts from site use were noted (i.e., no sludge present). The detected concentrations also were within the mid-range of detected concentrations of aluminum in the background data set (3,620 to 47,900 mg/kg). An SSL DAF20 is not available for aluminum, but the groundwater sample results did not indicate the leaching of aluminum from soil to groundwater at concentrations above its adjusted T-RBC.

4.5.2.2 Chromium

Chromium was detected at concentrations above its R-RBC and background point estimate in 3 surface soil/sludge samples collected within the drying bed. Detected concentrations in these samples were below its adjusted I-RBC. Detected chromium concentrations in samples collected from 1 foot below the sludge to the boring termination depths were below the R-RBC and background point estimate indicating the vertical extent of concentrations above the adjusted R-RBC and background point estimate is limited to the sludge material and a maximum depth of 1 ft bgs (Figure 4-7). Although 3 surface soil/sludge

samples were above chromium's SSL DAF20, subsurface soil sample results did not indicate leaching of chromium from the sludge to underlying soil at levels above the SSL DAF20 or the background point estimate (Figure 4-8). In addition, groundwater sample results did not indicate the leaching of chromium from soil to groundwater at concentrations above its adjusted T-RBC.

4.5.2.3 Manganese

Manganese was detected at concentrations above its R-RBC but below its background point estimate and adjusted I-RBC in all samples collected. Although manganese was not detected at concentrations above its background point estimate, it was identified as a hazard driver for the construction worker in the HHRA; therefore, manganese is included in the nature and extent assessment for the site (Figure 4-7). Detected manganese concentrations within the drying bed (87 to 550 mg/kg) were similar to detected manganese concentrations outside the drying bed (222 to 600 mg/kg) where no indication of impacts from site use were noted (i.e., no sludge present). The detected concentrations also were within the low-to-mid range of detected concentrations of manganese in the background data set (16.7 to 2,040 mg/kg). Although detected manganese concentrations in soil were not above its SSL DAF20, the groundwater sample results resulted in manganese concentrations in groundwater above its adjusted and unadjusted T-RBC at one well location (38MW3).

4.5.2.4 Pesticides

Pesticides were detected in samples at concentrations below their adjusted RBCs and SSL DAF20s.

4.5.2.5 PCBs

Aroclor 1254 was detected at concentrations above its adjusted R-RBC in 3 of 18 soil samples but below its I-RBC. The sample concentrations above its adjusted R-RBC are limited to surface soil/sludge within the drying bed. The vertical extent of detected concentrations of PCBs above adjusted R-RBC is limited to surface soil/sludge within the drying bed and to a maximum depth of 1 ft bgs (Figure 4-7). PCBs were not detected in soil at concentrations above SSL DAF20s and the groundwater sample results did not indicate leaching of PCBs from soil to groundwater at detectable levels.

4.5.2.6 VOCs

VOCs were detected in samples at concentrations below their adjusted RBCs and SSL DAF20s.

4.5.2.7 SVOCs

SVOCs were detected in samples at concentrations below their adjusted RBCs and SSL DAF20s.

4.5.2.8 Explosives

Explosives were detected in samples at concentrations below their adjusted RBCs and SSL DAF20s.

4.5.3 Soil-to-groundwater Migration Assessment

As previously discussed in Section 4.5.1 and presented on Table 4-10, the concentrations for each detected chemical at the site was screened against the DAF20 SSL and background point estimate resulting in the identification of the following SSL COPC: chromium. Sample concentrations that were above the SSL DAF20 and background point estimate are summarized in the table below:

Chemical	Total # of Det/# of Samples	# of Samples Above SSL DAF20	Sample Identification
Chromium	33/33	3	38SB1A, 38SB3A, 38B10A

Although chromium was detected at a concentration in one or more samples above its DAF20 SSL and background point estimate, chromium was not detected in subsurface soil samples collected below the

sludge at concentrations above these levels (Figure 4-8). In addition, chromium was not detected in groundwater samples at levels above its adjusted T-RBCs.

While SSL exceedances indicate a theoretical potential for impact to groundwater, empirical evidence in the form of actual groundwater chemical data, soil boring characterization and chemical analyses, soil characteristics/chemistry, and fate and transport analysis offer more concrete evidence of site conditions and potential impact to groundwater. Given the age of the sludge in the drying bed (>20 years), the organic content within the sludge, limited detections above the SSL, and the lack of detections in groundwater of chromium at concentrations above its adjusted T-RBC, this chemical is not a concern at the site with respect to migration from soil to groundwater. Additional fate and transport information for chromium is provided in Section 5.1.4.

4.5.4 Ecological Nature and Extent Assessment

As presented in Section 7.4.3, after consideration of the results of the SLERA, background concentrations, site conditions, and nature of the material in place at the site, the SMDP is the following:

There is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk.

4.6 NATURE AND EXTENT – SWMU 38/AOC Q GROUNDWATER

4.6.1 Monitoring Well Analytical Results

Monitoring well sample results from wells 38MW1, 38MW2, and 38MW3, are summarized in Table 4-11. Table 4-12 summarizes the screening results for groundwater data including: constituents detected, minimum and maximum concentrations detected, number of detections, number of samples, and the number of samples above human health screening criteria. The screening resulted in the identification of the following COPCs:

TAL Metals (Methods 6010B, 6020A, 7470A) – 17 TAL metals were detected in groundwater at concentrations below their adjusted T-RBCs with the exception of arsenic (total), iron (total), manganese (total and dissolved), and vanadium (total).

TCL Pesticides (Method 8081A) – 2 pesticides were detected in groundwater at concentrations below their adjusted T-RBCs.

TCL PCBs (Method 8082) – PCBs were not detected in groundwater.

TCL VOCs (Method 8260B) – 3 VOCs were detected in groundwater at concentrations below their adjusted T-RBCs and MCLs with the exception of chloroform, which is above its T-RBC but was below the MCL for THMs.

TCL SVOCs (Method 8270C) – SVOCs were not analyzed for in groundwater.

Explosives (Method 8330) and Nitroglycerin (Method 8332) – Explosives were not detected in groundwater.

Perchlorate (Method 6850) – Perchlorate was detected in groundwater at a concentration below its adjusted T-RBC.

4.6.2 Human Health Nature and Extent Assessment

The groundwater risk screening identified dissolved manganese and chloroform as COPCs for groundwater. The nature and extent of these COPCs in groundwater is discussed below and presented on Figure 4-9:

Manganese

For the February 2008 sampling event (Figure 4-9), dissolved manganese was detected at a concentration above its adjusted and unadjusted T-RBC of 73 µg/L in the sample collected from well 38MW3 (2,400 µg/L). Groundwater from downgradient well 38MW3 was re-sampled and analyzed for manganese in June 2008. The dissolved manganese concentration detected (1,050 µg/L) is also above its adjusted and unadjusted T-RBC (Figure 4-9).

Chloroform

As presented on Figure 4-9, chloroform was detected at a concentration above its T-RBC of 0.155 µg/L in the sample collected from well 38MW1 (1.7 µg/L). Detected concentrations were below the MCL of 80 µg/L for chloroform (total THMs).

4.7 NATURE AND EXTENT SUMMARY

4.7.1 Nature and Extent Summary – SWMU 35

The primary site-related COPCs in soil at SWMU 35 are metals, PCBs, and nitroglycerin located primarily within the drying bed. These conclusions are supported by the results of the human health and ecological risks assessments presented in Sections 6.0 and 7.0, respectively. Metals concentrations in soil were highest within sludge contained in the drying bed (Figure 4-1). Aroclor 1254 concentrations above its adjusted I-RBCs were limited to one surface soil/sludge sample collected within the drying bed (Figure 4-1).

As shown on Figure 4-2, sample concentrations above its SSL DAF20 and background point estimate for chromium were limited to surface soil/sludge samples collected within the drying bed. Chromium was not detected in groundwater at concentrations above its adjusted T-RBC. Given the age of the sludge in the drying bed (>20 years), the high organic content within the sludge, limited detections above the SSL, no detections in the subsurface soil above SSLs, the lack of detections in groundwater for Aroclor 1254, and the lack of detections in groundwater of chromium at concentrations above its adjusted T-RBC, these chemicals are not a concern at the site with respect to migration from soil to groundwater.

The results of the ecological risk assessment indicated that there is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk.

COPCs identified in groundwater were limited to manganese and chloroform, with dissolved metals and chloroform concentrations detected below their unadjusted T-RBCs or MCLs (Figure 4-3). It is important to note that studies and groundwater investigations have shown the presence of chloroform in most groundwater samples collected at the facility regardless of location. The concentrations of chloroform detected in monitoring wells at SWMU 35 are low level concentrations below the range of chloroform levels present in the water transmitted through water lines at the facility. The site is located downgradient of developed areas containing water lines that could be leaking, which may have been the source of chloroform. In addition, as presented in Section 6.0 chloroform was not identified as a risk driver in the human health risk assessment.

COPCs identified in the nature and extent assessment are summarized in the following table.

Summary of Nature and Extent Assessment – SWMU 35

Chemical	HH Soil COPC [1]	HH Groundwater COPC [1]
Aluminum	X	
Calcium		
Chromium	X	
Lead	X	
Manganese		X
Mercury		
Aroclor 1254	X	
Aroclor 1260	X	
Chloroform		X
Nitroglycerin	X	

Note: [1] Chemicals with available screening values

4.7.2 Nature and Extent Summary – SWMU 37

The primary site-related COPCs in soil at SWMU 37 are metals and PCBs located within the drying bed. These conclusions are supported by the results of the human health and ecological risks assessments presented in Sections 6.0 and 7.0, respectively. Metals concentrations in soil were highest within sludge contained in the drying bed (Figure 4-4). Aroclor 1254 concentrations above its adjusted R-RBC were limited to surface soil/sludge sample collected within the drying bed (Figure 4-4).

As shown on Figure 4-5, sample concentrations of chromium above its SSL DAF20 and background point estimate were limited to surface soil/sludge samples collected within the drying bed. Chromium was not detected in groundwater at concentrations above its adjusted T-RBC. Given the age of the sludge in the drying bed (>20 years), the organic content within the sludge, limited organic detections above the SSLs, the lack of detections in groundwater for dieldrin, TCE, and 2,4,-DNT, and the lack of detections in groundwater of chromium at concentrations above its adjusted T-RBC, these chemicals are not a concern at the site with respect to migration from soil to groundwater.

The results of the ecological risk assessment indicated that there is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk.

COPCs identified in groundwater were limited to manganese, pesticides (alpha-BHC and heptachlor epoxide), and chloroform, with dissolved metals, heptachlor epoxide, and chloroform concentrations detected below their unadjusted T-RBCs or MCLs (Figure 4-6). An MCL is not available for alpha-BHC, but as presented in Section 6.0, alpha-BHC was not identified as a risk or hazard driver in the human health risk assessment.

It is important to note that studies and groundwater investigations have shown the presence of chloroform in most groundwater samples collected at the facility regardless of location. The concentrations of chloroform detected in monitoring wells at SWMU 37 are low level concentrations below the range of chloroform levels present in the water transmitted through water lines at the facility. The site is located downgradient of developed areas containing water lines that could be leaking, which may have been the source of chloroform. In addition, as presented in Section 6.0 chloroform was not identified as a risk driver in the human health risk assessment. Data suggests the site is not the source of pesticides in groundwater since the pesticides detected in groundwater were not detected in soil at the site and pesticides were also detected in background well 37MW1.

COPCs identified in the nature and extent assessment are summarized in the following table.

Summary of Nature and Extent Assessment – SWMU 37

Chemical	HH COPC[1]	Groundwater COPC [1,2]
Aluminum	X	
Calcium		
Chromium	X	
Copper		
Manganese		X
Mercury	X	
Aroclor 1254	X	
Dieldrin		
alpha-BHC[2]		X
Heptachlor Epoxide[2]		X
Chloroform		X
TCE		
2,4-DNT		

Note: [1] Chemicals with available screening values
[2] Groundwater COPCs for downgradient wells – June 2008 sampling event

4.7.3 Nature and Extent Summary – SWMU 38 and AOC Q

The primary site-related COPCs in soil at SWMU 38/AOC Q are metals and Aroclor 1254 located within the drying bed. These conclusions are supported by the results of the human health and ecological risks assessments presented in Sections 6.0 and 7.0, respectively. Metals concentrations in soil were highest in sludge contained in the drying bed (Figure 4-7). Aroclor 1254 concentrations above its adjusted R-RBC were limited to surface soil/sludge samples collected within the drying bed (Figure 4-7).

As shown on Figure 4-8, sample chromium concentrations above its SSL DAF20 and background point estimate were limited to surface soil/sludge samples collected within the drying bed. Although chromium was detected in soil within the surface soil/sludge in the drying bed at concentrations above its site-specific SSL, chromium was not detected in groundwater at concentrations above its adjusted T-RBC.

The results of the ecological risk assessment indicated that there is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk.

COPCs identified in groundwater were limited to manganese and chloroform, with chloroform concentrations detected below its MCLs (Figure 4-9). It is important to note that studies and groundwater investigations have shown the presence of chloroform in most groundwater samples collected at the facility regardless of location. The concentrations of chloroform detected in monitoring wells at SWMU 38/AOC Q are low level concentrations below the range of chloroform levels present in the water transmitted through water lines at the facility. The site is located downgradient of developed areas containing water lines that could be leaking, which may have been the source of chloroform. In addition, as presented in Section 6.0 chloroform was not identified as a risk driver in the human health risk assessment.

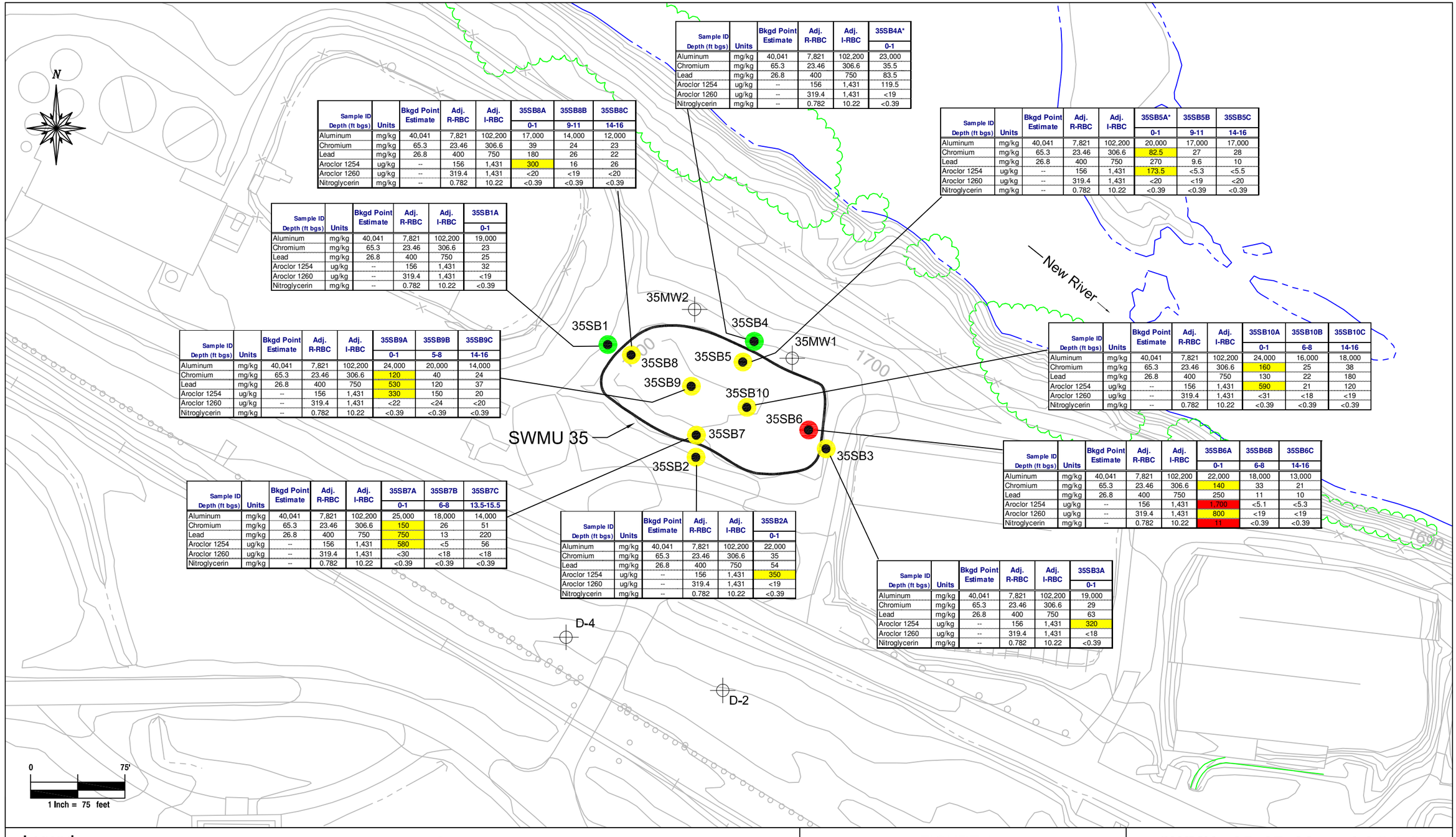
A site-specific source related to disposal activities for the dissolved manganese concentrations detected in well 38MW3 was not identified. Manganese concentrations within material in the drying bed (87 to 550 mg/kg) were similar to manganese concentrations in soil outside the drying bed (222 to 600 mg/kg) where no indication of impacts from site use were noted (i.e., no sludge present). Manganese concentrations at the site also were within the low-to-mid range of concentrations of manganese in the background data set (16.7 to 2,040 mg/kg). The occurrence of dissolved manganese at concentrations above the T-RBC at one well location 38MW3 may be due natural geologic conditions (i.e., weathering of bedrock containing

manganese and alluvial deposition). COPCs identified in the nature and extent assessment are summarized in the following table.

Summary of Nature and Extent Assessment – SWMU 38 and AOC Q

Chemical	HH COPC[1]	Groundwater COPC[1]
Aluminum	X	
Calcium		
Chromium	X	
Manganese	X	X
Aroclor 1254	X	
Chloroform		X

Note: [1] Chemicals with available screening values



Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	35SB8A 0-1	35SB8B 9-11	35SB8C 14-16
Aluminum	mg/kg	40,041	7,821	102,200	17,000	14,000	12,000
Chromium	mg/kg	65.3	23.46	306.6	39	24	23
Lead	mg/kg	26.8	400	750	180	26	22
Aroclor 1254	ug/kg	--	156	1,431	300	16	26
Aroclor 1260	ug/kg	--	319.4	1,431	<20	<19	<20
Nitroglycerin	mg/kg	--	0.782	10.22	<0.39	<0.39	<0.39

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	35SB4A* 0-1
Aluminum	mg/kg	40,041	7,821	102,200	23,000
Chromium	mg/kg	65.3	23.46	306.6	35.5
Lead	mg/kg	26.8	400	750	83.5
Aroclor 1254	ug/kg	--	156	1,431	119.5
Aroclor 1260	ug/kg	--	319.4	1,431	<19
Nitroglycerin	mg/kg	--	0.782	10.22	<0.39

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	35SB5A* 0-1	35SB5B 9-11	35SB5C 14-16
Aluminum	mg/kg	40,041	7,821	102,200	20,000	17,000	17,000
Chromium	mg/kg	65.3	23.46	306.6	82.5	27	28
Lead	mg/kg	26.8	400	750	270	9.6	10
Aroclor 1254	ug/kg	--	156	1,431	173.5	<5.3	<5.5
Aroclor 1260	ug/kg	--	319.4	1,431	<20	<19	<20
Nitroglycerin	mg/kg	--	0.782	10.22	<0.39	<0.39	<0.39

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	35SB1A 0-1
Aluminum	mg/kg	40,041	7,821	102,200	19,000
Chromium	mg/kg	65.3	23.46	306.6	23
Lead	mg/kg	26.8	400	750	25
Aroclor 1254	ug/kg	--	156	1,431	32
Aroclor 1260	ug/kg	--	319.4	1,431	<19
Nitroglycerin	mg/kg	--	0.782	10.22	<0.39

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	35SB9A 0-1	35SB9B 5-8	35SB9C 14-16
Aluminum	mg/kg	40,041	7,821	102,200	24,000	20,000	14,000
Chromium	mg/kg	65.3	23.46	306.6	120	40	24
Lead	mg/kg	26.8	400	750	530	120	37
Aroclor 1254	ug/kg	--	156	1,431	330	150	20
Aroclor 1260	ug/kg	--	319.4	1,431	<22	<24	<20
Nitroglycerin	mg/kg	--	0.782	10.22	<0.39	<0.39	<0.39

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	35SB10A 0-1	35SB10B 6-8	35SB10C 14-16
Aluminum	mg/kg	40,041	7,821	102,200	24,000	16,000	18,000
Chromium	mg/kg	65.3	23.46	306.6	160	25	38
Lead	mg/kg	26.8	400	750	130	22	180
Aroclor 1254	ug/kg	--	156	1,431	590	21	120
Aroclor 1260	ug/kg	--	319.4	1,431	<31	<18	<19
Nitroglycerin	mg/kg	--	0.782	10.22	<0.39	<0.39	<0.39

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	35SB7A 0-1	35SB7B 6-8	35SB7C 13.5-15.5
Aluminum	mg/kg	40,041	7,821	102,200	25,000	18,000	14,000
Chromium	mg/kg	65.3	23.46	306.6	150	26	51
Lead	mg/kg	26.8	400	750	750	13	220
Aroclor 1254	ug/kg	--	156	1,431	580	<5	56
Aroclor 1260	ug/kg	--	319.4	1,431	<30	<18	<18
Nitroglycerin	mg/kg	--	0.782	10.22	<0.39	<0.39	<0.39

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	35SB2A 0-1
Aluminum	mg/kg	40,041	7,821	102,200	22,000
Chromium	mg/kg	65.3	23.46	306.6	35
Lead	mg/kg	26.8	400	750	54
Aroclor 1254	ug/kg	--	156	1,431	350
Aroclor 1260	ug/kg	--	319.4	1,431	<19
Nitroglycerin	mg/kg	--	0.782	10.22	<0.39

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	35SB6A 0-1	35SB6B 6-8	35SB6C 14-16
Aluminum	mg/kg	40,041	7,821	102,200	22,000	18,000	13,000
Chromium	mg/kg	65.3	23.46	306.6	140	33	21
Lead	mg/kg	26.8	400	750	250	11	10
Aroclor 1254	ug/kg	--	156	1,431	1,700	<5.1	<5.3
Aroclor 1260	ug/kg	--	319.4	1,431	800	<19	<19
Nitroglycerin	mg/kg	--	0.782	10.22	11	<0.39	<0.39

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	35SB3A 0-1
Aluminum	mg/kg	40,041	7,821	102,200	19,000
Chromium	mg/kg	65.3	23.46	306.6	29
Lead	mg/kg	26.8	400	750	63
Aroclor 1254	ug/kg	--	156	1,431	320
Aroclor 1260	ug/kg	--	319.4	1,431	<18
Nitroglycerin	mg/kg	--	0.782	10.22	<0.39

Legend

- Approximate SWMU Boundary
- Soil Boring Location
- Monitoring Well
- Exceeds Adjusted Residential Risk-Based Concentration (R-RBC) and Facility-wide Background Point Estimate
- Exceeds Adjusted R-RBC, Adjusted Industrial RBC (I-RBC), and Facility-wide Background Point Estimate
- Parameters do not exceed Adjusted RBCs and Facility-wide Background Point Estimate
- Parameters exceed Adjusted R-RBC and Facility-wide Background Point Estimate
- Parameters exceed Adjusted R-RBC, Adjusted I-RBC, and Facility-wide Background Point Estimate
- mg/kg — Concentrations in milligrams per kilogram
- ug/kg — Concentrations in micrograms per kilogram
- * — Duplicate Average

FIGURE 4-1

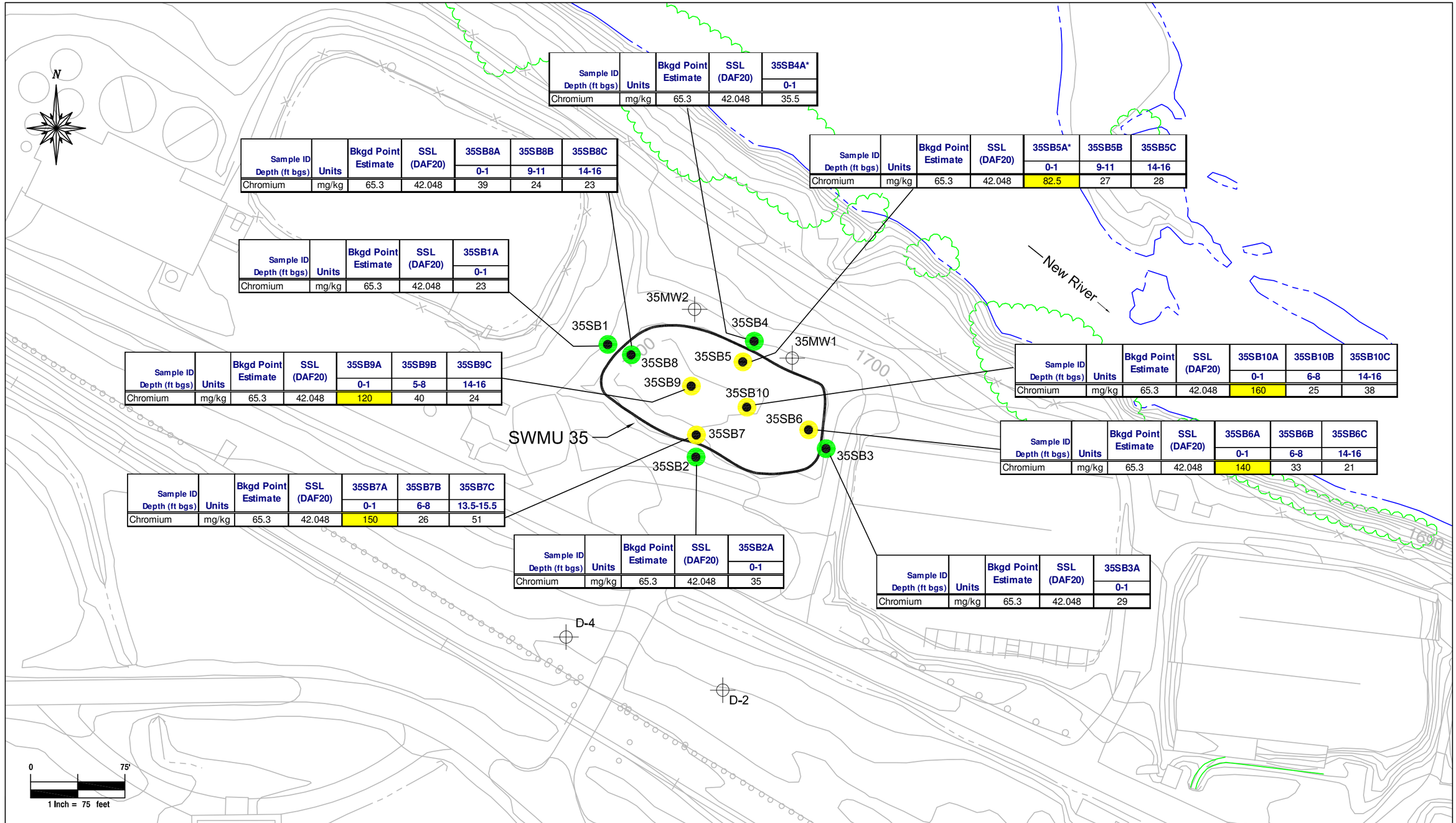
Extent of Human Health COPCs - Soil
SWMU 35

Date: July 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 75 feet	File Name: Fig.4-1

SWMUs 35, 37, 38, and AOC Q

RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	35SB4A* 0-1
Chromium	mg/kg	65.3	42.048	35.5

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	35SB8A 0-1	35SB8B 9-11	35SB8C 14-16
Chromium	mg/kg	65.3	42.048	39	24	23

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	35SB5A* 0-1	35SB5B 9-11	35SB5C 14-16
Chromium	mg/kg	65.3	42.048	82.5	27	28

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	35SB1A 0-1
Chromium	mg/kg	65.3	42.048	23

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	35SB9A 0-1	35SB9B 5-8	35SB9C 14-16
Chromium	mg/kg	65.3	42.048	120	40	24

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	35SB10A 0-1	35SB10B 6-8	35SB10C 14-16
Chromium	mg/kg	65.3	42.048	160	25	38

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	35SB6A 0-1	35SB6B 6-8	35SB6C 14-16
Chromium	mg/kg	65.3	42.048	140	33	21

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	35SB7A 0-1	35SB7B 6-8	35SB7C 13.5-15.5
Chromium	mg/kg	65.3	42.048	150	26	51

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	35SB2A 0-1
Chromium	mg/kg	65.3	42.048	35

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	35SB3A 0-1
Chromium	mg/kg	65.3	42.048	29

Legend

- Approximate SWMU Boundary
- Soil Boring Location
- Monitoring Well
- Exceeds SSL DAF20 and Facility-wide Background Point Estimate
- mg/kg — Concentrations in milligrams per kilogram
- Parameters do not exceed SSL DAF20 and Facility-wide Background Point Estimate
- Parameters exceed SSL DAF20 and Facility-wide Background Point Estimate
- * — Duplicate Average

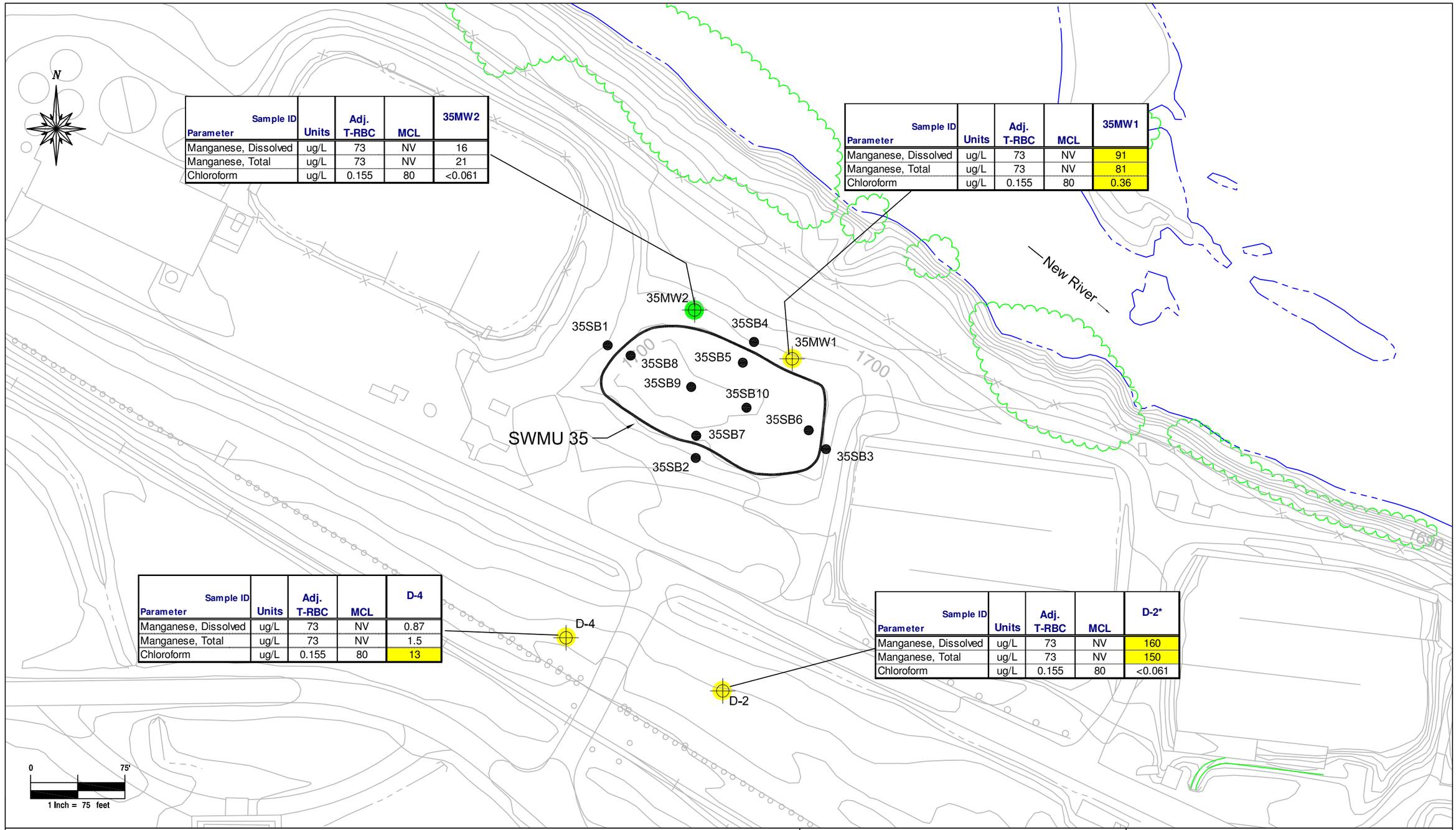
FIGURE 4-2
Extent of SSL COPCs
SWMU 35

Date: July 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 75 feet	File Name: Fig.4-2

SWMUs 35, 37, 38, and AOC Q

RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Legend

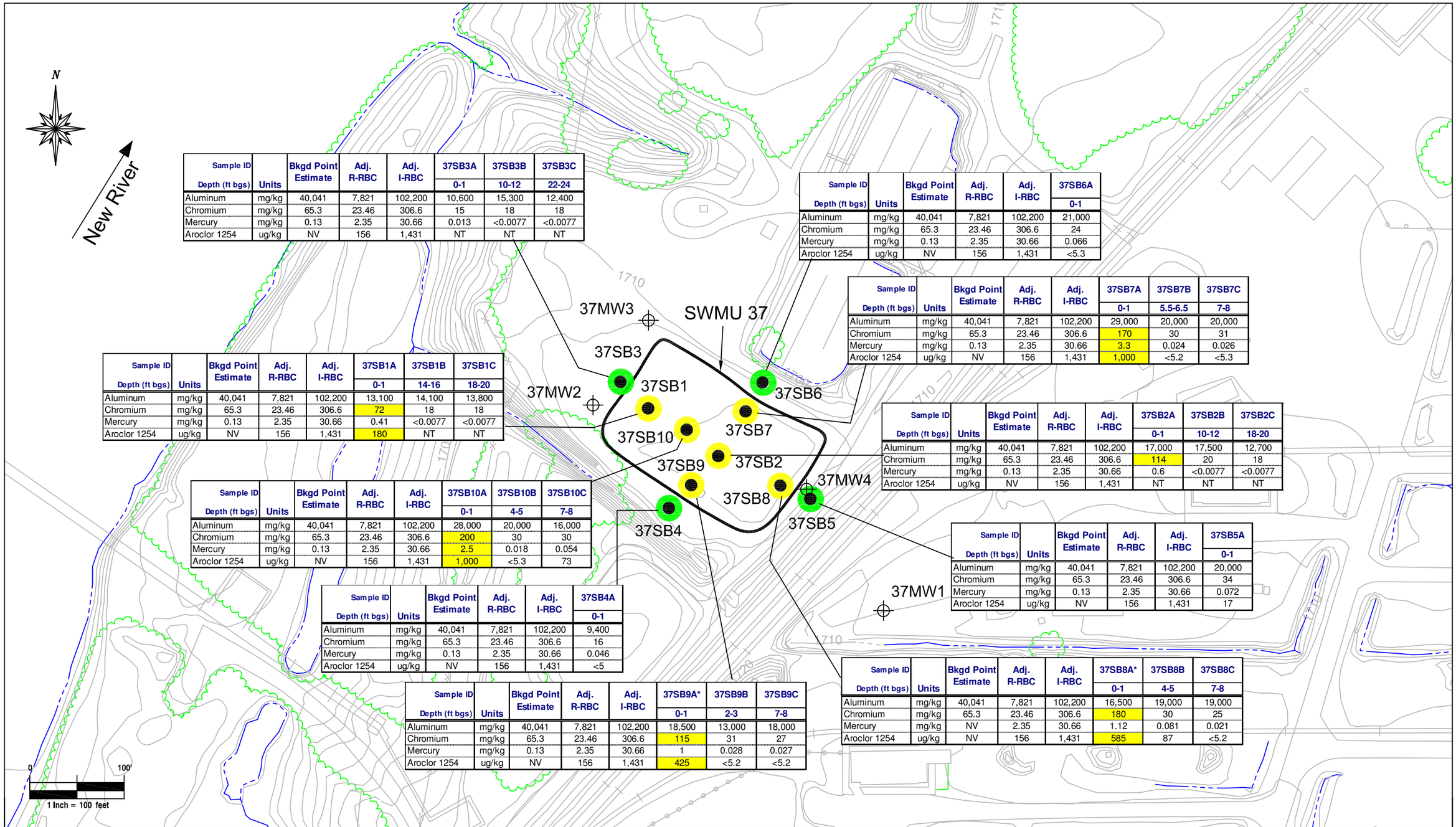
- Approximate SWMU Boundary
- Soil Boring Location
- Monitoring Well
- Exceeds Adjusted Tap Water RBC (T-RBC)
- ug/L — Concentrations in micrograms per liter
- Parameters do not exceed Adjusted T-RBC
- Parameters exceed Adjusted T-RBC
- NV — No Value
- MCL — Maximum Contaminant Level
- * — Duplicate Average

FIGURE 4-3
Extent of Human Health COPCs - Groundwater
SWMU 35

Date: July 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 75 feet	File Name: Fig.4-3

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	37SB3A 0-1	37SB3B 10-12	37SB3C 22-24
Aluminum	mg/kg	40,041	7,821	102,200	10,600	15,300	12,400
Chromium	mg/kg	65.3	23.46	306.6	15	18	18
Mercury	mg/kg	0.13	2.35	30.66	0.013	<0.0077	<0.0077
Aroclor 1254	ug/kg	NV	156	1,431	NT	NT	NT

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	37SB6A 0-1
Aluminum	mg/kg	40,041	7,821	102,200	21,000
Chromium	mg/kg	65.3	23.46	306.6	24
Mercury	mg/kg	0.13	2.35	30.66	0.066
Aroclor 1254	ug/kg	NV	156	1,431	<5.3

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	37SB7A 0-1	37SB7B 5.5-6.5	37SB7C 7-8
Aluminum	mg/kg	40,041	7,821	102,200	29,000	20,000	20,000
Chromium	mg/kg	65.3	23.46	306.6	170	30	31
Mercury	mg/kg	0.13	2.35	30.66	3.3	0.024	0.026
Aroclor 1254	ug/kg	NV	156	1,431	1,000	<5.2	<5.3

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	37SB1A 0-1	37SB1B 14-16	37SB1C 18-20
Aluminum	mg/kg	40,041	7,821	102,200	13,100	14,100	13,800
Chromium	mg/kg	65.3	23.46	306.6	72	18	18
Mercury	mg/kg	0.13	2.35	30.66	0.41	<0.0077	<0.0077
Aroclor 1254	ug/kg	NV	156	1,431	180	NT	NT

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	37SB2A 0-1	37SB2B 10-12	37SB2C 18-20
Aluminum	mg/kg	40,041	7,821	102,200	17,000	17,500	12,700
Chromium	mg/kg	65.3	23.46	306.6	114	20	18
Mercury	mg/kg	0.13	2.35	30.66	0.6	<0.0077	<0.0077
Aroclor 1254	ug/kg	NV	156	1,431	NT	NT	NT

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	37SB10A 0-1	37SB10B 4-5	37SB10C 7-8
Aluminum	mg/kg	40,041	7,821	102,200	28,000	20,000	16,000
Chromium	mg/kg	65.3	23.46	306.6	200	30	30
Mercury	mg/kg	0.13	2.35	30.66	2.5	0.018	0.054
Aroclor 1254	ug/kg	NV	156	1,431	1,000	<5.3	73

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	37SB5A 0-1
Aluminum	mg/kg	40,041	7,821	102,200	20,000
Chromium	mg/kg	65.3	23.46	306.6	34
Mercury	mg/kg	0.13	2.35	30.66	0.072
Aroclor 1254	ug/kg	NV	156	1,431	17

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	37SB4A 0-1
Aluminum	mg/kg	40,041	7,821	102,200	9,400
Chromium	mg/kg	65.3	23.46	306.6	16
Mercury	mg/kg	0.13	2.35	30.66	0.046
Aroclor 1254	ug/kg	NV	156	1,431	<5

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	37SB9A* 0-1	37SB9B 2-3	37SB9C 7-8
Aluminum	mg/kg	40,041	7,821	102,200	18,500	13,000	18,000
Chromium	mg/kg	65.3	23.46	306.6	115	31	27
Mercury	mg/kg	0.13	2.35	30.66	1	0.028	0.027
Aroclor 1254	ug/kg	NV	156	1,431	425	<5.2	<5.2

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	37SB8A* 0-1	37SB8B 4-5	37SB8C 7-8
Aluminum	mg/kg	40,041	7,821	102,200	16,500	19,000	19,000
Chromium	mg/kg	65.3	23.46	306.6	180	30	25
Mercury	mg/kg	NV	2.35	30.66	1.12	0.081	0.021
Aroclor 1254	ug/kg	NV	156	1,431	585	87	<5.2

Legend

- Approximate SWMU Boundary
- Soil Boring Location
- Monitoring Well
- Exceeds Adjusted Residential Risk-Based Concentration (R-RBC) and Facility-wide Background Point Estimate
- mg/kg — Concentrations in milligrams per kilogram
- Parameters do not exceed Adjusted RBCs and Facility-wide Background Point Estimate
- Parameters exceed Adjusted Residential RBC and Facility-wide Background Point Estimate
- ug/kg — Concentrations in micrograms per kilogram
- * — Duplicate Average
- NV — No Value
- NT — Not Tested

FIGURE 4-4

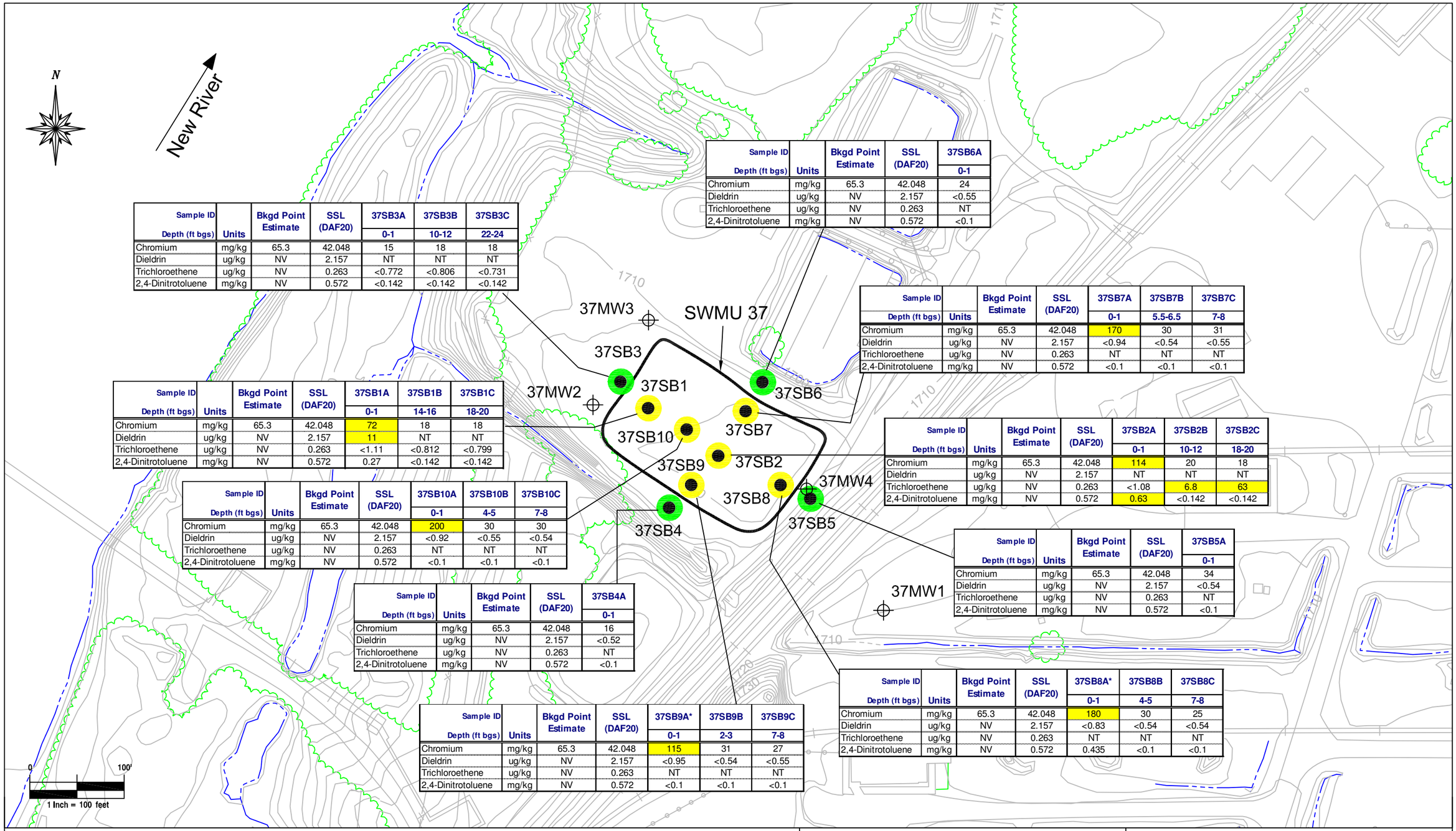
Extent of Human Health COPCs - Soil
SWMU 37

Date: July 2010	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 100 feet	File Name: Fig.4-4

SWMUs 35, 37, 38, and AOC Q

RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	37SB3A 0-1	37SB3B 10-12	37SB3C 22-24
Chromium	mg/kg	65.3	42.048	15	18	18
Dieldrin	ug/kg	NV	2.157	NT	NT	NT
Trichloroethene	ug/kg	NV	0.263	<0.772	<0.806	<0.731
2,4-Dinitrotoluene	mg/kg	NV	0.572	<0.142	<0.142	<0.142

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	37SB6A 0-1
Chromium	mg/kg	65.3	42.048	24
Dieldrin	ug/kg	NV	2.157	<0.55
Trichloroethene	ug/kg	NV	0.263	NT
2,4-Dinitrotoluene	mg/kg	NV	0.572	<0.1

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	37SB7A 0-1	37SB7B 5.5-6.5	37SB7C 7-8
Chromium	mg/kg	65.3	42.048	170	30	31
Dieldrin	ug/kg	NV	2.157	<0.94	<0.54	<0.55
Trichloroethene	ug/kg	NV	0.263	NT	NT	NT
2,4-Dinitrotoluene	mg/kg	NV	0.572	<0.1	<0.1	<0.1

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	37SB1A 0-1	37SB1B 14-16	37SB1C 18-20
Chromium	mg/kg	65.3	42.048	72	18	18
Dieldrin	ug/kg	NV	2.157	11	NT	NT
Trichloroethene	ug/kg	NV	0.263	<1.11	<0.812	<0.799
2,4-Dinitrotoluene	mg/kg	NV	0.572	0.27	<0.142	<0.142

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	37SB2A 0-1	37SB2B 10-12	37SB2C 18-20
Chromium	mg/kg	65.3	42.048	114	20	18
Dieldrin	ug/kg	NV	2.157	NT	NT	NT
Trichloroethene	ug/kg	NV	0.263	<1.08	6.8	63
2,4-Dinitrotoluene	mg/kg	NV	0.572	0.63	<0.142	<0.142

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	37SB10A 0-1	37SB10B 4-5	37SB10C 7-8
Chromium	mg/kg	65.3	42.048	200	30	30
Dieldrin	ug/kg	NV	2.157	<0.92	<0.55	<0.54
Trichloroethene	ug/kg	NV	0.263	NT	NT	NT
2,4-Dinitrotoluene	mg/kg	NV	0.572	<0.1	<0.1	<0.1

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	37SB5A 0-1
Chromium	mg/kg	65.3	42.048	34
Dieldrin	ug/kg	NV	2.157	<0.54
Trichloroethene	ug/kg	NV	0.263	NT
2,4-Dinitrotoluene	mg/kg	NV	0.572	<0.1

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	37SB4A 0-1
Chromium	mg/kg	65.3	42.048	16
Dieldrin	ug/kg	NV	2.157	<0.52
Trichloroethene	ug/kg	NV	0.263	NT
2,4-Dinitrotoluene	mg/kg	NV	0.572	<0.1

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	37SB8A* 0-1	37SB8B 4-5	37SB8C 7-8
Chromium	mg/kg	65.3	42.048	180	30	25
Dieldrin	ug/kg	NV	2.157	<0.83	<0.54	<0.54
Trichloroethene	ug/kg	NV	0.263	NT	NT	NT
2,4-Dinitrotoluene	mg/kg	NV	0.572	0.435	<0.1	<0.1

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	SSL (DAF20)	37SB9A* 0-1	37SB9B 2-3	37SB9C 7-8
Chromium	mg/kg	65.3	42.048	115	31	27
Dieldrin	ug/kg	NV	2.157	<0.95	<0.54	<0.55
Trichloroethene	ug/kg	NV	0.263	NT	NT	NT
2,4-Dinitrotoluene	mg/kg	NV	0.572	<0.1	<0.1	<0.1

Legend

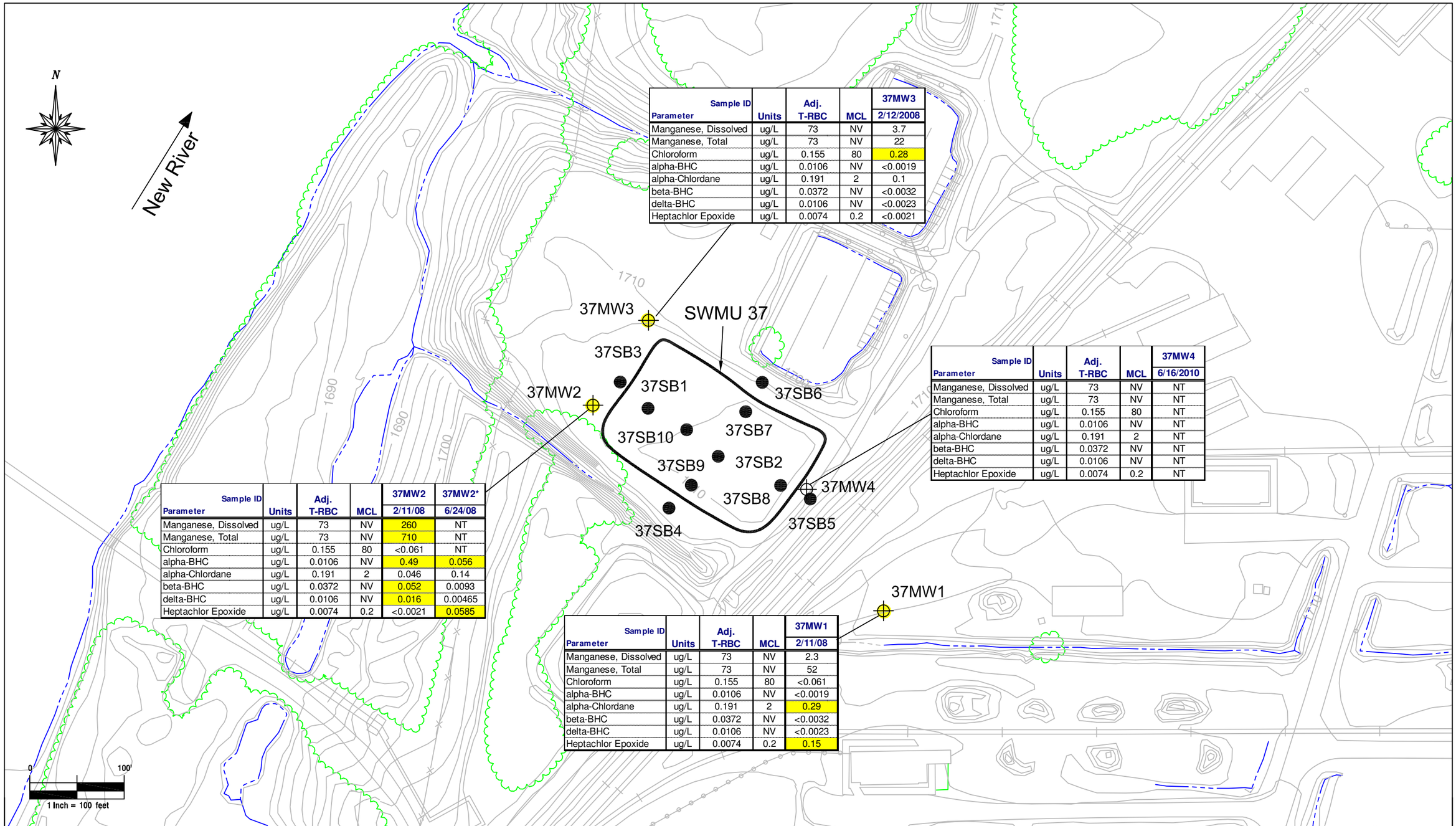
- Approximate SWMU Boundary
- Soil Boring Location
- Monitoring Well
- Exceeds SSL DAF20and Facility-wide Background Point Estimate
- mg/kg — Concentrations in milligrams per kilogram
- Parameters do not exceed SSL DAF20 and Facility-wide Background Point Estimate
- Parameters exceed SSL DAF20 and Facility-wide Background Point Estimate
- ug/kg — Concentrations in micrograms per kilogram
- * — Duplicate Average
- NV — No Value
- NT — Not Tested

FIGURE 4-5
Extent of SSL COPCs
SWMU 37

Date: July 2010	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 100 feet	File Name: Fig.4-5

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Sample ID / Parameter	Units	Adj. T-RBC	MCL	37MW3 2/12/2008
Manganese, Dissolved	ug/L	73	NV	3.7
Manganese, Total	ug/L	73	NV	22
Chloroform	ug/L	0.155	80	0.28
alpha-BHC	ug/L	0.0106	NV	<0.0019
alpha-Chlordane	ug/L	0.191	2	0.1
beta-BHC	ug/L	0.0372	NV	<0.0032
delta-BHC	ug/L	0.0106	NV	<0.0023
Heptachlor Epoxide	ug/L	0.0074	0.2	<0.0021

Sample ID / Parameter	Units	Adj. T-RBC	MCL	37MW4 6/16/2010
Manganese, Dissolved	ug/L	73	NV	NT
Manganese, Total	ug/L	73	NV	NT
Chloroform	ug/L	0.155	80	NT
alpha-BHC	ug/L	0.0106	NV	NT
alpha-Chlordane	ug/L	0.191	2	NT
beta-BHC	ug/L	0.0372	NV	NT
delta-BHC	ug/L	0.0106	NV	NT
Heptachlor Epoxide	ug/L	0.0074	0.2	NT

Sample ID / Parameter	Units	Adj. T-RBC	MCL	37MW2 2/11/08	37MW2* 6/24/08
Manganese, Dissolved	ug/L	73	NV	260	NT
Manganese, Total	ug/L	73	NV	710	NT
Chloroform	ug/L	0.155	80	<0.061	NT
alpha-BHC	ug/L	0.0106	NV	0.49	0.056
alpha-Chlordane	ug/L	0.191	2	0.046	0.14
beta-BHC	ug/L	0.0372	NV	0.052	0.0093
delta-BHC	ug/L	0.0106	NV	0.016	0.00465
Heptachlor Epoxide	ug/L	0.0074	0.2	<0.0021	0.0585

Sample ID / Parameter	Units	Adj. T-RBC	MCL	37MW1 2/11/08
Manganese, Dissolved	ug/L	73	NV	2.3
Manganese, Total	ug/L	73	NV	52
Chloroform	ug/L	0.155	80	<0.061
alpha-BHC	ug/L	0.0106	NV	<0.0019
alpha-Chlordane	ug/L	0.191	2	0.29
beta-BHC	ug/L	0.0372	NV	<0.0032
delta-BHC	ug/L	0.0106	NV	<0.0023
Heptachlor Epoxide	ug/L	0.0074	0.2	0.15

Legend

- Approximate SWMU Boundary
- Soil Boring Location
- Monitoring Well
- Exceeds Adjusted Tap Water Risk-Based Concentration (T-RBC)
- ug/L — Concentrations in micrograms per liter
- Parameters exceed T-RBC
- MCL — Maximum Contaminant Level
- * — Duplicate Average
- NV — No Value
- NT — Not tested

FIGURE 4-6

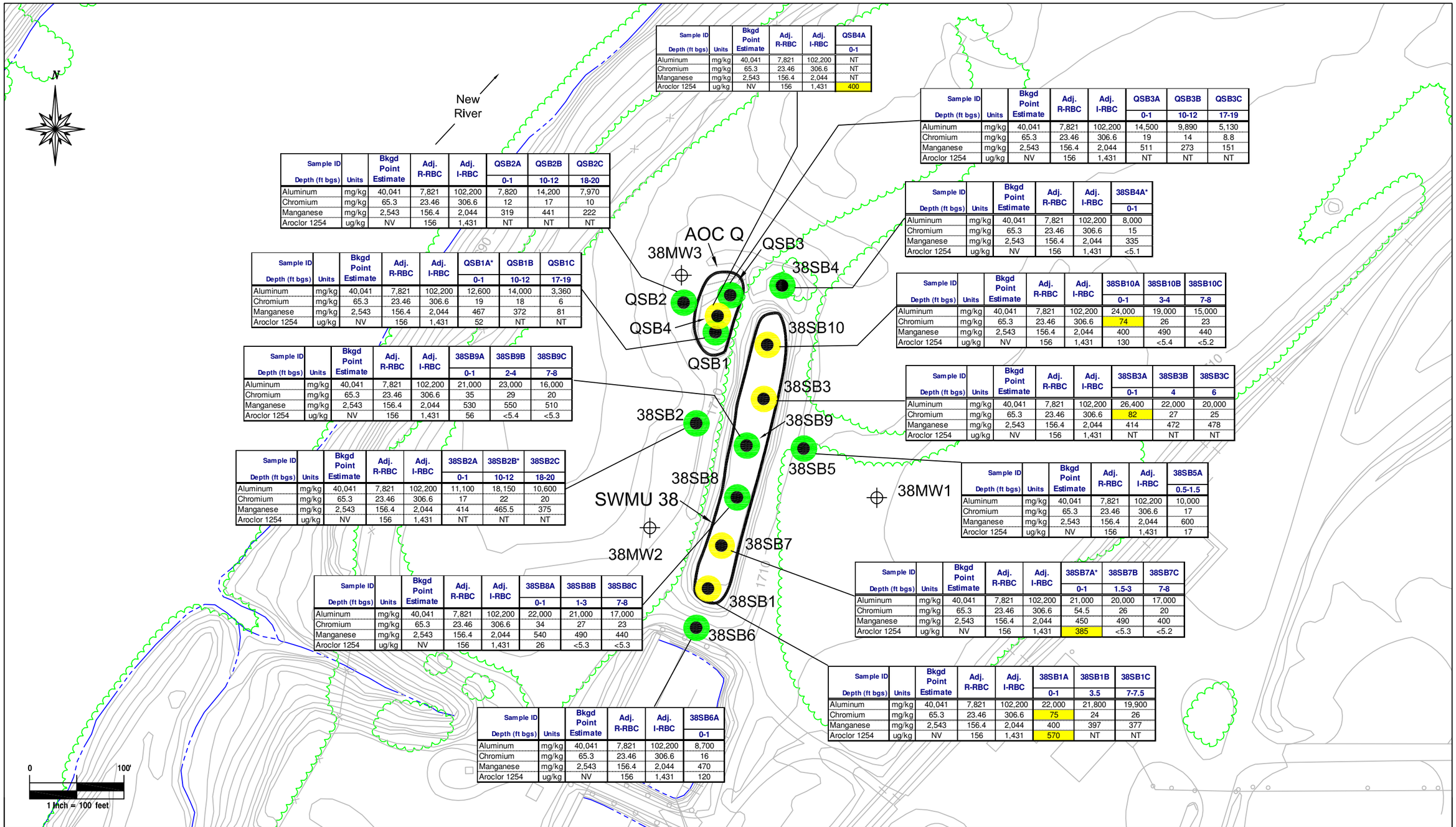
Extent of Human Health COPCs - Groundwater
SWMU 37

Date: July 2010	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 100 feet	File Name: Fig.4-6

SWMUs 35, 37, 38, and AOC Q

RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	QSB4A 0-1
Aluminum	mg/kg	40,041	7,821	102,200	NT
Chromium	mg/kg	65.3	23.46	306.6	NT
Manganese	mg/kg	2,543	156.4	2,044	NT
Aroclor 1254	ug/kg	NV	156	1,431	400

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	QSB2A 0-1	QSB2B 10-12	QSB2C 18-20
Aluminum	mg/kg	40,041	7,821	102,200	7,820	14,200	7,970
Chromium	mg/kg	65.3	23.46	306.6	12	17	10
Manganese	mg/kg	2,543	156.4	2,044	319	441	222
Aroclor 1254	ug/kg	NV	156	1,431	NT	NT	NT

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	QSB3A 0-1	QSB3B 10-12	QSB3C 17-19
Aluminum	mg/kg	40,041	7,821	102,200	14,500	9,890	5,130
Chromium	mg/kg	65.3	23.46	306.6	19	14	8.8
Manganese	mg/kg	2,543	156.4	2,044	511	273	151
Aroclor 1254	ug/kg	NV	156	1,431	NT	NT	NT

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	QSB1A* 0-1	QSB1B 10-12	QSB1C 17-19
Aluminum	mg/kg	40,041	7,821	102,200	12,600	14,000	3,360
Chromium	mg/kg	65.3	23.46	306.6	19	18	6
Manganese	mg/kg	2,543	156.4	2,044	467	372	81
Aroclor 1254	ug/kg	NV	156	1,431	52	NT	NT

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	38SB4A* 0-1
Aluminum	mg/kg	40,041	7,821	102,200	8,000
Chromium	mg/kg	65.3	23.46	306.6	15
Manganese	mg/kg	2,543	156.4	2,044	335
Aroclor 1254	ug/kg	NV	156	1,431	<5.1

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	38SB10A 0-1	38SB10B 3-4	38SB10C 7-8
Aluminum	mg/kg	40,041	7,821	102,200	24,000	19,000	15,000
Chromium	mg/kg	65.3	23.46	306.6	74	26	23
Manganese	mg/kg	2,543	156.4	2,044	400	490	440
Aroclor 1254	ug/kg	NV	156	1,431	130	<5.4	<5.2

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	38SB9A 0-1	38SB9B 2-4	38SB9C 7-8
Aluminum	mg/kg	40,041	7,821	102,200	21,000	23,000	16,000
Chromium	mg/kg	65.3	23.46	306.6	35	29	20
Manganese	mg/kg	2,543	156.4	2,044	530	550	510
Aroclor 1254	ug/kg	NV	156	1,431	56	<5.4	<5.3

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	38SB3A 0-1	38SB3B 4	38SB3C 6
Aluminum	mg/kg	40,041	7,821	102,200	26,400	22,000	20,000
Chromium	mg/kg	65.3	23.46	306.6	82	27	25
Manganese	mg/kg	2,543	156.4	2,044	414	472	478
Aroclor 1254	ug/kg	NV	156	1,431	NT	NT	NT

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	38SB2A 0-1	38SB2B* 10-12	38SB2C 18-20
Aluminum	mg/kg	40,041	7,821	102,200	11,100	18,150	10,600
Chromium	mg/kg	65.3	23.46	306.6	17	22	20
Manganese	mg/kg	2,543	156.4	2,044	414	465.5	375
Aroclor 1254	ug/kg	NV	156	1,431	NT	NT	NT

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	38SB5A 0.5-1.5
Aluminum	mg/kg	40,041	7,821	102,200	10,000
Chromium	mg/kg	65.3	23.46	306.6	17
Manganese	mg/kg	2,543	156.4	2,044	600
Aroclor 1254	ug/kg	NV	156	1,431	17

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	38SB8A 0-1	38SB8B 1-3	38SB8C 7-8
Aluminum	mg/kg	40,041	7,821	102,200	22,000	21,000	17,000
Chromium	mg/kg	65.3	23.46	306.6	34	27	23
Manganese	mg/kg	2,543	156.4	2,044	540	490	440
Aroclor 1254	ug/kg	NV	156	1,431	26	<5.3	<5.3

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	38SB7A* 0-1	38SB7B 1.5-3	38SB7C 7-8
Aluminum	mg/kg	40,041	7,821	102,200	21,000	20,000	17,000
Chromium	mg/kg	65.3	23.46	306.6	54.5	26	20
Manganese	mg/kg	2,543	156.4	2,044	450	490	400
Aroclor 1254	ug/kg	NV	156	1,431	385	<5.3	<5.2

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	38SB6A 0-1
Aluminum	mg/kg	40,041	7,821	102,200	8,700
Chromium	mg/kg	65.3	23.46	306.6	16
Manganese	mg/kg	2,543	156.4	2,044	470
Aroclor 1254	ug/kg	NV	156	1,431	120

Sample ID / Depth (ft bgs)	Units	Bkgd Point Estimate	Adj. R-RBC	Adj. I-RBC	38SB1A 0-1	38SB1B 3.5	38SB1C 7-7.5
Aluminum	mg/kg	40,041	7,821	102,200	22,000	21,800	19,900
Chromium	mg/kg	65.3	23.46	306.6	75	24	26
Manganese	mg/kg	2,543	156.4	2,044	400	397	377
Aroclor 1254	ug/kg	NV	156	1,431	570	NT	NT

Legend

- Approximate SWMU Boundary
- Soil Boring Location
- Monitoring Well
- Exceeds Adjusted Residential Risk-Based Concentration (R-RBC) and Facility-wide Background Point Estimate
- mg/kg — Concentrations in milligrams per kilogram
- Parameters do not exceed Adjusted RBCs and Facility-wide Background Point Estimate
- Parameters exceed Adjusted R-RBC and Facility-wide Background Point Estimate
- ug/kg — Concentrations in micrograms per kilogram
- NV — No Value
- NT — Not Tested
- * — Duplicate Average

FIGURE 4-7
Extent of Human Health COPCs - Soil
SWMU 38/AOC Q

Date: July 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 100 feet	File Name: Fig.4-7

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230

N

New River

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	QSB2A 0-1	QSB2B 10-12	QSB2C 18-20
Chromium	65.3	42.048	12	17	10

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	QSB4A 0-1
Chromium	65.3	42.048	NT

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	QSB1A* 0-1	QSB1B 10-12	QSB1C 17-19
Chromium	65.3	42.048	19	18	6

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	38SB9A 0-1	38SB9B 2-4	38SB9C 7-8
Chromium	65.3	42.048	35	29	20

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	38SB2A 0-1	38SB2B* 10-12	38SB2C 18-20
Chromium	65.3	42.048	17	22	20

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	38SB8A 0-1	38SB8B 1-3	38SB8C 7-8
Chromium	65.3	42.048	34	27	23

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	38SB6A 0-1
Chromium	65.3	42.048	16

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	QSB3A 0-1	QSB3B 10-12	QSB3C 17-19
Chromium	65.3	42.048	19	14	8.8

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	38SB4A* 0-1
Chromium	65.3	42.048	15

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	38SB10A 0-1	38SB10B 3-4	38SB10C 7-8
Chromium	65.3	42.048	74	26	23

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	38SB3A 0-1	38SB3B 4	38SB3C 6
Chromium	65.3	42.048	82	27	25

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	38SB5A 0.5-1.5
Chromium	65.3	42.048	17

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	38SB7A* 0-1	38SB7B 1.5-3	38SB7C 7-8
Chromium	65.3	42.048	54.5	26	20

Sample ID / Depth (ft bgs)	Bkgd Point Estimate	SSL (DAF20)	38SB1A 0-1	38SB1B 3.5	38SB1C 7-7.5
Chromium	65.3	42.048	75	24	26

AOC Q
38MW3
QSB3
38SB4
QSB2
QSB4
38SB10
QSB1
38SB3
38SB2
38SB9
38SB5
38SB8
38MW1
SWMU 38
38SB7
38MW2
38SB1
38SB6

0 100'
1 inch = 100 feet

Legend

- Approximate SWMU Boundary
- Soil Boring Location
- Monitoring Well
- Exceeds SSL DAF20 and Facility-wide Background Point Estimate
- mg/kg — Concentrations in milligrams per kilogram
- * — Duplicate Average
- Parameters do not exceed SSL DAF20 and Facility-wide Background Point Estimate
- Parameters exceed SSL DAF20 and Facility-wide Background Point Estimate
- NT — Not Tested

FIGURE 4-8
Extent of SSL COPCs
SWMU 38/AOC Q

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Scale: 1 inch = 100 feet	File Name: Fig.4-8

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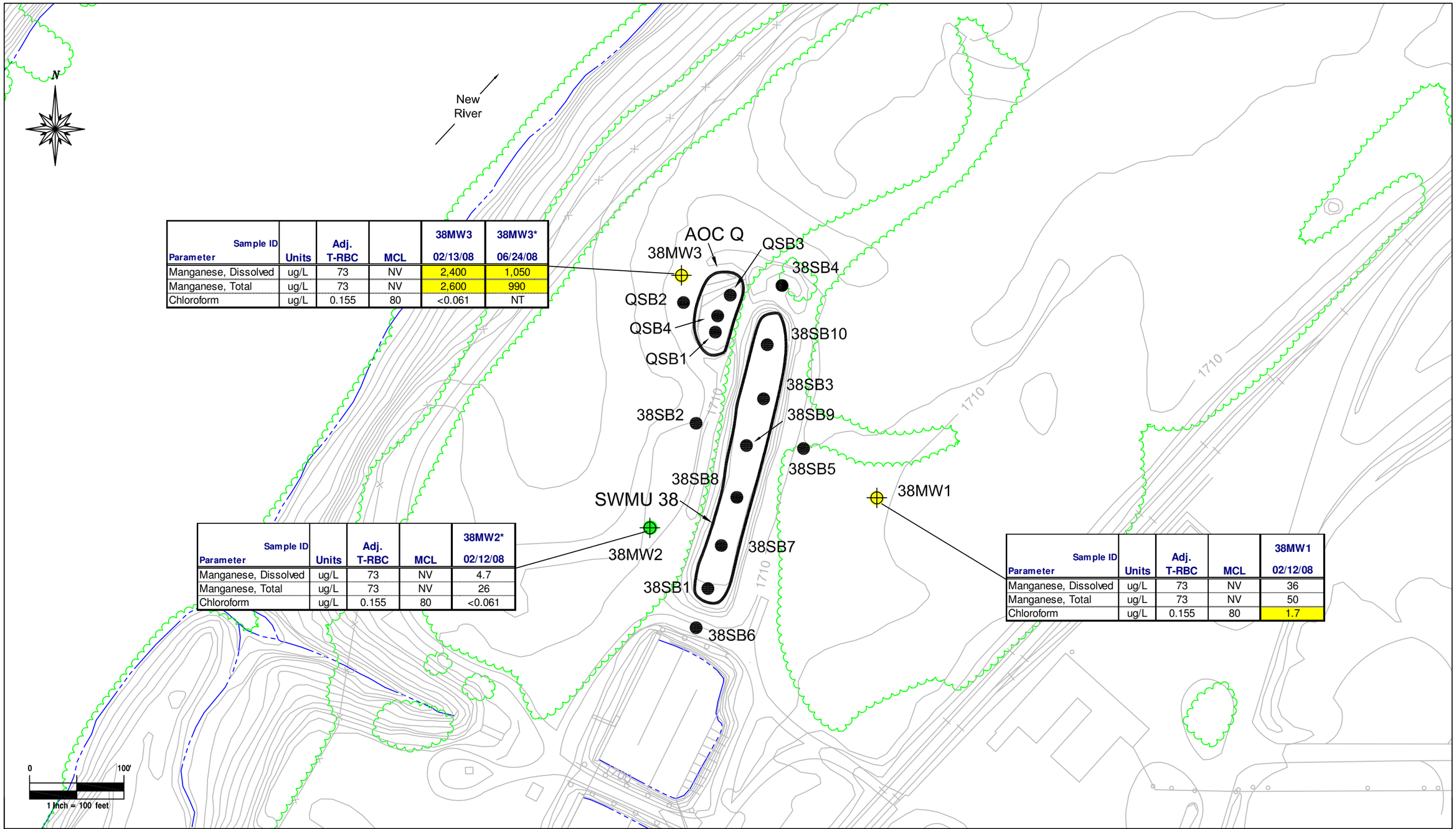

Sample ID / Parameter	Units	Adj. T-RBC	MCL	38MW3 02/13/08	38MW3* 06/24/08
Manganese, Dissolved	ug/L	73	NV	2,400	1,050
Manganese, Total	ug/L	73	NV	2,600	990
Chloroform	ug/L	0.155	80	<0.061	NT

Sample ID / Parameter	Units	Adj. T-RBC	MCL	38MW2* 02/12/08
Manganese, Dissolved	ug/L	73	NV	4.7
Manganese, Total	ug/L	73	NV	26
Chloroform	ug/L	0.155	80	<0.061

Sample ID / Parameter	Units	Adj. T-RBC	MCL	38MW1 02/12/08
Manganese, Dissolved	ug/L	73	NV	36
Manganese, Total	ug/L	73	NV	50
Chloroform	ug/L	0.155	80	1.7

Legend

- Approximate SWMU Boundary
- Soil Boring Location
- Monitoring Well
- Exceeds Adjusted Tap water Risk-Based Concentration (T-RBC)
- ug/L — Concentrations in micrograms per liter
- * — Duplicate Average
- Parameters do not exceed Adjusted T-RBC
- Parameters exceed Adjusted T-RBC
- NV — No Value
- NT — Not Tested
- MCL — Maximum Contaminant Level

FIGURE 4-9
Extent of Human Health COPCs - Groundwater
SWMU 38/AOC Q

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Prepared by: DBC	Approved by: JOS
Scale: 1 inch = 100 feet	File Name: Fig.4-9

SWMUs 35, 37, 38, and AOC Q
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Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	35SB1A 11/13/2007 0-1		MDL	RL	35SB2A 11/13/2007 0-1		MDL	RL	35SB3A 11/12/2007 0-1		MDL	RL	35SB4A 11/13/2007 0-1		MDL	RL	35SB4A-DUP(DUP-1) 11/13/2007 0-1		MDL	RL	35SB5A 11/14/2007 0-1		MDL	RL	35SB5A-DUP(DUP-2) 11/14/2007 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																																		
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	19,000		2.1	10	22,000		210	1,000	19,000		2.1	10	22,000		2.1	10	24,000		2.1	10	20,000		2.1	10	20,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	<0.2	U	0.042	0.2	0.079	J	0.042	0.2	0.086	J	0.042	0.2	0.052	J	0.042	0.2	<0.2	U	0.042	0.2	0.5		0.042	0.2	0.42		0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***1.5***		0.071	0.2	***3.6***		0.071	0.2	***2.1***		0.071	0.2	***2.4***		0.071	0.2	***3***		0.071	0.2	***3.8***		0.071	0.2	***3.4***		0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	130	,K,m	0.17	1	98	,K,m	0.17	1	120	,K,m	0.17	1	150	,K,m	0.17	1	130	,K,m	0.17	1	170	,K,m	0.17	1	170	,K,m	0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.68	J	0.021	1	0.59	J	0.021	1	0.78	J	0.021	1	0.82	J	0.021	1	0.7	J	0.021	1	0.77	J	0.021	1	0.85	J	0.021	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.2	J	0.11	2	1.4	J	0.11	2	1.3	J	0.11	2	1.5	J	0.11	2	1.9	J	0.11	2	1.7	J	0.11	2	1.8	J	0.11	2
Calcium	7440-70-2	--	--	--	--	--	5,300		4.2	50	11,000		4.2	50	12,000		4.2	50	9,200	,J,f	4.2	50	4,600	,J,f	4.2	50	8,700		4.2	50	5,300		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	23		0.72	5	35		0.72	5	29		0.72	5	31		0.72	5	40		0.72	5	***93***		0.72	5	***72***		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	9.9		0.37	2	7.9		0.37	2	9.7		0.37	2	12		0.37	2	9.8		0.37	2	12		0.37	2	11		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	12	,J,s	0.044	0.2	21	,J,s	0.044	0.2	18	,J,s	0.044	0.2	18	,J,s	0.044	0.2	17	,J,s	0.044	0.2	73	,J,s	0.22	1	68	,J,s	0.088	0.4
Iron	7439-89-6	N	50,962	5,475	71,540	--	24,000		0.48	10	31,000		240	5,000	27,000		0.48	10	29,000		0.48	10	29,000		0.48	10	27,000		0.48	10	27,000		0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	25		0.022	0.2	54		0.045	0.4	63		0.045	0.4	97		0.09	0.8	70		0.045	0.4	240		0.11	1	300		0.22	2
Magnesium	7439-95-4	--	--	--	--	--	3,300		5	50	6,000		5	50	6,900		5	50	5,900		5	50	3,600		5	50	5,500		5	50	3,800		5	50
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	590		0.16	1	510		1.6	10	490		0.16	1	750		0.16	1	600		0.16	1	640		0.16	1	620		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.044	J	0.0075	0.05	0.09		0.0075	0.05	0.061		0.0075	0.05	0.079		0.0075	0.05	0.12		0.0075	0.05	0.22		0.0075	0.05	0.21		0.0075	0.05
Nickel	7440-02-0	N	62.8	156.43	2,044	--	12	,J,s	0.036	0.1	16	,J,s	0.036	0.1	17	,J,s	0.036	0.1	16	,J,s	0.036	0.1	15	,J,s	0.036	0.1	27	,J,s	0.036	0.1	23	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,600		5.3	50	1,600		5.3	50	1,700		5.3	50	1,700		5.3	50	1,400		5.3	50	1,600		5.3	50	1,600		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.3	J,L,m	0.089	0.3	0.37	,L,m	0.089	0.3	0.37	,L,m	0.089	0.3	0.31	,L,m	0.089	0.3	0.29	J,L,m	0.089	0.3	0.31	,L,m	0.089	0.3	0.26	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.067	J	0.013	0.1	0.27		0.013	0.1	0.12		0.013	0.1	0.092	J	0.013	0.1	0.085	J	0.013	0.1	7.4		0.013	0.1	8.7		0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	31	J	13	100	59	J	13	100	54	J	13	100	43	J	13	100	34	J	13	100	51	J	13	100	46	J	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.19		0.0049	0.1	0.22		0.0049	0.1	0.19		0.0049	0.1	0.2		0.0049	0.1	0.22		0.0049	0.1	0.23		0.0049	0.1	0.24		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	39	,J,s	0.034	0.1	40	,J,s	0.034	0.1	41	,J,s	0.034	0.1	40	,J,s	0.034	0.1	47	,J,s	0.034	0.1	38	,J,s	0.034	0.1	38	,J,s	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	60	,J,s	1	5	150	,J,s	1	5	78	,J,s	1	5	110	,J,s	1	5	83	,J,s	1	5	160	,J,s	1	5	160	,J,s	1	5
TCL Pesticides/PCBs (ug/kg)																																		
4,4'-DDT	50-29-3	C	--	1.9E+03	8.4E+03	1.2E+03	1.5	J	1.2	3.9	<4	U	1.2	4	<3.6	U	1.1	3.6	<4	U	1.2	4	<3.9	U	1.2	3.9	<4.1	U,UL,s	1.3	4.1	<4.2	U	1.3	4.2
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	<2	U	0.48	2	6.5	,J,g	0.5	2	<1.9	U	0.46	1.9	<2	U	0.5	2	<2	U	0.49	2	<2.1	U,UL,s	0.51	2.1	<2.1	U	0.52	2.1
Aroclor 1254 [4]	11097-69-1	C/N*	--	1.6E+02	1.4E+03	1.1E+03	32	J,J,g	5.1	39	350		5.3	40	320		4.9	36	69		5.3	40	170		5.2	39	87	,J,f	5.4	41	260	,J,f	5.6	42
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	<78	U	19	78	<81	U	19	81	<74	U	18	74	<80	U	19	80	<80	U	19	80	<83	U,UL,s	20	83	<85	U	20	85
TCL VOCs (ug/kg)																																		
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	17	J	2.8	23	<3,000	U	20	3,000	15	J	2.7	22	14	J	2.9	24	13	J	2.9	24	<3,100	U	20	3,100	21	J	3.1	25
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	150		4.9	23	120	J	72	900	110		4.7	22	92		5.1	24	99		5	24	130	J	74	930	210	,J,c	5.3	25
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<5.8	U	0.15	5.8	<60	U	7.1	60	<5.5	U	0.14	5.5	<6	U	0.15	6	<6	U	0.15	6	<62	U	7.3	62	<6.3	U	0.16	6.3
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	3.3	JB,B,z	0.31	5.8	<300	U	17	300	3.1	JB,B,z	0.29	5.5	3.5	J	0.32	6	3.5	J	0.31	6	<310	U	18	310	3.4	J	0.33	6.3
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<5.8	U	0.17	5.8	<60	U	3.7	60	<5.5	U	0.16	5.5	<6	U	0.18	6	<6	U	0.18	6	<62	U	3.8	62	<6.3	U	0.19	6.3
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	4.7	J	0.97	23	200	J	10	300	3.1	J	0.92	22	<24	U	1	24	<24	U	0.99	24	170	J,J,f	10	310	9.6	J,J,f	1.1	25
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	5.5	J	4.6	23	<300	U	9.6	300	<22	U	4.4	22	<24	U	4.7	24	<24	U	4.7	24	<310	U	9.9	310	<25	U	5	25
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<5.8	U	0.47	5.8	<60	U	4.3	60	<5.5	U	0.44	5.5	<6	U	0.48	6	<6	U	0.48	6	110		4.4	62	<6.3	U	0.51	6.3
TCL SVOCs (ug/kg)																																		
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<99	U	2.5	99	<510	U	13	510	<190	U	4.7	190	<100	U	2.6	100	<100	U	2.5	100	<6,300	U	160	6,300	<7,500	U	190	7,500
Benzaldehyde	100-52-7	N	--	7.8E+05	1.0E+07	--	310	J	150	990	<5,100	U	790	5,100	<1,900	U	290	1,900	<1,000	U	160	1,000	<1,000	U	160	1,000	<63,000	U	9,700	63,000	<75,000	U	12,000	75,000
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	3.9	J	3.1	99	30	J	16	510	22	J	5.9	190	8	J	3.2	100	7.9	J	3.2	100	<6,300	U	200	6,300	<7,500	U	240	7,500
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	<99	U	6	99	<510	U	31	510	18	J	11	190	<100	U	6.2	100	7.9	J	6.1	100	<6,300	U	380	6,300	<7,500	U	460	7,500
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<99	U	5	99	<510	U	26	510	29	J	9.4	190	<100	U	5.1	100	16	J	5.1	100	<6,300	U	310	6,300	<7,500	U	380	7,500
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<99	U	4.2	99	<510	U	22	510	18	J	7.9	190	<100	U	4.3	100	<100	U	4.3	100	<6,300	U	270	6,300	<7,500	U	320	7,500
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	<990	U	7.6	990	110	J	39	5,100	55	J	14	1,900	16	J	7.8	1,000	16	J	7.7	1,000	<63,000	U	480	63,000	<75,000	U	570	75,000
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	<990	U	12	990	<5,100	U	63	5,100	<1,900	U	23	1,900	<1,000	U	13	1,000	<1,000	U	13	1,000	<63,000	U	780	63,000	<75,000	U	930	75,000
Carbazole	86-74-8	C	--	3.2E+04	1.4E+05	4.7E+02	<990	U	2.9	990	<5,100	U	15	5,100	7.4	J	5.5	1,900	<1,000	U	3	1,000	<1,000	U	3	1,000	<63,000	U	180	63,000	<75,000	U	220	75,000
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<99	U	2.8	99	20	J	14	510	15	J	5.2	190	6	J	2.9	100	7.9	J	2.8	100	<6,300	U	180	6,300	<7,500	U	210	7,500
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	53	J	7	990	130	J	36	5,100	59	J	13	1,900	12	J	7.2	1,000	9.9	J	7.2	1,000	4,700	J	440	63,000	5,000	J	530	75,000
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	<990	U	2.2	990	30	J	11	5,100	7.4	J	4.1	1,900	4	J	2.2	1,000	4	J	2.2	1,000	<63,000	U	140	63,000	<75,000	U	160	75,000
Dimethylphthalate	131-11-3	--	--	--	--	--	<990	U	2	990	<5,100	U	10	5,100	<1,900	U	3.7	1,900	<1,000	U	2	1,000	<1,000	U	2	1,000	<63,000	U	130	63,000	<75,000	U	150	75,000
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	<99	U	1.4	99	<510	U	7	510	3.7	J	2.6	190	<100	U	1.4	100	<100	U	1.4	100	<6,300	U	86	6,300	<7,500	U	100	7,500
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	1.9	J	1.9	99	20	J	9.5	510	18	J	3.5	190	8	J	1.9	100	7.9	J	1.9	100	<6,300	U	120	6,300	<7,500	U	140	7,500
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	<990	U	4.7	990	<5,100	U	24	5,100	<1,900	U	8.8	1,900	<1,000	U	4.8	1,000	<1,000	U	4.8	1,000	<63,000	U	300	63,000	<75,000	U	350	75,000
Pentachlorophenol	87-86-5	C	--	5.3E+03	2.4E+04	--	<1,900	U	22	1,900	<9,900	U	110	9,900	<3,600	U	41	3,600	<2,000	U	22	2,000	<2,000	U	22	2,000	<120,000	U	1,400	120,000	<150,000	U	1,600	150,000
Explosives (mg/kg)																																		
2,4,6-Trinitrotoluene [5]	118-96-7	N	--	7.8E+00	1.0E+02	--	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	0.46	J	0.1	2.5	***0.58***	J	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				ND				ND				0.46				0.58			
HMX	2691-41-0	N	--	3.9E+02	5.1E+03	--	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	0.64	J,J,g	0.066	2.5	0.53	J,J,g	0.066	2.5
Nitroglycerin (mg/kg)																																		
Nitroglycerin	55-63-0	N	--	0.782	10.22	--	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5
Percent Solids (%)																																		
Percent Solids	--	--	--	--	--	--	86		0.1	0.1	83		0.1	0.1	91		0.1	0.1	83		0.1	0.1	84		0.1	0.1	81		0.1	0.1	79		0.1	0.1
Total Organic Carbon (%)																																		
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	35SB5B 11/14/2007 9-11		MDL	RL	35SB5C 11/14/2007 14-16		MDL	RL	35SB6A 11/13/2007 0-1		MDL	RL	35SB6B 11/13/2007 6-8		MDL	RL	35SB6C 11/13/2007 14-16		MDL	RL	35SB7A 11/14/2007 0-1		MDL	RL	35SB7B 11/14/2007 6-8		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																																
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	17,000		2.1	10	17,000		2.1	10	22,000		2.1	10	18,000		2.1	10	13,000		2.1	10	25,000		2.1	10	18,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.082	J	0.042	0.2	0.065	J	0.042	0.2	0.21		0.042	0.2	<0.2	U	0.042	0.2	<0.2	U	0.042	0.2	1.1		0.042	0.2	0.12	J	0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***1.1***		0.071	0.2	***0.82***		0.071	0.2	***7.9***		0.071	0.2	***1.2***		0.071	0.2	***1***		0.071	0.2	***9.7***		0.071	0.2	***1.5***		0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	120	,K,m	0.17	1	130	,K,m	0.17	1	100	,K,m	0.17	1	130	,K,m	0.17	1	110	,K,m	0.17	1	130	,K,m	0.17	1	130	,K,m	0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.79	J	0.021	1	0.76	J	0.021	1	1.1		0.021	1	0.76	J	0.021	1	0.57	J	0.021	1	0.8	J	0.021	1	0.67	J	0.021	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.6	J	0.11	2	1.6	J	0.11	2	1.5	J	0.11	2	1.7	J	0.11	2	1.2	J	0.11	2	2.2		0.11	2	1.8	J	0.11	2
Calcium	7440-70-2	--	--	--	--	--	1,800		4.2	50	1,500		4.2	50	33,000		4.2	50	2,800		4.2	50	2,000		4.2	50	53,000		4.2	50	1,700		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	27		0.72	5	28		0.72	5	***140***		0.72	5	33		0.72	5	21		0.72	5	***150***		0.72	5	26		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	10		0.37	2	7.8		0.37	2	8.9		0.37	2	9.8		0.37	2	8.7		0.37	2	6.4		0.37	2	9.9		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	11	,J,s	0.044	0.2	11	,J,s	0.044	0.2	79	,J,s	0.088	0.4	11	,J,s	0.044	0.2	10	,J,s	0.044	0.2	200	,J,s	0.22	1	11	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	23,000		0.48	10	20,000		0.48	10	26,000		0.48	10	25,000		0.48	10	20,000		0.48	10	24,000		0.48	10	26,000		0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	9.6		0.022	0.2	10		0.022	0.2	250		0.22	2	11		0.022	0.2	10		0.022	0.2	750		0.45	4	13		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	4,400		5	50	4,300		5	50	11,000		5	50	4,300		5	50	3,600		5	50	5,000		5	50	4,200		5	50
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	280		0.16	1	230		0.16	1	420		0.16	1	410		0.16	1	310		0.16	1	330		0.16	1	380		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.023	J,B,p	0.0075	0.05	0.032	J,B,p	0.0075	0.05	0.1		0.0075	0.05	0.032	J	0.0075	0.05	0.021	J	0.0075	0.05	0.83		0.0075	0.05	0.026	J,B,p	0.0075	0.05
Nickel	7440-02-0	N	62.8	156.43	2,044	--	14	,J,s	0.036	0.1	13	,J,s	0.036	0.1	45	,J,s	0.036	0.1	15	,J,s	0.036	0.1	12	,J,s	0.036	0.1	34	,J,s	0.036	0.1	14	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,800		5.3	50	1,600		5.3	50	1,500		5.3	50	1,700		5.3	50	1,500		5.3	50	1,300		5.3	50	1,900		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.13	J,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	0.16	J,L,m	0.089	0.3	0.29	J,L,m	0.089	0.3	0.14	J,L,m	0.089	0.3	0.2	J,L,m	0.089	0.3	0.12	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.073	J	0.013	0.1	0.08	J	0.013	0.1	2.2		0.013	0.1	0.052	J	0.013	0.1	0.07	J	0.013	0.1	25		0.013	0.1	0.065	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	60	J	13	100	56	J	13	100	79	J	13	100	47	J	13	100	47	J	13	100	82	J	13	100	52	J	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.18		0.0049	0.1	0.19		0.0049	0.1	0.11		0.0049	0.1	0.18		0.0049	0.1	0.15		0.0049	0.1	0.12		0.0049	0.1	0.18		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	35	,J,s	0.034	0.1	35	,J,s	0.034	0.1	28	,J,s	0.034	0.1	41	,J,s	0.034	0.1	30	,J,s	0.034	0.1	28	,J,s	0.034	0.1	37	,J,s	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	69	,J,s	1	5	75	,J,s	1	5	140	,J,s	1	5	63	,J,s	1	5	54	,J,s	1	5	210	,J,s	1	5	61	,J,s	1	5
TCL Pesticides/PCBs (ug/kg)																																
4,4'-DDT	50-29-3	C	--	1.9E+03	8.4E+03	1.2E+03	<4	U	1.2	4	<4.1	U	1.3	4.1	<5.6	U,UL,s	1.8	5.6	<3.9	U	1.2	3.9	<4	U	1.2	4	<6.2	U	1.9	6.2	<3.8	U	1.2	3.8
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	<2	U	0.5	2	<2.1	U	0.51	2.1	<2.9	U,UL,s	0.7	2.9	<2	U	0.48	2	<2.1	U	0.5	2.1	<3.2	U	0.78	3.2	<1.9	U	0.47	1.9
Aroclor 1254 [4]	11097-69-1	C/N*	--	1.6E+02	1.4E+03	1.1E+03	<40	U	5.3	40	<41	U	5.5	41	***1,700***	,L,s	15	110	<39	U	5.1	39	<40	U	5.3	40	580	,J,g	8.3	62	<38	U	5	38
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	<80	U	19	80	<83	U	20	83	800	,L,s	54	230	<78	U	19	78	<81	U	19	81	<130	U	30	130	<76	U	18	76
TCL VOCs (ug/kg)																																
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<24	U,UJ,c	2.9	24	<25	U,UJ,c	3	25	<4,200	U	28	4,200	7.4	J	2.8	23	<24	U	2.9	24	<4,700	U	31	4,700	9.4	J,J,c	2.8	23
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	11	J	5.1	24	15	J	5.2	25	160	J	100	1,300	32		4.9	23	32		5.1	24	<1,400	U	110	1,400	75		4.8	23
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<6	U	0.15	6	<6.2	U	0.16	6.2	<85	U	10	85	<5.8	U	0.15	5.8	<6	U	0.15	6	<94	U	11	94	<5.7	U	0.15	5.7
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	3.1	J	0.32	6	3.2	J	0.33	6.2	<420	U	24	420	3.1	J	0.31	5.8	3.1	J	0.32	6	<470	U	27	470	<5.7	U	0.3	5.7
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<6	U	0.18	6	<6.2	U	0.18	6.2	<85	U	5.3	85	<5.8	U	0.17	5.8	<6	U	0.18	6	<94	U	5.8	94	0.21	J	0.17	5.7
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	<24	U	1	24	<25	U	1	25	97	J	14	420	<23	U	0.97	23	<24	U	1	24	130	J	16	470	2.7	J,J,c	0.95	23
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<24	U	4.7	24	<25	U	4.9	25	<420	U	14	420	<23	U	4.6	23	<24	U	4.8	24	<470	U	15	470	<23	U	4.5	23
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<6	U	0.48	6	<6.2	U	0.5	6.2	<85	U	6.1	85	<5.8	U	0.47	5.8	<6	U	0.49	6	<94	U	6.8	94	<5.7	U	0.46	5.7
TCL SVOCs (ug/kg)																																
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<20	U	0.51	20	<21	U	0.53	21	<1,400	U	36	1,400	<99	U	2.5	99	<100	U	2.6	100	<9,600	U	240	9,600	<19	U	0.49	19
Benzaldehyde	100-52-7	N	--	7.8E+05	1.0E+07	--	<200	U	31	200	<210	U	33	210	4,600	J	2,200	14,000	<990	U	150	990	<1,000	U	160	1,000	<96,000	U	15,000	96,000	<190	U	30	190
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	0.8	J	0.64	20	1.2	J	0.67	21	57	J	46	1,400	<99	U	3.1	99	<100	U	3.2	100	<9,600	U	300	9,600	1.9	J	0.61	19
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	<20	U	1.2	20	<21	U	1.3	21	<1,400	U	88	1,400	<99	U	6	99	<100	U	6.2	100	<9,600	U	580	9,600	<19	U	1.2	19
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<20	U	1	20	<21	U	1.1	21	<1,400	U	72	1,400	<99	U	5	99	<100	U	5.1	100	<9,600	U	480	9,600	1.1	J	0.97	19
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<20	U	0.86	20	<21	U	0.89	21	<1,400	U	61	1,400	<99	U	4.2	99	<100	U	4.3	100	<9,600	U	410	9,600	1.9	J	0.82	19
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	14	J,B,z	1.6	200	16	J,B,z	1.6	210	540	J	110	14,000	9.7	J	7.6	990	20	J	7.9	1,000	<96,000	U	740	96,000	11	J,B,z	1.5	190
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	3.2	J	2.5	200	<210	U	2.6	210	<14,000	U	180	14,000	<990	U	12	990	<1,000	U	13	1,000	<96,000	U	1,200	96,000	<190	U	2.4	190
Carbazole	86-74-8	C	--	3.2E+04	1.4E+05	4.7E+02	<200	U	0.6	200	<210	U	0.62	210	<14,000	U	42	14,000	<990	U	2.9	990	<1,000	U	3	1,000	<96,000	U	280	96,000	<190	U	0.57	190
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<20	U	0.57	20	<21	U	0.59	21	57	J	40	1,400	<99	U	2.8	99	<100	U	2.9	100	<9,600	U	270	9,600	<19	U	0.54	19
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	8.8	J	1.4	200	4.1	J	1.5	210	650	J	100	14,000	<990	U	7	990	16	J	7.3	1,000	3,800	J	680	96,000	12	J	1.4	190
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	2	J	0.45	200	1.2	J	0.46	210	<14,000	U	32	14,000	<990	U	2.2	990	<1,000	U	2.2	1,000	<96,000	U	210	96,000	1.9	J	0.42	190
Dimethylphthalate	131-11-3	--	--	--	--	--	<200	U	0.41	200	<210	U	0.42	210	<14,000	U	29	14,000	<990	U	2	990	<1,000	U	2	1,000	<96,000	U	190	96,000	<190	U	0.39	190
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	<20	U	0.28	20	0.41	J	0.29	21	<1,400	U	20	1,400	<99	U	1.4	99	<100	U	1.4	100	<9,600	U	130	9,600	0.76	J	0.27	19
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	0.4	J	0.38	20	1.2	J	0.39	21	57	J	27	1,400	<99	U	1.9	99	<100	U	1.9	100	190	J	180	9,600	1.1	J	0.36	19
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	<200	U	0.96	200	<210	U	0.99	210	250	J	68	14,000	<990	U	4.7	990	<1,000	U	4.8	1,000	<96,000	U	450	96,000	<190	U	0.91	190
Pentachlorophenol	87-86-5	C	--	5.3E+03	2.4E+04	--	<400	U	4.4	400	<410	U	4.6	410	<28,000	U	310	28,000	<1,900	U	22	1,900	<2,000	U	22	2,000	<190,000	U	2,100	190,000	<380	U	4.2	380
Explosives (mg/kg)																																
2,4,6-Trinitrotoluene [5]	118-96-7	N	--	7.8E+00	1.0E+02	--	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	0.31	J	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				ND				ND				ND				ND			
HMX	2691-41-0	N	--	3.9E+02	5.1E+03	--	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	3.3		0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	7	,J,g	0.066	2.5	<2.5	U	0.066	2.5
Nitroglycerin (mg/kg)																																
Nitroglycerin	55-63-0	N	--	0.782	10.22	--	<5	U	0.39	5	<5	U	0.39	5	11		0.39	5	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5
Percent Solids (%)																																
Percent Solids	--	--	--	--	--	--	83		0.1	0.1	81		0.1	0.1	59		0.1	0.1	86		0.1	0.1	83		0.1	0.1	53		0.1	0.1	88		0.1	0.1
Total Organic Carbon (%)																																
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT				4		0.047	0.2	9		0.047	0.2

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	35SB7C 11/14/2007 13.5-15.5		MDL	RL	35SB8A 11/14/2007 0-1		MDL	RL	35SB8B 11/14/2007 9-11		MDL	RL	35SB8C 11/14/2007 14-16		MDL	RL	35SB9A 11/13/2007 0-1		MDL	RL	35SB9B 11/13/2007 5-8		MDL	RL	35SB9C 11/13/2007 14-16		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																																
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	14,000		2.1	10	17,000		2.1	10	14,000		2.1	10	12,000		2.1	10	24,000		2.1	10	20,000		2.1	10	14,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.35		0.042	0.2	0.31		0.042	0.2	0.12	J	0.042	0.2	0.13	J	0.042	0.2	0.16	J	0.042	0.2	<0.2	U	0.042	0.2	<0.2	U	0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***4.7***		0.071	0.2	***2.5***		0.071	0.2	***2.2***		0.071	0.2	***1.2***		0.071	0.2	***6.7***		0.071	0.2	***1.5***		0.071	0.2	***1.9***		0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	95	,K,m	0.17	1	140	,K,m	0.17	1	77	,K,m	0.17	1	60	,K,m	0.17	1	180	,K,m	0.17	1	130	,K,m	0.17	1	110	,K,m	0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.57	J	0.021	1	0.92	J	0.021	1	0.66	J	0.021	1	0.54	J	0.021	1	0.97	J	0.021	1	1		0.021	1	0.64	J	0.021	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	2		0.11	2	1.4	J	0.11	2	1.4	J	0.11	2	1.5	J	0.11	2	1.8	J	0.11	2	2	J	0.11	2	1.2	J	0.11	2
Calcium	7440-70-2	--	--	--	--	--	61,000		4.2	50	8,400		4.2	50	2,300		4.2	50	89,000		4.2	50	38,000		4.2	50	3,000		4.2	50	4,600		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	***51***		0.72	5	39		0.72	5	24		0.72	5	23		0.72	5	***120***		0.72	5	40		0.72	5	24		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	9.7		0.37	2	10		0.37	2	9		0.37	2	6.3		0.37	2	9.3		0.37	2	12		0.37	2	9.3		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	65	,J,s	0.22	1	38	,J,s	0.044	0.2	16	,J,s	0.044	0.2	13	,J,s	0.044	0.2	130	,J,s	0.22	1	24	,J,s	0.044	0.2	16	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	27,000		0.48	10	24,000		0.48	10	21,000		0.48	10	17,000		0.48	10	26,000		0.48	10	29,000		0.48	10	22,000		0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	220		0.11	1	180		0.11	1	26		0.022	0.2	22		0.022	0.2	530		0.45	4	120		0.11	1	37		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	39,000		5	50	5,200		5	50	3,800		5	50	44,000		50	500	4,700		5	50	5,000		5	50	4,000		5	50
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	490		0.16	1	640		0.16	1	280		0.16	1	330		0.16	1	590		0.16	1	470		0.16	1	550		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.1		0.0075	0.05	0.1		0.0075	0.05	0.059		0.0075	0.05	0.026	J,B,p	0.0075	0.05	0.55		0.0075	0.05	0.05	J	0.0075	0.05	0.035	J	0.0075	0.05
Nickel	7440-02-0	N	62.8	156.43	2,044	--	33	,J,s	0.036	0.1	23	,J,s	0.036	0.1	15	,J,s	0.036	0.1	11	,J,s	0.036	0.1	37	,J,s	0.036	0.1	21	,J,s	0.036	0.1	13	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,800		5.3	50	1,600		5.3	50	1,500		5.3	50	3,100		5.3	50	1,600		5.3	50	2,100		5.3	50	1,400		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.14	J,L,m	0.089	0.3	0.16	J,L,m	0.089	0.3	0.15	J,L,m	0.089	0.3	0.13	J,L,m	0.089	0.3	0.33	,L,m	0.089	0.3	0.21	J,L,m	0.089	0.3	0.22	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	5		0.013	0.1	0.71		0.013	0.1	0.62		0.013	0.1	0.68		0.013	0.1	17		0.013	0.1	0.11		0.013	0.1	1		0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	110		13	100	54	J	13	100	43	J	13	100	110		13	100	83	J	13	100	51	J	13	100	49	J	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.19		0.0049	0.1	0.17		0.0049	0.1	0.14		0.0049	0.1	0.16		0.0049	0.1	0.19		0.0049	0.1	0.2		0.0049	0.1	0.15		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	40	,J,s	0.034	0.1	32	,J,s	0.034	0.1	28	,J,s	0.034	0.1	32	,J,s	0.034	0.1	35	,J,s	0.034	0.1	41	,J,s	0.034	0.1	31	,J,s	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	79	,J,s	1	5	110	,J,s	1	5	54	,J,s	1	5	41	,J,s	1	5	280	,J,s	1	5	81	,J,s	1	5	64	,J,s	1	5
TCL Pesticides/PCBs (ug/kg)																																
4,4'-DDT	50-29-3	C	--	1.9E+03	8.4E+03	1.2E+03	<3.8	U	1.2	3.8	<4.1	U	1.3	4.1	<4	U	1.3	4	<4.1	U	1.3	4.1	<4.5	U,UL,s	1.4	4.5	<5	U	1.5	5	<4.1	U	1.3	4.1
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	<2	U	0.48	2	<2.1	U	0.51	2.1	<2.1	U	0.5	2.1	<2.1	U	0.51	2.1	<2.3	U,UL,s	0.57	2.3	<2.6	U	0.62	2.6	<2.1	U	0.52	2.1
Aroclor 1254 [4]	11097-69-1	C/N*	--	1.6E+02	1.4E+03	1.1E+03	56		5.1	38	300		5.5	41	16	J	5.4	40	26	J	5.4	41	330	,J,g	6	45	150		6.6	50	20	J,J,g	5.5	41
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	<77	U	18	77	<83	U	20	83	<82	U	19	82	<83	U	20	83	<92	U,UL,s	22	92	<100	U	24	100	<83	U	20	83
TCL VOCs (ug/kg)																																
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<23	U,UJ,c	2.8	23	<3,100	U	20	3,100	<24	U,UJ,c	2.9	24	<25	U	3	25	<3,400	U	23	3,400	<30	U	3.6	30	8.4	J	3	25
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	27		4.9	23	120	J	74	930	51		5.1	24	52	,B,z	5.2	25	150	J	82	1,000	44		6.4	30	66		5.3	25
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	0.2	J	0.15	5.8	<62	U	7.3	62	<6.1	U	0.16	6.1	<6.2	U	0.16	6.2	<68	U	8.1	68	<7.5	U	0.19	7.5	<6.2	U	0.16	6.2
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	3.1	J	0.3	5.8	<310	U	18	310	3.2	J	0.32	6.1	3.2	J	0.32	6.2	<340	U	19	340	<7.5	U	0.4	7.5	3.6	J	0.33	6.2
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	0.21	J	0.17	5.8	<62	U	3.8	62	0.22	J	0.18	6.1	0.2	J	0.18	6.2	<68	U	4.2	68	<7.5	U	0.22	7.5	<6.2	U	0.18	6.2
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	<23	U	0.96	23	160	J	10	310	4.6	J,J,c	1	24	<25	U	1	25	180	J	11	340	2.9	J	1.3	30	4.7	J	1	25
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<23	U	4.6	23	<310	U	9.9	310	<24	U	4.8	24	<25	U	4.9	25	<340	U	11	340	<30	U	5.9	30	<25	U	4.9	25
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<5.8	U	0.46	5.8	<62	U	4.5	62	<6.1	U	0.49	6.1	<6.2	U	0.5	6.2	25	J	4.9	68	<7.5	U	0.6	7.5	<6.2	U	0.5	6.2
TCL SVOCs (ug/kg)																																
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<98	U,UL,s	2.5	98	<2,600	U	66	2,600	0.81	J	0.52	21	<100	U	2.6	100	<1,200	U,UL,s	29	1,200	<130	U	3.2	130	<110	U	2.7	110
Benzaldehyde	100-52-7	N	--	7.8E+05	1.0E+07	--	<980	U,UL,s	150	980	<26,000	U	4,100	26,000	74	J	32	210	<1,000	U	160	1,000	<12,000	U,UL,s	1,800	12,000	<1,300	U	200	1,300	<1,100	U	160	1,100
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	7.7	J,L,s	3.1	98	100	J	83	2,600	2.4	J	0.65	21	4.1	J	3.3	100	46	J,L,s	37	1,200	5	J	4	130	6.2	J	3.3	110
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	<98	U,UL,s	6	98	<2,600	U	160	2,600	1.6	J	1.3	21	<100	U	6.4	100	<1,200	U,UL,s	70	1,200	<130	U	7.7	130	<110	U	6.4	110
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	15	J,L,s	4.9	98	<2,600	U	130	2,600	4.1	J	1	21	<100	U	5.2	100	<1,200	U,UL,s	58	1,200	<130	U	6.4	130	<110	U	5.3	110
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	5.8	J,L,s	4.1	98	<2,600	U	110	2,600	2	J	0.87	21	<100	U	4.4	100	<1,200	U,UL,s	49	1,200	<130	U	5.4	130	<110	U	4.5	110
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	48	J,B,z	7.5	980	<26,000	U	200	26,000	26	J,B,z	1.6	210	31	J,B,z	8	1,000	160	J,L,s	89	12,000	18	J	9.8	1,300	56	J	8.1	1,100
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	<980	U,UL,s	12	980	<26,000	U	330	26,000	<210	U	2.6	210	<1,000	U	13	1,000	<12,000	U,UL,s	140	12,000	<1,300	U	16	1,300	<1,100	U	13	1,100
Carbazole	86-74-8	C	--	3.2E+04	1.4E+05	4.7E+02	<980	U,UL,s	2.9	980	<26,000	U	77	26,000	1.6	J	0.61	210	<1,000	U	3.1	1,000	<12,000	U,UL,s	34	12,000	<1,300	U	3.7	1,300	<1,100	U	3.1	1,100
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	7.7	J,L,s	2.8	98	<2,600	U	74	2,600	2.8	J	0.58	21	<100	U	2.9	100	<1,200	U,UL,s	33	1,200	<130	U	3.6	130	4.2	J	3	110
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	54	J,L,s	6.9	980	210	J	190	26,000	80	J	1.5	210	270	J	7.4	1,000	460	J,L,s	82	12,000	28	J	9	1,300	66	J	7.5	1,100
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	3.9	J,L,s	2.1	980	<26,000	U	58	26,000	2.4	J	0.45	210	6.2	J	2.3	1,000	<12,000	U,UL,s	25	12,000	<1,300	U	2.8	1,300	4.2	J	2.3	1,100
Dimethylphthalate	131-11-3	--	--	--	--	--	<980	U,UL,s	2	980	<26,000	U	53	26,000	0.81	J	0.41	210	<1,000	U	2.1	1,000	<12,000	U,UL,s	23	12,000	<1,300	U	2.6	1,300	<1,100	U	2.1	1,100
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	1.9	J,L,s	1.3	98	<2,600	U	36	2,600	0.81	J	0.28	21	<100	U	1.4	100	<1,200	U,UL,s	16	1,200	<130	U	1.8	130	<110	U	1.5	110
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	9.6	J,L,s	1.8	98	52	J	49	2,600	3.7	J	0.39	21	2.1	J	2	100	46	J,L,s	22	1,200	2.5	J	2.4	130	4.2	J	2	110
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	9.6	J,L,s	4.6	980	<26,000	U	120	26,000	3.7	J	0.97	210	6.2	J	4.9	1,000	<12,000	U,UL,s	55	12,000	<1,300	U	6	1,300	8.3	J	5	1,100
Pentachlorophenol	87-86-5	C	--	5.3E+03	2.4E+04	--	91	J,L,s	21	1,900	<51,000	U	570	51,000	<400	U	4.5	400	<2,000	U	23	2,000	<23,000	U,UL,s	250	23,000	<2,500	U	28	2,500	<2,100	U	23	2,100
Explosives (mg/kg)																																
2,4,6-Trinitrotoluene [5]	118-96-7	N	--	7.8E+00	1.0E+02	--	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				ND				ND				ND				ND			
HMX	2691-41-0	N	--	3.9E+02	5.1E+03	--	0.51	J,J,g	0.066	2.5	0.66	J,J,g	0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	4		0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5
Nitroglycerin (mg/kg)																																
Nitroglycerin	55-63-0	N	--	0.782	10.22	--	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5
Percent Solids (%)																																
Percent Solids	--	--	--	--	--	--	87		0.1	0.1	81		0.1	0.1	82		0.1	0.1	81		0.1	0.1	73		0.1	0.1	66		0.1	0.1	80		0.1	0.1
Total Organic Carbon (%)																																
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT				NT				NT				NT				NT			

Table 4-1
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	35SB10A 11/13/2007 0-1 Result	LQ, VQ, r	MDL	RL	35SB10B 11/13/2007 6-8 Result	LQ, VQ, r	MDL	RL	35SB10C 11/13/2007 14-16 Result	LQ, VQ, r	MDL	RL
TAL Metals (mg/kg)																		
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	24,000		2.1	10	16,000		2.1	10	18,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.2		0.042	0.2	<0.2	U	0.042	0.2	0.045	J	0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***10***		0.071	0.2	***0.95***		0.071	0.2	***1.5***		0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	82	,K,m	0.17	1	89	,K,m	0.17	1	91	,K,m	0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	1.1		0.021	1	0.62	J	0.021	1	0.6	J	0.021	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	2	J	0.11	2	1.2	J	0.11	2	0.97	J	0.11	2
Calcium	7440-70-2	--	--	--	--	--	87,000		4.2	50	3,700		4.2	50	17,000		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	***160***		0.72	5	25		0.72	5	38		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	5.1		0.37	2	9.2		0.37	2	8.7		0.37	2
Copper	7440-50-8	N	53.5	312.86	4,088	10,518	83	,J,s	0.22	1	11	,J,s	0.044	0.2	28	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	19,000		0.48	10	23,000		0.48	10	23,000		0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	130		0.11	1	22		0.022	0.2	180		0.11	1
Magnesium	7439-95-4	--	--	--	--	--	14,000		5	50	4,200		5	50	10,000		5	50
Manganese	7439-96-5	N	2,543	156.43	2,044	951.9	260		0.16	1	350		0.16	1	300		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.67		0.0075	0.05	0.025	J	0.0075	0.05	0.068		0.0075	0.05
Nickel	7440-02-0	N	62.8	156.43	2,044	--	36	,J,s	0.036	0.1	13	,J,s	0.036	0.1	17	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,400		5.3	50	1,800		5.3	50	1,800		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.18	J,L,m	0.089	0.3	0.22	J,L,m	0.089	0.3	0.29	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	2.2		0.013	0.1	0.048	J	0.013	0.1	1.1		0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	85	J	13	100	50	J	13	100	74	J	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.059	J	0.0049	0.1	0.17		0.0049	0.1	0.15		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	21	,J,s	0.034	0.1	36	,J,s	0.034	0.1	32	,J,s	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	110	,J,s	1	5	56	,J,s	1	5	70	,J,s	1	5
TCL Pesticides/PCBs (ug/kg)																		
4,4'-DDT	50-29-3	C	--	1.9E+03	8.4E+03	1.2E+03	<6.5	U,UL,s	2	6.5	<3.8	U	1.2	3.8	<4	U	1.3	4
Heptachlor epoxide	1024-57-3	C	--	7.0E+01	3.1E+02	2.5E+01	<3.4	U,UL,s	0.82	3.4	<2	U	0.48	2	<2.1	U	0.5	2.1
Aroclor 1254 [4]	11097-69-1	C/N*	--	1.6E+02	1.4E+03	1.1E+03	590		8.7	65	21	J	5.1	38	120		5.3	40
Aroclor 1260	11096-82-5	C	--	3.2E+02	1.4E+03	--	<130	U	31	130	<78	U	18	78	<81	U	19	81
TCL VOCs (ug/kg)																		
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<4,900	U	33	4,900	<23	U	2.8	23	12	J	2.9	24
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	240	J	120	1,500	14	J,B,x	4.9	23	83		5.1	24
Benzene	71-43-2	C	--	1.2E+04	5.2E+04	1.9E+00	<99	U	12	99	<5.8	U	0.15	5.8	<6.1	U	0.16	6.1
Carbon disulfide	75-15-0	N	--	7.8E+05	1.0E+07	1.9E+04	<490	U	28	490	3	J	0.31	5.8	3.8	JB,B,z	0.32	6.1
Chloroform	67-66-3	N	--	7.8E+04	1.0E+06	9.1E-01	<99	U	6.1	99	<5.8	U	0.17	5.8	<6.1	U	0.18	6.1
Methyl acetate	79-20-9	N	--	7.8E+06	1.0E+08	2.5E+04	78	J	16	490	<23	U	0.97	23	2.1	J	1	24
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<490	U	16	490	<23	U	4.6	23	<24	U	4.8	24
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<99	U	7.1	99	<5.8	U	0.47	5.8	<6.1	U	0.49	6.1
TCL SVOCs (ug/kg)																		
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<17,000	U	420	17,000	<99	U	2.5	99	<100	U	2.6	100
Benzaldehyde	100-52-7	N	--	7.8E+05	1.0E+07	--	<170,000	U	26,000	170,000	<990	U	150	990	<1,000	U	160	1,000
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	<17,000	U	530	17,000	<99	U	3.1	99	6.1	J	3.3	100
Benzo(a)pyrene	50-32-8	C	--	2.2E+01	3.9E+02	1.2E+02	<17,000	U	1,000	17,000	<99	U	6	99	<100	U	6.3	100
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<17,000	U	840	17,000	<99	U	4.9	99	<100	U	5.2	100
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<17,000	U	710	17,000	<99	U	4.2	99	<100	U	4.3	100
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	<170,000	U	1,300	170,000	15	J	7.5	990	45	J	7.9	1,000
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	<170,000	U	2,100	170,000	<990	U	12	990	<1,000	U	13	1,000
Carbazole	86-74-8	C	--	3.2E+04	1.4E+05	4.7E+02	<170,000	U	490	170,000	<990	U	2.9	990	<1,000	U	3	1,000
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<17,000	U	470	17,000	<99	U	2.8	99	8.1	J	2.9	100
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	1,300	J	1,200	170,000	<990	U	7	990	120	J	7.3	1,000
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	<170,000	U	370	170,000	<990	U	2.2	990	4	J	2.3	1,000
Dimethylphthalate	131-11-3	--	--	--	--	--	<170,000	U	330	170,000	<990	U	2	990	<1,000	U	2.1	1,000
Naphthalene	91-20-3	N	--	1.6E+05	2.0E+06	1.5E+02	<17,000	U	230	17,000	<99	U	1.4	99	<100	U	1.4	100
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<17,000	U	310	17,000	1.9	J	1.8	99	10	J	1.9	100
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	<170,000	U	790	170,000	<990	U	4.6	990	16	J	4.9	1,000
Pentachlorophenol	87-86-5	C	--	5.3E+03	2.4E+04	--	<330,000	U	3,600	330,000	<1,900	U	21	1,900	<2,000	U	22	2,000
Explosives (mg/kg)																		
2,4,6-Trinitrotoluene [5]	118-96-7	N	--	7.8E+00	1.0E+02	--	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5	<2.5	U	0.15	2.5
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND			
HMX	2691-41-0	N	--	3.9E+02	5.1E+03	--	4		0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5
Nitroglycerin (mg/kg)																		
Nitroglycerin	55-63-0	N	--	0.782	10.22	--	<5	U	0.39	5	<5	U	0.39	5	<5	U	0.39	5
Percent Solids (%)																		
Percent Solids	--	--	--	--	--	--	51		0.1	0.1	86		0.1	0.1	82		0.1	0.1
Total Organic Carbon (%)																		
Carbon, Total Organic	--	--	--	--	--	--	NT				NT				NT			

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested
ND = Not Detected
-- = No Value Available

[A] = Facility Background = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = Noncarcinogenic Residential and Industrial RBC values for 2,4,6-Trinitrotoluene were used for screening

= Concentration Exceeds Adjusted Soil Residential RBC

= Concentration Exceeds Adjusted Soil Industrial RBC

underline = Concentration Exceeds Site Background Values

bold italic = Concentration Exceeds SSL DAF20

Laboratory Qualifiers

B	Analyte found in associated blank as well as in the sample.
J	Estimated value.
U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.

Validation Qualifiers

B	Not detected substantially above the level reported in laboratory or field blanks.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.

Reason Codes

GC/MS Organics

c	Calibration failure; poor (RRF) or unstable (%D) response
f	Field duplicate imprecision
l	MS/MSD recovery failure
s	Surrogate failure
t	Tentatively identified compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

GC and HPLC Organics

c	Calibration failure; poor or unstable (%D) response
f	Field duplicate imprecision
g	Dual column confirmation imprecision
l	MS/MSD recovery failure
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

f	Field duplicate imprecision
m	MS/MSD recovery failure
p	Preparation blank contamination
s	Serial dilution failure

Table 4-2
Summary of Risk Screening Results for Soil - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL[A]	# of Detections	# of Samples
TAL Metals (mg/kg)														
Aluminum	7429-90-5	40,041	7,821	N	102,200	N	--	12,000	25,000	0	0	--	22	22
Antimony	7440-36-0	--	3.13	N	40.88	N	13.2	0.0365	1.1	0	0	0	16	22
Arsenic	7440-38-2	15.8	0.426	C	1.91	C	0.026	0.82	10	0	0	0	22	22
Barium	7440-39-3	209	1,564	N	20,440	N	6,015	60	180	0	0	0	22	22
Beryllium	7440-41-7	1.02	15.64	N	204.4	N	1,154	0.54	1.1	0	0	0	22	22
Cadmium	7440-43-9	0.69	3.91	N	51.1	N	27.45	0.97	2.2	0	0	0	22	22
Calcium	7440-70-2	--	--	--	--	--	--	1,500	89,000	--	--	--	22	22
Chromium [1]	7440-47-3	65.3	23.46	N	306.6	N	42.048	21	160	**5**	0	**5**	22	22
Cobalt	7440-48-4	72.3	--	--	--	--	--	5.1	12	--	--	--	22	22
Copper	7440-50-8	53.5	312.9	N	4,088	N	10,518	10	200	0	0	0	22	22
Iron	7439-89-6	50,962	5,475	N	71,540	N	--	17,000	31,000	0	0	--	22	22
Lead [2]	7439-92-1	26.8	400	--	750	--	--	9.6	750	**2**	0	--	22	22
Magnesium	7439-95-4	--	--	--	--	--	--	3,300	44,000	--	--	--	22	22
Manganese	7439-96-5	2543	156.43	N	2,044	N	951.9	230	675	0	0	0	22	22
Mercury [3]	7439-97-6	0.13	2.35	--	30.66	--	--	0.021	0.83	0	0	--	22	22
Nickel	7440-02-0	62.8	156.43	N	2,044	N	--	11	45	0	0	--	22	22
Potassium	7440-09-7	--	--	--	--	--	--	1,300	3,100	--	--	--	22	22
Selenium	7782-49-2	--	39.11	N	511	N	18.98	0.12	0.37	0	0	0	21	22
Silver	7440-22-4	--	39.11	N	511	N	31.03	0.048	25	0	0	0	22	22
Sodium	7440-23-5	--	--	--	--	--	--	31	110	--	--	--	22	22
Thallium	7440-28-0	2.11	0.548	N	7.154	N	3.638	0.059	0.235	0	0	0	22	22
Vanadium	7440-62-2	108	7.821	N	102.2	N	730.1	21	43.5	0	0	0	22	22
Zinc	7440-66-6	202	2,346	N	30,660	N	13,622	41	280	0	0	0	22	22
TCL Pesticides/PCBs (ug/kg)														
4,4'-DDT	50-29-3	--	1.9E+03	C	8.4E+03	C	1.2E+03	1.5	1.5	0	0	0	1	22
Heptachlor epoxide	1024-57-3	--	7.0E+01	C	3.1E+02	C	2.5E+01	6.5	6.5	0	0	0	1	22
Aroclor 1254 [4]	11097-69-1	--	1.6E+02	N	1.4E+03	C	1.1E+03	16	1,700	**8**	**1**	**1**	17	22
Aroclor 1260	11096-82-5	--	3.2E+02	C	1.4E+03	C	--	800	800	**1**	0	--	1	22
TCL VOCs (ug/kg)														
2-Butanone	78-93-3	--	4.7E+06	N	6.1E+07	N	2.9E+04	7.4	17	0	0	0	8	22
Acetone	67-64-1	--	7.0E+06	N	9.2E+07	N	2.2E+04	11	240	0	0	0	21	22
Benzene	71-43-2	--	1.2E+04	C	5.2E+04	C	1.9E+00	0.2	0.2	0	0	0	1	22
Carbon disulfide	75-15-0	--	7.8E+05	N	1.0E+07	N	1.9E+04	3	6.2	0	0	0	14	22
Chloroform	67-66-3	--	7.8E+04	N	1.0E+06	N	9.1E-01	0.2	0.22	0	0	0	4	22
Methyl acetate	79-20-9	--	7.8E+06	N	1.0E+08	N	2.5E+04	2.1	200	0	0	0	14	22
Methylene chloride	75-09-2	--	8.5E+04	C	3.8E+05	C	1.9E+01	5.5	5.5	0	0	0	1	22
Toluene	108-88-3	--	6.3E+05	N	8.2E+06	N	2.7E+04	25	55.13	0	0	0	2	22
TCL SVOCs (ug/kg)														
Anthracene	120-12-7	--	2.3E+06	N	3.1E+07	N	4.7E+05	0.81	0.81	0	0	0	1	22
Benzaldehyde	100-52-7	--	7.8E+05	N	1.0E+07	N	--	74	4,600	0	0	--	3	22
Benzo(a)anthracene	56-55-3	--	2.2E+02	C	3.9E+03	C	4.8E+02	0.8	100	0	0	0	16	22
Benzo(a)pyrene	50-32-8	--	2.2E+01	C	3.9E+02	C	1.2E+02	1.6	18	0	0	0	3	22
Benzo(b)fluoranthene	205-99-2	--	2.2E+02	C	3.9E+03	C	1.5E+03	1.1	29	0	0	0	5	22
Benzo(k)fluoranthene	207-08-9	--	2.2E+03	C	3.9E+04	C	1.5E+04	1.9	18	0	0	0	4	22
Bis(2-ethylhexyl) Phthalate	117-81-7	--	4.6E+04	C	2.0E+05	C	2.9E+06	9.7	540	0	0	0	17	22
Butyl Benzyl Phthalate	85-68-7	--	1.6E+06	N	2.0E+07	N	1.7E+07	3.2	3.2	0	0	0	1	22
Carbazole	86-74-8	--	3.2E+04	C	1.4E+05	C	4.7E+02	1.6	7.4	0	0	0	2	22
Chrysene	218-01-9	--	2.2E+04	C	3.9E+05	C	4.8E+04	2.8	57	0	0	0	8	22
Di-n-butylphthalate	84-74-2	--	7.8E+05	N	1.0E+07	N	5.0E+06	4.1	4,850	0	0	0	20	22
Diethylphthalate	84-66-2	--	6.3E+06	N	8.2E+07	N	4.5E+05	1.2	30	0	0	0	11	22
Dimethylphthalate	131-11-3	--	--	--	--	--	--	0.81	0.81	--	--	--	1	22
Naphthalene	91-20-3	--	1.6E+05	N	2.0E+06	N	1.5E+02	0.41	3.7	0	0	0	5	22
N-Nitrosodiphenylamine	86-30-6	--	1.3E+05	C	5.8E+05	C	7.6E+02	3.7	250	0	0	0	6	22
Pentachlorophenol	87-86-5	--	5.3E+03	C	2.4E+04	C	--	91	91	0	0	--	1	22
Pyrene	129-00-0	--	2.3E+05	N	3.1E+06	N	6.8E+05	0.4	190	0	0	0	18	22
Explosives (mg/kg)														
2,4,6-Trinitrotoluene [5]	118-96-7	--	7.8E+00	N	1.0E+02	N	--	0.31	0.31	0	0	--	1	22
2,4-Dinitrotoluene	121-14-2	--	1.6E+01	N	2.0E+02	N	5.7E-01	0.52	0.52	0	0	0	1	22
Dinitrotoluene Mix	--	--	9.4E-01	--	4.2E+00	--	--	0.52	0.52	0	0	--	1	22
HMX	2691-41-0	--	3.9E+02	N	5.1E+03	N	--	0.51	7	0	0	--	7	22
Nitroglycerin (mg/kg)														
Nitroglycerin	55-63-0	--	7.8E-01	N	1.0E+01	N	--	11	11	**1**	**1**	--	1	22

Table 4-2
Summary of Risk Screening Results for Soil - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
µg/kg = Microgram per kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
Facility Background = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001)
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
R-RBC = Adjusted Residential RBC
I-RBC = Adjusted Industrial RBC
C = Carcinogenic per EPA RBC Table (October 2007)
N = Noncarcinogenic per EPA RBC Table (October 2007)
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
-- = No screening value available

[A] = For inorganics, number of samples that exceed background (if available) and screening level
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = Noncarcinogenic Residential and Industrial RBC values for 2,4,6-Trinitrotoluene were used for screening

Table 4-3
Summary of Detected Chemicals in Groundwater Analytical Samples at SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS	C/N	Adjusted Tap Water RBC	MCL	Units	35MW1 2/7/2008 Result	35MW1 2/7/2008 LQ, VQ, r	MDL	RL	35MW2 2/7/2008 Result	35MW2 2/7/2008 LQ, VQ, r	MDL	RL	D-2 2/8/2008 Result	D-2 2/8/2008 LQ, VQ, r	MDL	RL
Perchlorate																	
Perchlorate	14797-73-0	N	2.555	--	ug/L	0.25		0.08	0.2	0.13	J	0.08	0.2	0.29		0.08	0.2
TAL Metals																	
Aluminum, Total	7429-90-5	N	3,650	--	ug/L	420		44	200	140	J	44	200	<200	U	44	200
Antimony, Total	7440-36-0	N	1.46	6	ug/L	<3	U	0.44	3	0.69	J,B,o	0.44	3	<3	U	0.44	3
Barium, Dissolved	7440-39-3	N	730	2,000	ug/L	95		0.52	2	43		0.52	2	120		0.52	2
Barium, Total	7440-39-3	N	730	2,000	ug/L	100		0.52	2	48		0.52	2	130		0.52	2
Cadmium, Dissolved	7440-43-9	N	1.825	5	ug/L	<0.2	U	0.062	0.2	<0.2	U	0.062	0.2	<0.2	U	0.062	0.2
Cadmium, Total	7440-43-9	N	1.825	5	ug/L	<0.2	U	0.062	0.2	0.064	J	0.062	0.2	<0.2	U	0.062	0.2
Calcium, Dissolved	7440-70-2	--	--	--	ug/L	85,000		40	500	130,000		40	500	53,000		40	500
Calcium, Total	7440-70-2	--	--	--	ug/L	87,000		40	500	140,000		40	500	51,000		40	500
Chromium, Dissolved [1]	7440-47-3	C	10.95	100	ug/L	1.2	J,B,p	0.31	2	1.5	J,B,p	0.31	2	1.6	J,B,p	0.31	2
Chromium, Total [1]	7440-47-3	C	10.95	100	ug/L	4.9		0.31	2	5.2		0.31	2	1.6	J,B,x	0.31	2
Cobalt, Dissolved	7440-48-4	--	--	--	ug/L	1.4		0.096	1	0.72	J	0.096	1	0.76	J	0.096	1
Cobalt, Total	7440-48-4	--	--	--	ug/L	2.2		0.096	1	1.9		0.096	1	0.63	J	0.096	1
Copper, Dissolved	7440-50-8	N	146	1,300	ug/L	0.52	J	0.33	1	1.2		0.33	1	1.1		0.33	1
Copper, Total	7440-50-8	N	146	1,300	ug/L	0.85	J	0.33	1	2		0.33	1	0.71	J	0.33	1
Iron, Dissolved	7439-89-6	N	2,555	--	ug/L	12	J	5.7	20	12	J	5.7	20	13	J	5.7	20
Iron, Total	7439-89-6	N	2,555	--	ug/L	370		5.7	20	200		5.7	20	10	J	5.7	20
Lead, Dissolved [2]	7439-92-1	--	15	--	ug/L	<1	U	0.33	1	<1	U	0.33	1	<1	U	0.33	1
Lead, Total [2]	7439-92-1	--	15	--	ug/L	0.33	J	0.33	1	0.41	J	0.33	1	<1	U	0.33	1
Magnesium, Dissolved	7439-95-4	--	--	--	ug/L	34,000		38	500	35,000		38	500	32,000		38	500
Magnesium, Total	7439-95-4	--	--	--	ug/L	35,000		38	500	37,000		38	500	30,000		38	500
Manganese, Dissolved	7439-96-5	N	73	--	ug/L	91		0.43	3	16		0.43	3	160		0.43	3
Manganese, Total	7439-96-5	N	73	--	ug/L	81		0.43	3	21		0.43	3	150		0.43	3
Nickel, Dissolved	7440-02-0	N	73	--	ug/L	2.4	,B,p	0.28	2	2.4	,B,p	0.28	2	1.6	J,B,p	0.28	2
Nickel, Total	7440-02-0	N	73	--	ug/L	3.3		0.28	2	3.1		0.28	2	1.6	J,B,x	0.28	2
Potassium, Dissolved	7440-09-7	--	--	--	ug/L	1,500		54	200	1,200		54	200	1,400		54	200
Potassium, Total	7440-09-7	--	--	--	ug/L	1,600		54	200	1,400		54	200	1,500		54	200
Silver, Total	7440-22-4	N	18.25	--	ug/L	<0.5	U	0.12	0.5	0.12	J	0.12	0.5	<0.5	U	0.12	0.5
Sodium, Dissolved	7440-23-5	--	--	--	ug/L	9,100		84	500	7,600		84	500	5,800		84	500
Sodium, Total	7440-23-5	--	--	--	ug/L	9,400		84	500	8,300		84	500	5,900		84	500
Vanadium, Dissolved	7440-62-2	N	3.65	--	ug/L	1.1	J	0.83	5	1.1	J	0.83	5	<5	U	0.83	5
Vanadium, Total	7440-62-2	N	3.65	--	ug/L	1.4	J	0.83	5	1.1	J	0.83	5	<5	U	0.83	5
Zinc, Dissolved	7440-66-6	N	1,095	--	ug/L	8.8	J,B,p	0.84	10	9.2	J,B,p	0.84	10	24		0.84	10
Zinc, Total	7440-66-6	N	1,095	--	ug/L	9.8	J,B,p	0.84	10	15		0.84	10	15		0.84	10
Pesticides																	
alpha-Chlordane [3]	5103-71-9	C	0.191	2	ug/L	<0.05	U	0.0021	0.05	<0.05	U	0.0021	0.05	0.0038	J	0.0021	0.05
gamma-Chlordane [3]	5103-74-2	C	0.191	2	ug/L	<0.05	U	0.0021	0.05	<0.05	U	0.0021	0.05	0.0028	J	0.0021	0.05
TCL VOCs																	
Chloroform	67-66-3	C	0.155	80	ug/L	0.36	J,L,h	0.061	1	<1	U	0.061	1	<1	U	0.061	1
Toluene	108-88-3	N	227.1	1,000	ug/L	0.13	J,B,z	0.072	1	<1	U	0.072	1	0.22	J,B,z	0.072	1
TCL SVOCs																	
Anthracene	120-12-7	N	182.5	--	ug/L	<0.5	U	0.014	0.5	0.019	J	0.014	0.5	<0.5	U	0.014	0.5
Bis(2-ethylhexyl) Phthalate	117-81-7	C	4.784	--	ug/L	0.54	J,B,x	0.41	5	0.54	J,B,x	0.41	5	0.5	J,B,x	0.41	5
Butyl Benzyl Phthalate	85-68-7	N	730	--	ug/L	0.26	J,B,x	0.029	5	0.26	J,B,x	0.029	5	0.26	J,B,x	0.029	5
Di-n-butylphthalate	84-74-2	N	365	--	ug/L	<5	U	0.38	5	<5	U	0.38	5	<5	U	0.38	5
Fluoranthene	206-44-0	N	146	--	ug/L	<0.5	U	0.016	0.5	0.019	J	0.016	0.5	<0.5	U	0.016	0.5
Isophorone	78-59-1	C	70.5	--	ug/L	0.075	J,B,x	0.031	5	0.066	J,B,x	0.031	5	0.057	J,B,x	0.031	5
Phenanthrene [4]	85-01-8	N	18.25	--	ug/L	0.019	J	0.015	0.5	0.019	J	0.015	0.5	<0.5	U	0.015	0.5
Explosives																	
HMX	2691-41-0	N	182.5	--	ug/L	1	J	0.2	5	0.88	J	0.2	5	1.4	J	0.2	5
Field Parameters																	
Dissolved Oxygen	--	--	--	--	mg/L	0				3.29				0			
Oxidation Reduction Potential	--	--	--	--	mV	83				151				75			
pH	--	--	--	--	SU	6.39				6.37				6.3			
Conductivity	--	--	--	--	mS	0.836				0.99				0.662			
Temperature	--	--	--	--	°C	16.6				17.48				15.37			
Turbidity	--	--	--	--	ntu	6.19				6.85				2.39			

Table 4-3
Summary of Detected Chemicals in Groundwater Analytical Samples at SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS	C/N	Adjusted Tap Water RBC	MCL	Units	D-2-DUP (DUP-7) 2/8/2008 Result	D-2-DUP (DUP-7) 2/8/2008 LQ, VQ, r	MDL	RL	D-4 2/8/2008 Result	D-4 2/8/2008 LQ, VQ, r	MDL	RL
Perchlorate													
Perchlorate	14797-73-0	N	2.555	--	ug/L	--				0.45		0.08	0.2
TAL Metals													
Aluminum, Total	7429-90-5	N	3,650	--	ug/L	<200	U	44	200	74	J	44	200
Antimony, Total	7440-36-0	N	1.46	6	ug/L	<3	U	0.44	3	<3	U	0.44	3
Barium, Dissolved	7440-39-3	N	730	2,000	ug/L	120		0.52	2	110		0.52	2
Barium, Total	7440-39-3	N	730	2,000	ug/L	130		0.52	2	120		0.52	2
Cadmium, Dissolved	7440-43-9	N	1.825	5	ug/L	<0.2	U	0.062	0.2	0.12	J	0.062	0.2
Cadmium, Total	7440-43-9	N	1.825	5	ug/L	<0.2	U	0.062	0.2	<0.2	U	0.062	0.2
Calcium, Dissolved	7440-70-2	--	--	--	ug/L	49,000		40	500	41,000		40	500
Calcium, Total	7440-70-2	--	--	--	ug/L	51,000		40	500	40,000		40	500
Chromium, Dissolved [1]	7440-47-3	C	10.95	100	ug/L	0.89	J,B,p	0.31	2	2.9		0.31	2
Chromium, Total [1]	7440-47-3	C	10.95	100	ug/L	1.5	J,B,x	0.31	2	3.8		0.31	2
Cobalt, Dissolved	7440-48-4	--	--	--	ug/L	0.54	J	0.096	1	0.68	J	0.096	1
Cobalt, Total	7440-48-4	--	--	--	ug/L	0.63	J	0.096	1	0.66	J	0.096	1
Copper, Dissolved	7440-50-8	N	146	1,300	ug/L	2.7		0.33	1	1.8		0.33	1
Copper, Total	7440-50-8	N	146	1,300	ug/L	1.1		0.33	1	0.74	J	0.33	1
Iron, Dissolved	7439-89-6	N	2,555	--	ug/L	<20	U	5.7	20	<20	U	5.7	20
Iron, Total	7439-89-6	N	2,555	--	ug/L	13	J	5.7	20	30		5.7	20
Lead, Dissolved [2]	7439-92-1	--	15	--	ug/L	<1	U	0.33	1	0.94	J	0.33	1
Lead, Total [2]	7439-92-1	--	15	--	ug/L	<1	U	0.33	1	<1	U	0.33	1
Magnesium, Dissolved	7439-95-4	--	--	--	ug/L	29,000		38	500	21,000		38	500
Magnesium, Total	7439-95-4	--	--	--	ug/L	30,000		38	500	20,000		38	500
Manganese, Dissolved	7439-96-5	N	73	--	ug/L	160		0.43	3	0.87	J	0.43	3
Manganese, Total	7439-96-5	N	73	--	ug/L	150		0.43	3	1.5	J	0.43	3
Nickel, Dissolved	7440-02-0	N	73	--	ug/L	1.4	J,B,p	0.28	2	1.3	J,B,p	0.28	2
Nickel, Total	7440-02-0	N	73	--	ug/L	1.5	J,B,x	0.28	2	1.7	J,B,x	0.28	2
Potassium, Dissolved	7440-09-7	--	--	--	ug/L	1,300		54	200	1,300		54	200
Potassium, Total	7440-09-7	--	--	--	ug/L	1,400		54	200	1,300		54	200
Silver, Total	7440-22-4	N	18.25	--	ug/L	<0.5	U	0.12	0.5	<0.5	U	0.12	0.5
Sodium, Dissolved	7440-23-5	--	--	--	ug/L	5,600		84	500	8,800		84	500
Sodium, Total	7440-23-5	--	--	--	ug/L	5,800		84	500	8,700		84	500
Vanadium, Dissolved	7440-62-2	N	3.65	--	ug/L	<5	U	0.83	5	<5	U	0.83	5
Vanadium, Total	7440-62-2	N	3.65	--	ug/L	<5	U	0.83	5	<5	U	0.83	5
Zinc, Dissolved	7440-66-6	N	1,095	--	ug/L	13	,B,p	0.84	10	7.8	J,B,p	0.84	10
Zinc, Total	7440-66-6	N	1,095	--	ug/L	12	,B,p	0.84	10	8.7	J,B,p	0.84	10
Pesticides													
alpha-Chlordane [3]	5103-71-9	C	0.191	2	ug/L	0.0045	J	0.0021	0.05	0.034	J	0.0021	0.05
gamma-Chlordane [3]	5103-74-2	C	0.191	2	ug/L	0.003	J	0.0021	0.05	0.024	J	0.0021	0.05
TCL VOCs													
Chloroform	67-66-3	C	0.155	80	ug/L	<1	U	0.061	1	13		0.061	1
Toluene	108-88-3	N	227.1	1,000	ug/L	0.23	J,B,z	0.072	1	0.18	J,B,z	0.072	1
TCL SVOCs													
Anthracene	120-12-7	N	182.5	--	ug/L	<0.5	U	0.014	0.5	<0.5	U	0.014	0.5
Bis(2-ethylhexyl) Phthalate	117-81-7	C	4.784	--	ug/L	0.45	J,B,x	0.41	5	0.51	J,B,x	0.41	5
Butyl Benzyl Phthalate	85-68-7	N	730	--	ug/L	0.26	J,B,x	0.029	5	0.26	J,B,x	0.029	5
Di-n-butylphthalate	84-74-2	N	365	--	ug/L	<5	U	0.38	5	0.42	J	0.38	5
Fluoranthene	206-44-0	N	146	--	ug/L	<0.5	U	0.016	0.5	<0.5	U	0.016	0.5
Isophorone	78-59-1	C	70.5	--	ug/L	0.075	J,B,x	0.031	5	0.066	J,B,x	0.031	5
Phenanthrene [4]	85-01-8	N	18.25	--	ug/L	<0.5	U	0.015	0.5	<0.5	U	0.015	0.5
Explosives													
HMX	2691-41-0	N	182.5	--	ug/L	1.3	J	0.2	5	4.3	J	0.2	5
Field Parameters													
Dissolved Oxygen	--	--	--	--	mg/L	0				1.86			
Oxidation Reduction Potential	--	--	--	--	mV	75				144			
pH	--	--	--	--	SU	6.3				6.28			
Conductivity	--	--	--	--	mS	0.662				0.457			
Temperature	--	--	--	--	°C	15.37				14.13			
Turbidity	--	--	--	--	ntu	2.39				NR			

Notes:
CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
SVOC = Semi-volatile Organic Compound
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested
mg/L = Milligram Per Liter
mV = millivolt
SU = Standard Units
mS = milliSiemen
°C = degrees Celcius
ntu = Nephelometric Turbidity
NR = Not Recorded (Equipment Not Functioning Properly)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2007)
N = Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level
-- = No Value Available

[1] = Chromium VI RBC used for screening
[2] = USEPA Action Level used for screening
[3] = Chlordane RBC used for screening
[4] = Pyrene RBC used for screening

=Exceeds MCL

=Exceeds Adjusted T-RBC

Data Qualifiers:
B = Not detected substantially above the level reported in laboratory or field blanks.
J = Analyte present. Reported value may not be accurate or precise.
L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
f = Field duplicate imprecision
m = MS/MSD recovery failure.
o = Calibration blank contamination
p = Preparation blank contamination
x = Trip blank contamination
y = Trip blank contamination
z = Method blank and/or storage blank contamination

Table 4-4
Summary of Risk Screening Results for Groundwater at SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	C/N	Adjusted T-RBC	MCL	Minimum Detected Concentration	Maximum Detected Concentration	Number of Samples that Exceed Adj. T-RBC	Number of Samples that Exceed MCL	Number of Detections	Number of Samples
Perchlorate										
Perchlorate	14797-73-0	N	2.555	--	0.13	0.45	0	0	4	4
TAL Metals										
Aluminum, Total	7429-90-5	N	3,650	--	74	420	0	0	3	4
Antimony, Total	7429-90-5	N	3,650	6	0.69	0.69	0	0	1	4
Barium, Dissolved	7440-39-3	N	730	2,000	43	120	0	0	4	4
Barium, Total	7440-39-3	N	730	2,000	48	130	0	0	4	4
Cadmium, Dissolved	7440-43-9	N	1.825	5	0.12	0.12	0	0	1	4
Cadmium, Total	7440-43-9	N	1.825	5	0.064	0.064	0	0	1	4
Calcium, Dissolved	7440-70-2	--	--	--	41,000	130,000	0	0	4	4
Calcium, Total	7440-70-2	--	--	--	40,000	140,000	0	0	4	4
Chromium, Dissolved [1]	7440-47-3	--	--	100	1.2	2.9	0	0	4	4
Chromium, Total [1]	7440-47-3	--	--	100	1.55	5.2	0	0	4	4
Cobalt, Dissolved	7440-48-4	--	--	--	0.65	1.4	0	0	4	4
Cobalt, Total	7440-48-4	--	--	--	0.63	2.2	0	0	4	4
Copper, Dissolved	7440-50-8	N	146	1,300	0.52	1.9	0	0	4	4
Copper, Total	7440-50-8	N	146	1,300	0.74	2	0	0	4	4
Iron, Dissolved	7439-89-6	N	2,555	--	7.925	12	0	0	3	4
Iron, Total	7439-89-6	N	2,555	--	11.5	370	0	0	4	4
Lead, Dissolved [2]	7439-92-1	--	15	--	0.94	0.94	0	0	1	4
Lead, Total [2]	7439-92-1	--	15	--	0.33	0.41	0	0	2	4
Magnesium, Dissolved	7439-95-4	--	--	--	21,000	35,000	0	0	4	4
Magnesium, Total	7439-95-4	--	--	--	20,000	37,000	0	0	4	4
Manganese, Dissolved	7439-96-5	N	73	--	0.87	160	**2**	0	4	4
Manganese, Total	7439-96-5	N	73	--	1.5	150	**2**	0	4	4
Nickel, Dissolved	7440-02-0	N	73	--	1.3	2.4	0	0	4	4
Nickel, Total	7440-02-0	N	73	--	1.55	3.3	0	0	4	4
Potassium, Dissolved	7440-09-7	--	--	--	1,200	1,500	0	0	4	4
Potassium, Total	7440-09-7	--	--	--	1,300	1,600	0	0	4	4
Silver, Total	7440-22-4	N	18.25	--	0.12	0.12	0	0	1	4
Sodium, Dissolved	7440-23-5	--	--	--	5,700	9,100	0	0	4	4
Sodium, Total	7440-23-5	--	--	--	5,850	9,400	0	0	4	4
Vanadium, Dissolved	7440-62-2	N	3.65	--	1.1	1.1	0	0	2	4
Vanadium, Total	7440-62-2	N	3.65	--	1.1	1.4	0	0	2	4
Zinc, Dissolved	7440-66-6	N	1,095	--	7.8	18.5	0	0	4	4
Zinc, Total	7440-66-6	N	1,095	--	8.7	15	0	0	4	4
Pesticides										
alpha-Chlordane [3]	5103-71-9	C	0.191	2	0.00415	0.034	0	0	2	4
gamma-Chlordane [3]	5103-74-2	C	0.191	2	0.0029	0.024	0	0	2	4
TCL VOCs										
Chloroform	67-66-3	C	0.155	80	0.36	13	**2**	0	2	4
Toluene	108-88-3	N	227.1	1,000	0.13	0.225	0	0	3	4

Table 4-4
Summary of Risk Screening Results for Groundwater at SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	C/N	Adjusted T-RBC	MCL	Minimum Detected Concentration	Maximum Detected Concentration	Number of Samples that Exceed Adj. T-RBC	Number of Samples that Exceed MCL	Number of Detections	Number of Samples
TCL SVOCs										
Anthracene	120-12-7	N	182.5	--	0.019	0.019	0	0	1	4
Bis(2-ethylhexyl) Phthalate	117-81-7	C	4.784	--	0.475	0.54	0	0	4	4
Butyl Benzyl Phthalate	85-68-7	N	730	--	0.26	0.26	0	0	4	4
Di-n-butylphthalate	84-74-2	N	365	--	0.42	0.42	0	0	1	4
Fluoranthene	206-44-0	N	146	--	0.019	0.019	0	0	1	4
Isophorone	78-59-1	C	70.5	--	0.066	0.075	0	0	4	4
Phenanthrene [4]	85-01-8	N	18.25	--	0.019	0.019	0	0	2	4
Explosives										
HMX	2691-41-0	N	182.5	--	0.88	4.3	0	0	4	4

Notes:
CAS = Chemical Abstract Service
TAL = Target Analyte List
ug/L = Microgram Per Liter
T-RBC = Adjusted Tap Water RBC
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level
[1] = Chromium VI RBC value was used
[2] = USEPA Action Level used for screening
[3] = Chlordane RBC used for screening
[4] = Pyrene RBC used for screening

Table 4-5
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, VIrginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	37SB1A 10/1/2003 0-1		MDL	RL	37SB1B 10/1/2003 14-16		MDL	RL	37SB1C 10/1/2003 18-20		MDL	RL	37SB2A 10/2/2003 0-1		MDL	RL	37SB2B 10/2/2003 10-12		MDL	RL	37SB2C 10/2/2003 18-20		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	13,100		91.5	500	14,100		91.5	500	13,800		91.5	500	17,000		91.5	500	17,500		91.5	500	12,700		91.5	500
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.52	,B,p	0.0518	0.5	0.19	J,B,p	0.0518	0.5	0.24	J,B,p	0.0518	0.5	1.2		0.0518	0.5	0.23	J,B,p	0.0518	0.5	0.22	J,B,p	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***3.8***		0.0232	0.4	***1***		0.0232	0.4	***1.7***		0.0232	0.4	***5***		0.0232	0.4	***1.3***		0.0232	0.4	***1.6***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	51		0.106	1	132		0.53	5	85		0.106	1	50		0.106	1	103		5.3	5	73		0.106	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.64	J	0.0391	1	0.71	J	0.0391	1	0.52	J	0.0391	1	0.72	J	0.0391	1	0.61	J	0.0391	1	0.36	J	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.9		0.182	1	0.79	J,B,p	0.182	1	0.59	J,B,p	0.182	1	1.6		0.182	1	1.6	,B,p	0.182	1	0.75	J,B,p	0.182	1
Calcium	7440-70-2	--	--	--	--	--	35,700	,L,m	830	2,500	1,990	,L,m	16.6	250	1,700		16.6	250	106,000		4150	12,500	2,610		16.6	250	2,040		16.6	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	***72***	,J,s	0.912	5	18	,J,s	0.912	5	18		0.912	5	***114***	,J,s	4.56	25	20		0.912	5	18		0.912	5
Cobalt	7440-48-4	--	72.3	--	--	--	2.8	,J,s	0.208	1	8.4	,J,s	0.208	1	8.1		0.208	1	3.1		0.208	1	11		0.208	1	6.9		0.208	1
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	78		0.368	1	8		0.368	1	10		0.368	1	193		1.84	5	11		0.368	1	10		0.368	1
Iron	7439-89-6	N	50,962	5,475	71,540	--	14,300	,J,s	106	500	20,200	,J,s	106	500	27,700		212	1,000	19,500		212	1,000	28,200		212	1,000	17,500		106	500
Lead [2]	7439-92-1	--	26.8	400	750	--	80		0.218	10	8.4		0.0218	1	7.6		0.0218	1	277		1.09	50	7.8		0.0218	1	7.9		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	3,270		16.05	250	3,630		16.05	250	3,230	,K,m	16.1	250	3,780	,K,m	16.1	250	4,790	,K,m	32.1	500	3,430	,K,m	16.05	250
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	147		1.32	5	479		2.64	10	503		2.64	10	164		1.32	5	419		2.64	10	252		1.32	5
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.41		0.0077	0.1	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1	0.6	,J,m	0.0077	0.1	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.4	2,044	--	30	,J,s	0.0356	0.5	12	,J,s	0.0356	0.5	12		0.0356	0.5	50		0.356	5	14		0.0356	0.5	12		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	860	,J,s	5	20	2,000	,J,s	25	100	1,600		25	100	677		5	20	2,140		25	100	1,650		25	100
Selenium	7782-49-2	N	--	39.11	511	18.98	0.47	J	0.0502	1	0.6	J	0.0502	1	0.58	J	0.0502	1	0.43	J	0.0502	1	0.53	J	0.0502	1	0.45	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.14	J	0.0044	3	0.063	J	0.0044	3	0.047	J	0.0044	3	0.24	J	0.0044	3	0.051	J	0.0044	3	0.042	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	70	J,B,x	8.92	100	67	J,B,p	8.92	100	93	J,B,p	8.92	100	87	J,B,p	8.92	100	80	J,B,p	8.92	100	72	J,B,p	8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.069	J	0.027	0.5	0.16	J	0.027	0.5	0.15	J	0.027	0.5	0.064	J	0.027	0.5	0.19	J	0.027	0.5	0.16	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	16		0.207	1	27		0.207	1	33		0.207	1	19		0.207	1	43		0.207	1	27		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	67		0.517	4	55		0.517	4	45		0.517	4	129		2.585	20	65		0.517	4	38		0.517	4
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	***11***	J,J,g	0.494	33	NT				NT				NT				NT				NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	<33	U	0.477	33	NT				NT				NT				NT				NT			
Aroclor 1254 [4]	11097-69-1	C/N*	--	1.6E+02	1.4E+03	1.1E+03	180		4.8	54	NT				NT				NT				NT				NT			
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<32	U	8.2	32	24		6	24	<24	U	5.9	24	<32	U	7.95	32	18	J	5.9	24	<24	U	5.8	24
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	110	,J,c	8.2	32	48	,B,z	6	24	24	,B,z	5.9	24	37	J,B,z	7.95	32	25	,B,z	5.9	24	19	J,B,z	5.8	24
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	<8.2	U	1.16	8.2	<6	U	0.852	6	<5.9	U	0.838	5.9	<7.9	U	1.13	7.9	1.3	J	0.838	5.9	<5.8	U	0.824	5.8
Methylcyclohexane	108-87-2	--	--	--	--	--	<16	U	1.39	16	<12	U	1.01	12	<12	U	0.997	12	<16	U	1.34	16	<12	U	0.997	12	<12	U	0.98	12
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<32	U,UJ,c	4.61	32	4.6	J	3.37	24	5	J,J,c	3.32	24	10	J,J,c	4.47	32	5.3	J,J,c	3.32	24	5.2	J,J,c	3.26	24
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<8.2	U	0.761	8.2	<6	U	0.557	6	<5.9	U	0.548	5.9	<7.9	UJ,UJ,m	0.738	7.9	1	J	0.548	5.9	<5.8	U	0.538	5.8
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<8.2	U	1.11	8.2	<6	U	0.812	6	<5.9	U	0.799	5.9	<7.9	U	1.08	7.9	***6.8***		0.799	5.9	***63***		0.785	5.8
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<8.2	U	0.69	8.2	<6	U	0.505	6	0.78	J	0.497	5.9	<7.9	UJ,UJ,m	0.669	7.9	<5.9	U	0.497	5.9	<5.8	U	0.488	5.8
VOC TICs (ug/kg)																														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,3-Dimethyl-,trans-cyclohexane	352-20-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Methyl-1-Propene	115-11-7	--	--	--	--	--	NI				NI				NI				NI				NI				8.4	E,NJ,t	0	1
Ethyl-cyclohexane	1678-91-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptane, 2-methyl-	592-27-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Nonane	111-84-2	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Octane	111-65-9	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
TCL SVOCs (ug/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	260	J	50.4	2,800	<200	U	3.15	200	<170	U	3.78	170	***1,800***	J,J,m	75.6	4,000	<200	U	3.78	200	<200	U	3.78	200
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	260				ND				ND				1,800				ND				ND			
4-Chloro-3-Methylphenol [5]	59-50-7	N	--	3.9E+05	5.1E+06	--	<2,800	U	83.4	2,800	24	J	5.21	200	21	J	6.25	170	<4,000	U,UJ,s	125	4,000	<200	U	6.25	200	15	J	6.25	200
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	890	J,B,x	33.1	2,800	46	J,B,x	2.07	200	45	J	2.48	170	1,000	J,J,c	49.7	4,000	44	J	2.48	200	41	J	2.48	200
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	14,000		61.1	2,800	33	J	3.82	200	30	J	4.58	170	26,000	,J,m	91.7	4,000	18	J	4.58	200	25	J	4.58	200
Di-n-octylphthalate	117-84-0	--	--	--	--	--	<2,800	U	49.6	2,800	<200	U	3.1	200	<170	U	3.72	170	<4,000	U,UJ,c	74.4	4,000	<200	U	3.72	200	<200	U	3.72	200
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	<2,800	U	30.4	2,800	<200	U	1.9	200	26	J	2.28	170	120	J,J,l	45.6	4,000	20	J,B,z	2.28	200	18	J,B,z	2.28	200
Dimethylphthalate	131-11-3	--	--	--	--	--	<2,800	U	53	2,800	30	J	3.31	200	<170	U	3.97	170	<4,000	U	79.4	4,000	<200	U	3.97	200	<200	U	3.97	200
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	120	J	37.6	2,800	<200	U	2.35	200	<170	U	2.82	170	190	J,J,m	56.4	4,000	<200	U	2.82	200	<200	U	2.82	200
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	450	J	76	2,800	<200	U	4.75	200	<170	U	5.7	170	300	J,J,m	114	4,000	<200	U	5.7	200	<200	U	5.7	200
Phenanthrene [6]	85-01-8	N	--	2.3E+05	3.1E+06	--	40	J	36.8	2,800	<200	U	2.3	200	<170	U	2.76	170	<4,000	U	55.2	4,000	<200	U	2.76	200	<200	U	2.76	200
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	110	J	23.7	2,800	<200	U	1.48	200	<170	U,UJ,l	1.78	170	110	J	35.5	4,000	<200	U	1.78	200	<200	U	1.78	200
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NI				110	E,B,x	0	100	52	E,B,x	0	100	NI				45	E,B,x	0	100	62	E,B,x	0	100
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	280	E,NJ,t	0	50	NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NI				45	E,B,x	0	100	39	E,B,x	0	100	NI				24	E,B,x	0	100	24	E,B,x	0	100
2 (5H)-Furanone	497-23-4	--	--	--	--	--	320	E,NJ,t	0	50	NI				NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NI				100	E,B,x	0	100	86	E,B,x	0	100	NI				67	E,B,x	0	100	NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	NI				NI				25	E,NJ,t	0	1,700	NI				NI				NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	NI				NI				200	E,NJ,t	0	10	400	E,NJ,t	0	10	NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NI				NI				39	E,NJ,t	0	1	NI				25	E,NJ,t	0	1	30	E,NJ,t	0	1
Erucylamide	112-84-5	--	--	--	--	--	NI				NI				220	E,NJ,t	0	10	NI				150	E,NJ,t	0	10	NI			
Hexadecanoic acid, butylester	111-06-8	--	--	--	--	--	NI				NI				28	E,NJ,t	0	10	NI				NI				NI			
Octadecanoic acid, 2-methylpropyl ester	646-13-9	--	--	--	--	--	NI				NI				30	E,NJ,t	0	1	NI				NI				NI			
Tetratetracontane	7098-22-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			

Table 4-5
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, VIrginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	37SB1A 10/1/2003 0-1		MDL	RL	37SB1B 10/1/2003 14-16		MDL	RL	37SB1C 10/1/2003 18-20		MDL	RL	37SB2A 10/2/2003 0-1		MDL	RL	37SB2B 10/2/2003 10-12		MDL	RL	37SB2C 10/2/2003 18-20		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<34	U	1.15	34	<25	U	0.84	25	<24	U	0.84	24	2.4	J,J,s	1.12	33	<25	U	0.84	25	<24	U	0.84	24
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<34	U	2.13	34	<25	U	1.56	25	<24	U	1.56	24	7.6	J,J,d	2.08	33	<25	U	1.56	25	<24	U	1.56	24
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<34	U	1.64	34	<25	U	1.2	25	<24	U	1.2	24	5.5	J,J,d	1.6	33	<25	U	1.2	25	<24	U	1.2	24
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<34	U	1.97	34	<25	U	1.44	25	<24	U	1.44	24	12	J,J,s	1.92	33	<25	U	1.44	25	<24	U	1.44	24
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	73		2.79	34	<25	U	2.04	25	<24	U	2.04	24	70	,J,m	2.72	33	<25	U,UJ,l	2.04	25	<24	U,UJ,l	2.04	24
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	<34	U	1.15	34	<25	U	0.84	25	<24	U	0.84	24	8.1	J,J,s	1.12	33	<25	U	0.84	25	<24	U	0.84	24
Phenanthrene [6]	85-01-8	N	--	2.3E+05	3.1E+06	--	15	J	0.984	34	<25	U	0.72	25	<24	U	0.72	24	18	J,J,s	0.96	33	<25	U	0.72	25	<24	U	0.72	24
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	58		1.48	34	<25	U	1.08	25	<24	U,UJ,l	1.08	24	59	,J,m	1.44	33	<25	U	1.08	25	<24	U	1.08	24
Explosives (mg/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	0.27	J	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	***0.63***	,J,m	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	0.27				ND				ND				0.63				ND				ND			
HMX	2691-41-0	N	--	3.9E+02	5.1E+03	--	<1	U,UJ,c	0.229	1	<1	U,UJ,c	0.229	1	<1	U,UJ,c	0.229	1	<1	U	0.229	1	<1	U	0.229	1	<1	U	0.229	1
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.8		0.0356	0.5	0.11	J	0.0356	0.5	0.09	J	0.0356	0.5	0.5		0.0356	0.5	0.04	J	0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																														
Percent Solids	--		--	--	--	--	61		0.1	0.1	83		0.1	0.1	85		0.1	0.1	63		0.1	0.1	85		0.1	0.1	86		0.1	0.1

Table 4-5
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, VIrginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	37SB3A 10/2/2003 0-1		MDL	RL	37SB3B 10/2/2003 10-12		MDL	RL	37SB3C 10/2/2003 22-24		MDL	RL	37SB4A 11/15/2007 0-1		MDL	RL	37SB5A 11/15/2007 0-1		MDL	RL	37SB6A 11/15/2007 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	10,600		91.5	500	15,300		91.5	500	12,400		91.5	500	9,400		2.1	10	20,000		210	1,000	21,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.18	J,B,p	0.0518	0.5	0.17	J,B,p	0.0518	0.5	0.26	J,B,p	0.0518	0.5	0.086	J	0.042	0.2	0.23		0.042	0.2	0.22		0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***1***		0.0232	0.4	***1***		0.0232	0.4	***2.1***		0.0232	0.4	***1.1***	,L,m	0.071	0.2	***2.5***	,L,m	0.071	0.2	***1.8***	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	103		0.53	5	98		0.53	5	113		0.53	5	100		0.17	1	86		0.17	1	47		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.48	J	0.0391	1	0.46	J	0.0391	1	0.34	J	0.0391	1	0.46	J	0.021	1	0.47	J	0.021	1	0.64	J	0.021	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.1	,B,p	0.182	1	1.3	,B,p	0.182	1	0.82	J,B,p	0.182	1	1	J	0.11	2	1.9	J	0.11	2	2.2		0.11	2
Calcium	7440-70-2	--	--	--	--	--	1,480		16.6	250	1,030		16.6	250	1,590		16.6	250	1,300		4.2	50	1,300		4.2	50	250		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	15		0.912	5	18		0.912	5	18		0.912	5	16		0.72	5	34		0.72	5	24		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	5.6		0.208	1	7.4		0.208	1	9		0.208	1	6.4		0.37	2	9.6		0.37	2	3.7		0.37	2
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	6.9		0.368	1	9.6		0.368	1	7.7		0.368	1	7.6	,J,s	0.044	0.2	15	,J,s	0.044	0.2	11	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	15,900		106	500	22,900		212	1,000	26,000		212	1,000	15,000		0.48	10	29,000	,J,s	240	5,000	28,000	,J,s	0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	15		0.0218	1	7.4		0.0218	1	9.2		0.0218	1	12	,J,s	0.022	0.2	18	,J,s	0.022	0.2	10	,J,s	0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	2,600	,K,m	16.05	250	3,550	,K,m	16.05	250	3,170	,K,m	16.05	250	2,500		5	50	2,800		5	50	880		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	403		2.64	10	267		1.32	5	381		2.64	10	400		0.16	1	470		1.6	10	160		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.013	J	0.0077	0.1	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1	0.046	J	0.0075	0.05	0.072		0.0075	0.05	0.066		0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	8.4		0.0356	0.5	11		0.0356	0.5	11		0.0356	0.5	8.9	,J,s	0.036	0.1	12	,J,s	0.036	0.1	7.2	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,290		25	100	1,820		25	100	1,480		25	100	1,400		5.3	50	1,700		5.3	50	1,100		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.42	J	0.0502	1	0.42	J	0.0502	1	0.5	J	0.0502	1	0.14	J,L,m	0.089	0.3	0.17	J,L,m	0.089	0.3	0.18	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.045	J	0.0044	3	0.037	J	0.0044	3	0.06	J	0.0044	3	0.034	J	0.013	0.1	0.041	J	0.013	0.1	0.028	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	83	J,B,p	8.92	100	69	J,B,p	8.92	100	67	J,B,p	8.92	100	47	J	13	100	39	J	13	100	28	J	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.12	J	0.027	0.5	0.15	J	0.027	0.5	0.13	J	0.027	0.5	0.12		0.0049	0.1	0.2		0.0049	0.1	0.14		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	21		0.207	1	33		0.207	1	27		0.207	1	18		0.034	0.1	49		0.069	0.2	49		0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	77		0.517	4	55		0.517	4	56		0.517	4	60		1	5	49		1	5	31		1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	NT				NT				NT				<3.7	U	0.52	3.7	<3.9	U	0.54	3.9	<4	U	0.55	4
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				NT				NT				<3.7	U	0.61	3.7	<3.9	U,UJ,m	0.63	3.9	<4	U	0.64	4
Aroclor 1254 [4]	11097-69-1	C/N*	--	1.6E+02	1.4E+03	1.1E+03	NT				NT				NT				<37	U	5	37	17	J	5.2	39	<40	U	5.3	40
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	24		5.7	22	<24	U	5.95	24	<22	U	5.4	22	NT				NT				NT			
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	66	,B,z	5.7	22	31	J,B,z	5.95	24	16	J,B,z	5.4	22	NT				NT				NT			
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	<5.7	U	0.809	5.7	<6	U	0.845	6	<5.4	U	0.767	5.4	NT				NT				NT			
Methylcyclohexane	108-87-2	--	--	--	--	--	<11	U	0.963	11	3	J	1.01	12	<11	U	0.913	11	NT				NT				NT			
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	4.5	J,J,c	3.2	22	5	J,J,c	3.34	24	4.7	J,J,c	3.03	22	NT				NT				NT			
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<5.7	U	0.529	5.7	<6	U	0.552	6	<5.4	U	0.501	5.4	NT				NT				NT			
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	<5.7	U	0.772	5.7	<6	U	0.806	6	<5.4	U	0.731	5.4	NT				NT				NT			
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<5.7	U	0.48	5.7	2	J	0.501	6	<5.4	U	0.455	5.4	NT				NT				NT			
VOC TICs (ug/kg)																														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NI				3.6	Q,NJ,t	0	10	NI				NT				NT				NT			
1,3-Dimethyl-,trans-cyclohexane	352-20-7	--	--	--	--	--	NI				5.7	E,NJ,t	0	100	NI				NT				NT				NT			
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	NI				1.8	Q,NJ,t	0	10	NI				NT				NT				NT			
2-Methyl-1-Propene	115-11-7	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
Ethyl-cyclohexane	1678-91-7	--	--	--	--	--	NI				6.4	E,NJ,t	0	100	NI				NT				NT				NT			
Heptane, 2-methyl-	592-27-8	--	--	--	--	--	NI				6.5	E,NJ,t	0	100	NI				NT				NT				NT			
Nonane	111-84-2	--	--	--	--	--	NI				5.1	E,NJ,t	0	1,000	NI				NT				NT				NT			
Octane	111-65-9	--	--	--	--	--	NI				8.3	E,NJ,t	0	100	NI				NT				NT				NT			
TCL SVOCs (ug/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	<190	U	3.47	190	<200	U	3.78	200	<180	U	3.47	180	NT				NT				NT			
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	ND				ND				ND				NT				NT				NT			
4-Chloro-3-Methylphenol [5]	59-50-7	N	--	3.9E+05	5.1E+06	--	12	J	5.73	190	14	J	6.25	200	18	J	5.73	180	NT				NT				NT			
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	46	J	2.28	190	47	J	2.48	200	44	J	2.28	180	NT				NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	59	J	4.2	190	23	J,J,m	4.58	200	20	J	4.2	180	NT				NT				NT			
Di-n-octylphthalate	117-84-0	--	--	--	--	--	<190	U	3.41	190	38	J	3.72	200	<180	U	3.41	180	NT				NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	18	J,B,z	2.09	190	11	J	2.28	200	17	J,B,z	2.09	180	NT				NT				NT			
Dimethylphthalate	131-11-3	--	--	--	--	--	<190	U	3.64	190	<200	U	3.97	200	<180	U	3.64	180	NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	<190	U	2.59	190	<200	U	2.82	200	<180	U	2.59	180	NT				NT				NT			
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	<190	U	5.23	190	<200	U	5.7	200	<180	U	5.23	180	NT				NT				NT			
Phenanthrene [6]	85-01-8	N	--	2.3E+05	3.1E+06	--	<190	U	2.53	190	<200	U	2.76	200	<180	U	2.53	180	NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<190	J	1.63	190	<200	U	1.78	200	<180	U	1.63	180	NT				NT				NT			
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	46	E,B,x	0	100	120	E,B,x	0	100	110	E,B,x	0	100	NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	21	E,NJ,t	0	10	NI				NI				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NI				26	E,NJ,t	0	1	NI				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NI				NI				26	E,B,x	0	100	NT				NT				NT			
2 (5H)-Furanone	497-23-4	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NI				NI				72	E,B,x	0	100	NT				NT				NT			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NI				26	E,NJ,t	0	1	NI				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NI				NI				450	E,NJ,t	0	10	NT				NT				NT			
Hexadecanoic acid, butylester	111-06-8	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
Octadecanoic acid, 2-methylpropyl ester	646-13-9	--	--	--	--	--	NI				NI				NI				NT				NT				NT			
Tetratetracontane	7098-22-8	--	--	--	--	--	27	E,NJ,t	0	10	NI				NI				NT				NT				NT			

Table 4-5
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, VIrginia

Sample ID							37SB3A				37SB3B				37SB3C				37SB4A				37SB5A				37SB6A			
Sample Date							10/2/2003				10/2/2003				10/2/2003				11/15/2007				11/15/2007				11/15/2007			
Sample Depth (ft bgs)							0-1				10-12				22-24				0-1				0-1				0-1			
	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL	Result	LQ, VQ, r	MDL	RL
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<24	U	0.77	24	<25	U	0.84	25	<23	U,UJ,s	0.77	23	NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<24	U	1.43	24	<25	U	1.56	25	<23	U,UJ,s	1.43	23	NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<24	U	1.1	24	<25	U	1.2	25	<23	U,UJ,s	1.1	23	NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<24	U	1.32	24	<25	U	1.44	25	<23	U,UJ,s	1.32	23	NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	2.2	J,J,I	1.87	24	<25	U	2.04	25	<23	U,UJ,I	1.87	23	NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	<24	U	0.77	24	<25	U	0.84	25	<23	U,UJ,s	0.77	23	NT				NT				NT			
Phenanthrene [6]	85-01-8	N	--	2.3E+05	3.1E+06	--	<24	U	0.66	24	<25	U	0.72	25	<23	U,UJ,s	0.66	23	NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	1.8	J	0.99	24	<21	U	1.08	21	1.2	J,J,s	0.99	23	NT				NT				NT			
Explosives (mg/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				ND				ND				ND			
HMX	2691-41-0	N	--	3.9E+02	5.1E+03	--	<1	U	0.229	1	<1	U	0.229	1	<1	U	0.229	1	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--		--	--	--	--	88		0.1	0.1	84		0.1	0.1	93		0.1	0.1	88		0.1	0.1	85		0.1	0.1	83		0.1	0.1

Table 4-5
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, VIrginia

Sample ID							37SB7A				37SB7B				37SB7C				37SB8A				37SB8A-DUP(DUP-4)				37SB8B			
Sample Date							11/14/2007				11/14/2007				11/14/2007				11/15/2007				11/15/2007				11/15/2007			
Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	0-1		MDL	RL	5.5-6.5		MDL	RL	7-8		MDL	RL	0-1		MDL	RL	0-1		MDL	RL	4-5		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	29,000		2.1	10	20,000		2.1	10	20,000		210	1,000	17,000		2.1	10	16,000		2.1	10	19,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	1.2		0.042	0.2	0.094	J	0.042	0.2	0.13	J	0.042	0.2	0.99		0.042	0.2	1.1		0.042	0.2	0.2		0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***11***		0.071	0.2	***1.4***		0.071	0.2	***1.6***		0.071	0.2	***6.1***	,L,m	0.071	0.2	***7.5***	,L,m	0.071	0.2	***2.1***	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	63	,K,m	0.17	1	110	,K,m	0.17	1	110	,K,m	0.17	1	80		0.17	1	69		0.17	1	110		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	1.4		0.021	1	0.93	J	0.021	1	0.93	J	0.021	1	0.9	J	0.021	1	1.2		0.021	1	0.65	J	0.021	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.7	J	0.11	2	2.1		0.11	2	2.4		0.11	2	2.2		0.11	2	2.3		0.11	2	1.4	J	0.11	2
Calcium	7440-70-2	--	--	--	--	--	49,000		4.2	50	1,900		4.2	50	1,900		4.2	50	73,000		4.2	50	79,000		4.2	50	7,500		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	***170***		0.72	5	30		0.72	5	31		0.72	5	***170***		0.72	5	***190***		0.72	5	30		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	5		0.37	2	11		0.37	2	12		0.37	2	5.1		0.37	2	4.6		0.37	2	10		0.37	2
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	210	,J,s	0.22	1	12	,J,s	0.044	0.2	15	,J,s	0.044	0.2	120	,J,s	0.22	1	150	,J,s	0.44	2	20	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	21,000		0.48	10	27,000		0.48	10	32,000		240	5,000	25,000	,J,s	0.48	10	22,000	,J,s	0.48	10	28,000	,J,s	0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	180		0.11	1	13		0.022	0.2	13		0.022	0.2	290	,J,s	0.22	2	340	,J,s	0.22	2	28	,J,s	0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	6,600		5	50	4,700		5	50	5,000		5	50	2,900		5	50	2,700		5	50	4,600		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	250		0.16	1	430		0.16	1	330		0.16	1	130		0.16	1	130		0.16	1	340		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	3.3		0.075	0.5	0.024	J,B,p	0.0075	0.05	0.026	J,B,p	0.0075	0.05	0.94		0.015	0.1	1.3		0.015	0.1	0.081		0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	48	,J,s	0.036	0.1	16	,J,s	0.036	0.1	17	,J,s	0.036	0.1	56	,J,s	0.18	0.5	50	,J,s	0.036	0.1	18	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,000		5.3	50	2,600		5.3	50	2,700		5.3	50	1,100		5.3	50	940		5.3	50	2,600		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	<0.3	U,UL,m	0.089	0.3	0.11	J,L,m	0.089	0.3	0.18	J,L,m	0.089	0.3	0.12	J,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	0.11	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.3		0.013	0.1	0.045	J	0.013	0.1	0.045	J	0.013	0.1	0.15		0.013	0.1	0.19		0.013	0.1	0.047	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	93	J	13	100	77	J	13	100	110		13	100	91	J	13	100	93	J	13	100	61	J	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.056	J	0.0049	0.1	0.27		0.0049	0.1	0.25		0.0049	0.1	0.095	J,B,p	0.0049	0.1	0.076	J,B,p	0.0049	0.1	0.22		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	22	,J,s	0.034	0.1	43	,J,s	0.034	0.1	41	,J,s	0.034	0.1	21		0.034	0.1	20		0.034	0.1	41		0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	150	,J,s	1	5	77	,J,s	1	5	80	,J,s	1	5	99		1	5	85		1	5	69		1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	<6.7	U,UL,s	0.94	6.7	<3.9	U	0.54	3.9	<3.9	U	0.55	3.9	<5	U	0.69	5	<6	U,UL,s	0.83	6	<3.9	U	0.54	3.9
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	8.2	,L,s	1.1	6.7	<3.9	U	0.63	3.9	<3.9	U	0.64	3.9	5		0.81	5	4.8	J,L,s	0.97	6	<3.9	U	0.63	3.9
Aroclor 1254 [4]	11097-69-1	C/N*	--	1.6E+02	1.4E+03	1.1E+03	1,000	,L,s	9	67	<39	U	5.2	39	<39	U	5.3	39	590		6.6	50	580	,L,s	7.9	60	87		5.2	39
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	NT				NT				NT				NT				NT				NT			
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	NT				NT				NT				NT				NT				NT			
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	NT				NT				NT				NT				NT				NT			
Methylcyclohexane	108-87-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	NT				NT				NT				NT				NT				NT			
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	NT				NT				NT				NT				NT				NT			
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	NT				NT				NT				NT				NT				NT			
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	NT				NT				NT				NT				NT				NT			
VOC TICs (ug/kg)																														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,3-Dimethyl-,trans-cyclohexane	352-20-7	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2-Methyl-1-Propene	115-11-7	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Ethyl-cyclohexane	1678-91-7	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Heptane, 2-methyl-	592-27-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Nonane	111-84-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Octane	111-65-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
TCL SVOCs (ug/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	NT				NT				NT				NT				NT				NT			
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	NT				NT				NT				NT				NT				NT			
4-Chloro-3-Methylphenol [5]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT				NT				NT				NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT				NT				NT				NT				NT			
Di-n-octylphthalate	117-84-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT				NT				NT				NT				NT			
Dimethylphthalate	131-11-3	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	NT				NT				NT				NT				NT				NT			
Phenanthrene [6]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2 (5H)-Furanone	497-23-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Hexadecanoic acid, butylester	111-06-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Octadecanoic acid, 2-methylpropyl ester	646-13-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Tetratetracontane	7098-22-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			

Table 4-5
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, VIrginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	37SB7A 11/14/2007 0-1		MDL	RL	37SB7B 11/14/2007 5.5-6.5		MDL	RL	37SB7C 11/14/2007 7-8		MDL	RL	37SB8A 11/15/2007 0-1		MDL	RL	37SB8A-DUP(DUP-4) 11/15/2007 0-1		MDL	RL	37SB8B 11/15/2007 4-5		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Phenanthrene [6]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Explosives (mg/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	***0.82***	J	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				0.82				ND				ND			
HMX	2691-41-0	N	--	3.9E+02	5.1E+03	--	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	0.32	J	0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--		--	--	--	--	49		0.1	0.1	85		0.1	0.1	84		0.1	0.1	66		0.1	0.1	55		0.1	0.1	85		0.1	0.1

Table 4-5
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, VIrginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	37SB8C 11/15/2007 7-8		MDL	RL	37SB9A 11/14/2007 0-1		MDL	RL	37SB9A-DUP(DUP-3) 11/14/2007 0-1		MDL	RL	37SB9B 11/14/2007 2-3		MDL	RL	37SB9C 11/14/2007 7-8		MDL	RL	37SB10A 11/14/2007 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	19,000		2.1	10	18,000		2.1	10	19,000		2.1	10	13,000		2.1	10	18,000		2.1	10	28,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.15	J	0.042	0.2	0.96		0.042	0.2	0.54		0.042	0.2	0.078	J	0.042	0.2	1.5		0.042	0.2	0.076	J	0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***1.9***	,L,m	0.071	0.2	***5.3***		0.071	0.2	***6***		0.071	0.2	***1***		0.071	0.2	***1.1***		0.071	0.2	***10***		0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	120		0.17	1	88	,K,m	0.17	1	90	,K,m	0.17	1	130	,K,m	0.17	1	130	,K,m	0.17	1	55	,K,m	0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.56	J	0.021	1	0.94	J	0.021	1	0.91	J	0.021	1	0.91	J	0.021	1	0.8	J	0.021	1	1.3		0.021	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.9	J	0.11	2	1	J	0.11	2	0.86	J	0.11	2	1.4	J	0.11	2	1.2	J	0.11	2	2.6		0.11	2
Calcium	7440-70-2	--	--	--	--	--	1,900		4.2	50	12,000		4.2	50	18,000		4.2	50	2,000		4.2	50	10,000		4.2	50	87,000		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	25		0.72	5	***110***		0.72	5	***120***		0.72	5	31		0.72	5	27		0.72	5	***200***		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	11		0.37	2	4		0.37	2	4.3		0.37	2	6		0.37	2	12		0.37	2	4.7		0.37	2
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	14	,J,s	0.044	0.2	96	,J,s	0.22	1	99	,J,s	0.22	1	14	,J,s	0.044	0.2	11	,J,s	0.044	0.2	200	,J,s	0.22	1
Iron	7439-89-6	N	50,962	5,475	71,540	--	29,000	,J,s	0.48	10	18,000		0.48	10	20,000		0.48	10	19,000		0.48	10	24,000		0.48	10	27,000		0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	11	,J,s	0.022	0.2	180	,J,f	0.11	1	85	,J,f	0.11	1	10		0.022	0.2	11		0.022	0.2	170		0.11	1
Magnesium	7439-95-4	--	--	--	--	--	4,600		5	50	4,100		5	50	4,500		5	50	3,100		5	50	3,900		5	50	6,900		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	350		0.16	1	140		0.16	1	150		0.16	1	150		0.16	1	640		0.16	1	240		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.021	J	0.0075	0.05	1		0.015	0.1	1		0.015	0.1	0.028	J,B,p	0.0075	0.05	0.027	J,B,p	0.0075	0.05	2.5		0.075	0.5
Nickel	7440-02-0	N	62.8	156.4	2,044	--	15	,J,s	0.036	0.1	27	,J,s	0.036	0.1	34	,J,s	0.036	0.1	12	,J,s	0.036	0.1	14	,J,s	0.036	0.1	48	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	2,400		5.3	50	1,400		5.3	50	1,500		5.3	50	1,400		5.3	50	2,300		5.3	50	810		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	<0.3	U,UL,m	0.089	0.3	0.097	J,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3	0.1	J,L,m	0.089	0.3	0.17	J,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.043	J	0.013	0.1	0.14		0.013	0.1	0.17		0.013	0.1	0.046	J	0.013	0.1	0.041	J	0.013	0.1	0.25		0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	65	J	13	100	57	J	13	100	64	J	13	100	53	J	13	100	51	J	13	100	110		13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.22		0.0049	0.1	0.092	J	0.0049	0.1	0.094	J	0.0049	0.1	0.15		0.0049	0.1	0.2		0.0049	0.1	0.048	J	0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	39		0.034	0.1	18	,J,s	0.034	0.1	21	,J,s	0.034	0.1	25	,J,s	0.034	0.1	34	,J,s	0.034	0.1	19	,J,s	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	61		1	5	90	,J,s	1	5	84	,J,s	1	5	68	,J,s	1	5	66	,J,s	1	5	150	,J,s	1	5
Pesticides/PCBs (ug/kg)																														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	<3.9	U	0.54	3.9	<6.8	U	0.95	6.8	<5.5	U	0.77	5.5	<3.9	U	0.54	3.9	<3.9	U	0.55	3.9	<6.6	U,UL,s	0.92	6.6
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	<3.9	U	0.63	3.9	4.8	J	1.1	6.8	2.2	J,J,g	0.89	5.5	<3.9	U	0.63	3.9	<3.9	U	0.63	3.9	8.3	,L,s	1.1	6.6
Aroclor 1254 [4]	11097-69-1	C/N*	--	1.6E+02	1.4E+03	1.1E+03	<39	U	5.2	39	560		9.1	68	290		7.3	55	<39	U	5.2	39	<39	U	5.2	39	1,000	,L,s	8.8	66
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	NT				NT				NT				NT				NT				NT			
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	NT				NT				NT				NT				NT				NT			
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	NT				NT				NT				NT				NT				NT			
Methylcyclohexane	108-87-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	NT				NT				NT				NT				NT				NT			
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	NT				NT				NT				NT				NT				NT			
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	NT				NT				NT				NT				NT				NT			
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	NT				NT				NT				NT				NT				NT			
VOC TICs (ug/kg)																														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,3-Dimethyl-,trans-cyclohexane	352-20-7	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2-Methyl-1-Propene	115-11-7	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Ethyl-cyclohexane	1678-91-7	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Heptane, 2-methyl-	592-27-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Nonane	111-84-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Octane	111-65-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
TCL SVOCs (ug/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	NT				NT				NT				NT				NT				NT			
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	NT				NT				NT				NT				NT				NT			
4-Chloro-3-Methylphenol [5]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT				NT				NT				NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT				NT				NT				NT				NT			
Di-n-octylphthalate	117-84-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT				NT				NT				NT				NT			
Dimethylphthalate	131-11-3	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	NT				NT				NT				NT				NT				NT			
Phenanthrene [6]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
SVOC TICs (ug/kg)																														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2 (5H)-Furanone	497-23-4	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Hexadecanoic acid, butylester	111-06-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Octadecanoic acid, 2-methylpropyl ester	646-13-9	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Tetratetracontane	7098-22-8	--	--	--	--	--	NT				NT				NT				NT				NT				NT			

Table 4-5
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, VIrginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	37SB8C 11/15/2007 7-8		MDL	RL	37SB9A 11/14/2007 0-1		MDL	RL	37SB9A-DUP(DUP-3) 11/14/2007 0-1		MDL	RL	37SB9B 11/14/2007 2-3		MDL	RL	37SB9C 11/14/2007 7-8		MDL	RL	37SB10A 11/14/2007 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT				NT				NT				NT				NT			
Phenanthrene [6]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Explosives (mg/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				ND				ND				ND			
HMX	2691-41-0	N	--	3.9E+02	5.1E+03	--	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--		--	--	--	--	85		0.1	0.1	48		0.1	0.1	60		0.1	0.1	85		0.1	0.1	84		0.1	0.1	50		0.1	0.1

Table 4-5
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, VIrginia

Sample ID Sample Date Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	37SB10B 11/14/2007 4-5 Result	LQ, VQ, r	MDL	RL	37SB10C 11/14/2007 7-8 Result	LQ, VQ, r	MDL	RL
TAL Metals (mg/kg)														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	20,000		2.1	10	16,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.086	J	0.042	0.2	0.099	J	0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***1.5***		0.071	0.2	***1.2***		0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	120	,K,m	0.17	1	110	,K,m	0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.88	J	0.021	1	0.84	J	0.021	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	2.1		0.11	2	1.3	J	0.11	2
Calcium	7440-70-2	--	--	--	--	--	2,400		4.2	50	3,800		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	30		0.72	5	30		0.72	5
Cobalt	7440-48-4	--	72.3	--	--	--	13		0.37	2	9.3		0.37	2
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	13	,J,s	0.044	0.2	13	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	29,000		0.48	10	22,000		0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	13		0.022	0.2	13		0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	5,000		5	50	3,800		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	470		0.16	1	290		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.018	J,B,p	0.0075	0.05	0.054		0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	16	,J,s	0.036	0.1	14	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	2,100		5.3	50	2,000		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.16	J,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.044	J	0.013	0.1	0.052	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	62	J	13	100	69	J	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.24		0.0049	0.1	0.17		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	42	,J,s	0.034	0.1	31	,J,s	0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	79	,J,s	1	5	62	,J,s	1	5
Pesticides/PCBs (ug/kg)														
Dieldrin	60-57-1	C	--	4.0E+01	1.8E+02	2.2E+00	<4	U	0.55	4	<3.8	U	0.54	3.8
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	<4	U	0.64	4	<3.8	U	0.62	3.8
Aroclor 1254 [4]	11097-69-1	C/N*	--	1.6E+02	1.4E+03	1.1E+03	<40	U	5.3	40	73		5.1	38
TCL VOCs (ug/kg)														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	NT				NT			
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	NT				NT			
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	NT				NT			
Methylcyclohexane	108-87-2	--	--	--	--	--	NT				NT			
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	NT				NT			
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	NT				NT			
Trichloroethene	79-01-6	C	--	1.6E+03	7.2E+03	2.6E-01	NT				NT			
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	NT				NT			
VOC TICs (ug/kg)														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NT				NT			
1,3-Dimethyl-,trans-cyclohexane	352-20-7	--	--	--	--	--	NT				NT			
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	NT				NT			
2-Methyl-1-Propene	115-11-7	--	--	--	--	--	NT				NT			
Ethyl-cyclohexane	1678-91-7	--	--	--	--	--	NT				NT			
Heptane, 2-methyl-	592-27-8	--	--	--	--	--	NT				NT			
Nonane	111-84-2	--	--	--	--	--	NT				NT			
Octane	111-65-9	--	--	--	--	--	NT				NT			
TCL SVOCs (ug/kg)														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	NT				NT			
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	NT				NT			
4-Chloro-3-Methylphenol [5]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT			
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT			
Di-n-octylphthalate	117-84-0	--	--	--	--	--	NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT			
Dimethylphthalate	131-11-3	--	--	--	--	--	NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT			
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	NT				NT			
Phenanthrene [6]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT			
SVOC TICs (ug/kg)														
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NT				NT			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NT				NT			
1,2-Benzenedicarboxylic acid, butyl 8-me	89-18-9	--	--	--	--	--	NT				NT			
1,2-Benzenedicarboxylic acid, butyl cycl	84-64-0	--	--	--	--	--	NT				NT			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NT				NT			
2 (5H)-Furanone	497-23-4	--	--	--	--	--	NT				NT			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NT				NT			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	NT				NT			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	NT				NT			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NT				NT			
Erucylamide	112-84-5	--	--	--	--	--	NT				NT			
Hexadecanoic acid, butylester	111-06-8	--	--	--	--	--	NT				NT			
Octadecanoic acid, 2-methylpropyl ester	646-13-9	--	--	--	--	--	NT				NT			
Tetratetracontane	7098-22-8	--	--	--	--	--	NT				NT			

Table 4-5
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, VIrginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	37SB10B 11/14/2007 4-5 Result	LQ, VQ, r	MDL	RL	37SB10C 11/14/2007 7-8 Result	LQ, VQ, r	MDL	RL
PAHs (ug/kg)														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT			
Indeno(1,2,3-cd)pyrene	193-39-5	C	--	2.2E+02	3.9E+03	4.2E+03	NT				NT			
Phenanthrene [6]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT			
Explosives (mg/kg)														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND			
HMX	2691-41-0	N	--	3.9E+02	5.1E+03	--	<2.5	U	0.066	2.5	<2.5	U	0.066	2.5
Cyanide (mg/kg)														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT			
Percent Solids (%)														
Percent Solids	--		--	--	--	--	83		0.1	0.1	86		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested
NR = Not Reported
NI = Not Identified
-- = No Value Available

[A] = Facility Background = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = 3-Methylphenol RBC value was used
[6] = Pyrene RBC value was used

= Concentration Exceeds Adjusted Soil Residential RBC

= Concentration Exceeds Adjusted Soil Industrial RBC

underline = Concentration Exceeds Site Background Values

bold italic = Concentration Exceeds SSL DAF20

Laboratory Qualifiers

B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of
J	Estimated value.
U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.

Validation Qualifiers

B	Not detected substantially above the level reported in laboratory or field blanks.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.

Reason Codes

GC/MS Organics

c	Calibration failure; poor (RRF) or unstable (%D) response
f	Field duplicate imprecision
l	MS/MSD recovery failure
s	Surrogate failure
t	Tentatively identified compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

GC and HPLC Organics

c	Calibration failure; poor or unstable (%D) response
f	Field duplicate imprecision
g	Dual column confirmation imprecision
l	MS/MSD recovery failure
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

f	Field duplicate imprecision
m	MS/MSD recovery failure
p	Preparation blank contamination
s	Serial dilution failure

Table 4-6
Summary of Risk Screening Results for Soil - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL[A]	# of Detections	# of Samples
TAL Metals (mg/kg)														
Aluminum	7429-90-5	40,041	7,821	N	102,200	N	--	9,400	29,000	0	0	--	24	24
Antimony	7440-36-0	--	3.13	N	40.88	N	13.2	0.076	1.5	0	0	0	24	24
Arsenic	7440-38-2	15.8	0.426	C	1.91	C	0.026	1	11	0	0	0	24	24
Barium	7440-39-3	209	1,564	N	20,440	N	6,015	47	132	0	0	0	24	24
Beryllium	7440-41-7	1.02	15.64	N	204.4	N	1,154	0.34	1.4	0	0	0	24	24
Cadmium	7440-43-9	0.69	3.911	N	51.1	N	27.45	0.59	2.6	0	0	0	24	24
Calcium	7440-70-2	--	--	--	--	--	--	250	106,000	--	--	--	24	24
Chromium[1]	7440-47-3	65.3	23.46	N	306.6	N	42.048	15	200	**6**	0	**6**	24	24
Cobalt	7440-48-4	72.3	--	--	--	--	--	2.8	13	--	--	--	24	24
Copper	7440-50-8	53.5	312.9	N	4,088	N	10,518	6.9	210	0	0	0	24	24
Iron	7439-89-6	50,962	5,475	N	71,540	N	--	14,300	32,000	0	0	--	24	24
Lead [2]	7439-92-1	26.8	400	--	750	--	--	7.4	315	0	0	--	24	24
Magnesium	7439-95-4	--	--	--	--	--	--	880	6,900	--	--	--	24	24
Manganese	7439-96-5	2,543	156.43	N	2,044	N	951.92	130	640	0	0	0	24	24
Mercury [3]	7439-97-6	0.13	2.35	--	30.66	--	--	0.013	3.3	**2**	0	--	18	24
Nickel	7440-02-0	62.8	156.43	N	2,044	N	--	7.2	53	0	0	--	24	24
Potassium	7440-09-7	--	--	--	--	--	--	677	2,700	--	--	--	24	24
Selenium	7782-49-2	--	39.11	N	511	N	18.98	0.071	0.6	0	0	0	20	24
Silver	7440-22-4	--	39.11	N	511	N	31.03	0.028	0.3	0	0	0	24	24
Sodium	7440-23-5	--	--	--	--	--	--	28	110	--	--	--	24	24
Thallium	7440-28-0	2.11	0.548	N	7.154	N	3.638	0.048	0.27	0	0	0	24	24
Vanadium	7440-62-2	108	7.821	N	102.2	N	730.1	16	49	0	0	0	24	24
Zinc	7440-66-6	202	2,346	N	30,660	N	13,622	31	150	0	0	0	24	24
Pesticides/PCBs (ug/kg)														
Dieldrin	60-57-1	--	4.0E+01	C	1.8E+02	C	2.2E+00	11	11	0	0	**1**	1	16
Endrin	72-20-8	--	2.3E+03	N	3.1E+04	N	5.4E+03	3.5	8.3	0	0	0	4	16
Aroclor 1254 [4]	11097-69-1	--	1.6E+02	N	1.4E+03	C	1.1E+03	17	1,000	**5**	0	0	8	16
TCL VOCs (ug/kg)														
2-Butanone	78-93-3	--	4.7E+06	N	6.1E+07	N	2.9E+04	18	24	0	0	0	3	9
Acetone	67-64-1	--	7.0E+06	N	9.2E+07	N	2.2E+04	16	110	0	0	0	9	9
cis-1,2-Dichloroethene	156-59-2	--	7.8E+04	N	1.0E+06	N	--	1.3	1.3	0	0	--	1	9
Methylcyclohexane	108-87-2	--	--	--	--	--	--	3	3	--	--	--	1	9
Methylene chloride	75-09-2	--	8.5E+04	C	3.8E+05	C	1.9E+01	4.5	10	0	0	0	8	9
Toluene	108-88-3	--	6.3E+05	N	8.2E+06	N	2.7E+04	1	1	0	0	0	1	9
Trichloroethene	79-01-6	--	1.6E+03	C	7.2E+03	C	2.6E-01	6.8	63	0	0	**2**	2	9
Xylenes	1330-20-7	--	1.6E+06	N	2.0E+07	N	3.0E+03	0.78	2	0	0	0	2	9
TCL SVOCs (ug/kg)														
4-Chloro-3-Methylphenol [5]	59-50-7	--	3.9E+05	N	5.1E+06	N	--	12	24	0	0	--	6	9
Bis(2-ethylhexyl) Phthalate	117-81-7	--	4.6E+04	C	2.0E+05	C	2.9E+06	41	1,000	0	0	0	9	9
Di-n-butylphthalate	84-74-2	--	7.8E+05	N	1.0E+07	N	5.0E+06	18	26,000	0	0	0	9	9
Di-n-octylphthalate	117-84-0	--	--	--	--	--	--	38	38	--	--	--	1	9
Diethylphthalate	84-66-2	--	6.3E+06	N	8.2E+07	N	4.5E+05	11	120	0	0	0	7	9
Dimethylphthalate	131-11-3	--	--	--	--	--	--	30	30	--	--	--	1	9
Fluoranthene	206-44-0	--	3.1E+05	N	4.1E+06	N	6.3E+06	120	190	0	0	0	2	9
N-Nitrosodiphenylamine	86-30-6	--	1.3E+05	C	5.8E+05	C	7.6E+02	300	450	0	0	0	2	9
Phenanthrene [6]	85-01-8	--	2.3E+05	N	3.1E+06	N	--	40	40	0	0	--	1	9
Pyrene	129-00-0	--	2.3E+05	N	3.1E+06	N	6.8E+05	110	110	0	0	0	2	9
PAHs (ug/kg)														
Anthracene	120-12-7	--	2.3E+06	N	3.1E+07	N	4.7E+05	2.4	2.4	0	0	0	1	9
Benzo(b)fluoranthene	205-99-2	--	2.2E+02	C	3.9E+03	C	1.5E+03	7.6	7.6	0	0	0	1	9
Benzo(k)fluoranthene	207-08-9	--	2.2E+03	C	3.9E+04	C	1.5E+04	5.5	5.5	0	0	0	1	9
Chrysene	218-01-9	--	2.2E+04	C	3.9E+05	C	4.8E+04	12	12	0	0	0	1	9
Fluoranthene	206-44-0	--	3.1E+05	N	4.1E+06	N	6.3E+06	2.2	73	0	0	0	3	9
Indeno(1,2,3-cd)pyrene	193-39-5	--	2.2E+02	C	3.9E+03	C	4.2E+03	8.1	8.1	0	0	0	1	9
Phenanthrene [6]	85-01-8	--	2.3E+05	N	3.1E+06	N	--	15	18	0	0	--	2	9
Pyrene	129-00-0	--	2.3E+05	N	3.1E+06	N	6.8E+05	1.2	59	0	0	0	4	9

Table 4-6
Summary of Risk Screening Results for Soil - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	Adjusted R-RBC	C/N	Adjusted I-RBC	C/N	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL[A]	# of Detections	# of Samples
Explosives (mg/kg)														
2,4-Dinitrotoluene	121-14-2	--	1.6E+01	N	2.0E+02	N	5.7E-01	0.27	0.63	0	0	**1**	3	24
Dinitrotoluene Mix	--	--	9.4E-01	--	4.2E+00	--	--	0.27	0.63	0	0	**--**	3	24
HMX	2691-41-0	--	3.9E+02	N	5.1E+03	N	--	0.32	0.32	0	0	**--**	1	24
Cyanide (mg/kg)														
Cyanide	57-12-5	--	1.6E+02	N	2.0E+03	N	1.5E+02	0.04	0.8	0	0	0	5	9

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
µg/kg = Microgram per kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
Facility Background = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001)
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
R-RBC = Adjusted Residential RBC
I-RBC = Adjusted Industrial RBC
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
-- = No screening value available

[A] = For inorganics, number of samples that exceed background (if available) and screening level
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = 3-Methylphenol RBC value was used
[6] = Pyrene RBC value was used

Table 4-7
Summary of Detected Chemicals in Groundwater Analytical Samples at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS	C/N	Adjusted Tap Water RBC	MCL	Units	37MW1 2/11/2008 Result	37MW1 2/11/2008 LQ, VQ, r	MDL	RL	37MW2 2/11/2008 Result	37MW2 2/11/2008 LQ, VQ, r	MDL	RL	37MW2* 6/24/2008 Result	37MW2* 6/24/2008 LQ, VQ, r	MDL	RL	37MW2-DUP (DUP-2)* 6/24/2008 Result	37MW2-DUP (DUP-2)* 6/24/2008 LQ, VQ, r	MDL	RL	37MW3 2/12/2008 Result	37MW3 2/12/2008 LQ, VQ, r	MDL	RL	37MW4 6/16/2010 Result	37MW4 6/16/2010 LQ, VQ, r	MDL	RL	37MW4-DUP (DUP-1) 6/16/2010 Result	37MW4-DUP (DUP-1) 6/16/2010 LQ, VQ, r	MDL	RL
Perchlorate																																	
Perchlorate	14797-73-0	N	2.555	--	ug/L	0.97		0.08	0.2	2.2		0.08	0.2	NT				NT				2		0.08	0.2	NT				NT			
TAL Metals																																	
Aluminum, Total	7429-90-5	N	3,650	--	ug/L	82	J	44	200	17,000		44	200	NT				NT				180	J	44	200	NT				NT			
Antimony, Dissolved	7440-36-0	N	1.46	6	ug/L	<3	U	0.44	3	0.54	J,B,p	0.44	3	NT				NT				<3	U	0.44	3	NT				NT			
Arsenic, Total	7440-38-2	C	0.0446	10	ug/L	<3	U	0.74	3	3.9		0.74	3	NT				NT				<3	U	0.74	3	NT				NT			
Barium, Dissolved	7440-39-3	N	730	2,000	ug/L	35		0.52	2	28		0.52	2	NT				NT				12		0.52	2	NT				NT			
Barium, Total	7440-39-3	N	730	2,000	ug/L	42		0.52	2	1,300		2.6	10	NT				NT				16		0.52	2	NT				NT			
Beryllium, Total	7440-41-7	N	7.3	4	ug/L	<2	U	0.31	2	0.73	J	0.31	2	NT				NT				<2	U	0.31	2	NT				NT			
Cadmium, Total	7440-43-9	N	1.825	5	ug/L	<0.2	U	0.062	0.2	0.097	J	0.062	0.2	NT				NT				<0.2	U	0.062	0.2	NT				NT			
Calcium, Dissolved	7440-70-2	--	--	--	ug/L	92,000		40	500	160,000		40	500	NT				NT				260,000		40	500	NT				NT			
Calcium, Total	7440-70-2	--	--	--	ug/L	91,000		40	500	240,000		40	500	NT				NT				260,000		40	500	NT				NT			
Chromium, Dissolved[1]	7440-47-3	C	10.95	100	ug/L	5.9		0.31	2	2.4	,B,p	0.31	2	NT				NT				1.5	J,B,p	0.31	2	NT				NT			
Chromium, Total[1]	7440-47-3	C	10.95	100	ug/L	8.1		0.31	2	80		0.31	2	NT				NT				2.7	,B,x	0.31	2	NT				NT			
Cobalt, Dissolved	7440-48-4	--	--	--	ug/L	0.97	J	0.096	1	8.9		0.096	1	NT				NT				1.4		0.096	1	NT				NT			
Cobalt, Total	7440-48-4	--	--	--	ug/L	2.2		0.096	1	12		0.096	1	NT				NT				1.6		0.096	1	NT				NT			
Copper, Dissolved	7440-50-8	N	146	1,300	ug/L	1		0.33	1	1.3		0.33	1	NT				NT				1.6		0.33	1	NT				NT			
Copper, Total	7440-50-8	N	146	1,300	ug/L	1.3		0.33	1	8.4		0.33	1	NT				NT				2.3		0.33	1	NT				NT			
Iron, Dissolved	7439-89-6	N	2,555	--	ug/L	11	J	5.7	20	31		5.7	20	NT				NT				<20	U	5.7	20	NT				NT			
Iron, Total	7439-89-6	N	2,555	--	ug/L	380		5.7	20	24,000		5.7	20	NT				NT				320		5.7	20	NT				NT			
Lead, Total[2]	7439-92-1	--	15	--	ug/L	<1	U	0.33	1	5.4		0.33	1	NT				NT				<1	U	0.33	1	NT				NT			
Magnesium, Dissolved	7439-95-4	--	--	--	ug/L	28,000		38	500	89,000		38	500	NT				NT				47,000		38	500	NT				NT			
Magnesium, Total	7439-95-4	--	--	--	ug/L	29,000		38	500	130,000		38	500	NT				NT				48,000		38	500	NT				NT			
Manganese, Dissolved	7439-96-5	N	73	--	ug/L	2.3	J	0.43	3	260		0.43	3	NT				NT				3.7		0.43	3	NT				NT			
Manganese, Total	7439-96-5	N	73	--	ug/L	52		0.43	3	710		0.86	6	NT				NT				22		0.43	3	NT				NT			
Nickel, Dissolved	7440-02-0	N	73	--	ug/L	1.3	J,B,p	0.28	2	28		0.28	2	NT				NT				3.7		0.28	2	NT				NT			
Nickel, Total	7440-02-0	N	73	--	ug/L	2.4		0.28	2	62		0.28	2	NT				NT				3.7		0.28	2	NT				NT			
Potassium, Dissolved	7440-09-7	--	--	--	ug/L	570		54	200	5,100		54	200	NT				NT				1,100		54	200	NT				NT			
Potassium, Total	7440-09-7	--	--	--	ug/L	730		54	200	9,700		54	200	NT				NT				1,100		54	200	NT				NT			
Sodium, Dissolved	7440-23-5	--	--	--	ug/L	65,000		84	500	54,000		84	500	NT				NT				110,000		84	500	NT				NT			
Sodium, Total	7440-23-5	--	--	--	ug/L	65,000		84	500	56,000		84	500	NT				NT				110,000		84	500	NT				NT			
Selenium, Dissolved	7782-49-2	N	18.25	50	ug/L	1.2	J	0.92	3	<3	U	0.92	3	NT				NT				<3	U	0.92	3	NT				NT			
Selenium, Total	7782-49-2	N	18.25	50	ug/L	1.6	J	0.92	3	<3	U	0.92	3	NT				NT				<3	U	0.92	3	NT				NT			
Silver, Total	7440-22-4	N	18.25	--	ug/L	<0.5	U	0.12	0.5	0.32	J	0.12	0.5	NT				NT				<0.5	U	0.12	0.5	NT				NT			
Vanadium, Dissolved	7440-62-2	N	3.65	--	ug/L	<5	U	0.83	5	1.7	J	0.83	5	NT				NT				<5	U	0.83	5	NT				NT			
Vanadium, Total	7440-62-2	N	3.65	--	ug/L	0.85	J	0.83	5	24		0.83	5	NT				NT				0.98	J	0.83	5	NT				NT			
Zinc, Dissolved	7440-66-6	N	1,095	--	ug/L	15	,B,p	0.84	10	20	,B,p	0.84	10	NT				NT				7.4	J,B,p	0.84	10	NT				NT			
Zinc, Total	7440-66-6	N	1,095	--	ug/L	9.1	J,B,p	0.84	10	36		0.84	10	NT				NT				7.9	J,B,p	0.84	10	NT				NT			
Pesticides																																	
alpha-BHC	319-84-6	C	0.0106	--	ug/L	<0.05	U	0.0019	0.05	0.49		0.0038	0.1	0.062		0.0019	0.05	0.05		0.0019	0.05	<0.05	U	0.0019	0.05	NT				NT			
alpha-Chlordane[3]	5103-71-9	C	0.191	2	ug/L	0.29	,J,g	0.0042	0.1	0.046	J,J,g	0.0021	0.05	0.13	,J,m	0.0021	0.05	0.15	,J,g	0.0021	0.05	0.1	,J,g	0.0021	0.05	NT				NT			
beta-BHC	319-85-7	C	0.0372	--	ug/L	<0.05	U	0.0032	0.05	0.052	,J,g	0.0032	0.05	0.017	J,J,m	0.0032	0.05	<0.050	U	0.0032	0.05	<0.05	U	0.0032	0.05	NT				NT			
delta-BHC[4]	319-86-8	C	0.0106	--	ug/L	<0.1	U	0.0023	0.1	0.016	J	0.0023	0.1	0.0055	J	0.0023	0.1	0.0038	J	0.0023	0.05	<0.1	U	0.0023	0.1	NT				NT			
Endosulfan II[5]	33213-65-9	N	21.9	--	ug/L	<0.1	U	0.0018	0.1	<0.1	U	0.0018	0.1	0.02	J,J,g	0.0018	0.1	0.016	J,J,g	0.0018	0.1	0.013	J,J,g	0.0018	0.1	NT				NT			
gamma-BHC (Lindane)	58-89-9	C	0.0515	0.2	ug/L	<0.05	U	0.0018	0.05	0.013	J	0.0018	0.05	<0.05	U	0.0018	0.05	<0.05	U	0.0018	0.05	<0.05	U	0.0018	0.05	NT				NT			
gamma-Chlordane[3]	5103-74-2	C	0.191	2	ug/L	0.13		0.0021	0.05	<0.05	U	0.0021	0.05	<0.05	U	0.0021	0.05	<0.05	U	0.0021	0.05	0.058	,J,g	0.0021	0.05	NT				NT			
Heptachlor Epoxide	1024-57-3	C	0.0074	0.2	ug/L	0.15	,J,g	0.0021	0.05	<0.05	U	0.0021	0.05	0.059	,J,m	0.0021	0.05	0.058	,J,g	0.0021	0.5	<0.05	U	0.0021	0.05	NT				NT			
TCL VOCs																																	
1,3-Dichlorobenzene	541-73-1	N	1.825	--	ug/L	<1	U	0.12	1	0.21	J	0.12	1	NT				NT				<1	U	0.12	1	<1	U	0.13	1	<1	U	0.13	1
Acetone	67-64-1	N	547.5	--	ug/L	<20	U	1.2	20	16	J,B,z	1.2	20	NT				NT				<20	U	1.2	20	<20	U,UJ,c	2.1	20	<20	U,UJ,c	2.1	20
Chloroform	67-66-3	C	0.155	80	ug/L	<1	U	0.061	1	<1	U	0.061	1	NT				NT				0.28	J	0.061	1	<1	U	0.17	1	<1	U	0.17	1
Toluene	108-88-3	N	227.1	1,000	ug/L	0.17	J,B,z	0.072	1	0.25	J,B,z	0.072	1	NT				NT				0.13	J,B,z	0.072	1	0.22	J	0.16	1	0.22	J	0.16	1
Explosives																																	
1,3-Dinitrobenzene	99-65-0	N	0.365	--	ug/L	<5	U	0.071	5	<5	U	0.071	5	NT				NT				0.18	J	0.071	5	NT				NT			
2,6-Dinitrotoluene	606-20-2	N	3.65	--	ug/L	<5	U	0.16	5	<5	U	0.16	5	NT				NT				0.59	J,J,g	0.16	5	NT				NT			
2-Amino-4,6-dinitrotoluene	35572-78-2	N	7.3	--	ug/L	<5	U	0.24	5	<5	U	0.24	5	NT				NT				0.39	J	0.24	5	NT				NT			
4-Amino-2,6-dinitrotoluene	1946-51-0	N	7.3	--	ug/L	<5	U	0.22	5	<5	U	0.22	5	NT				NT				0.49	J	0.22	5	NT				NT			
Field Parameters																																	
Dissolved Oxygen	--	--	--	--	mg/L	6.34				3.98				NT				NT				0.88				NT				NT			
Oxidation Reduction Potential	--	--	--	--	mV	203				73				NT				NT				117				NT				NT			
pH	--	--	--	--	SU	6.66				6.52				NT				NT				6.31				NT				NT			
Conductivity	--	--	--	--	mS	0.97				1.73				NT				NT				1.8				NT				NT			
Temperature	--	--	--	--	°C	18.05				19.58				NT				NT				16.71				NT				NT			
Turbidity	--	--	--	--	ntu	9.74				62.5				NT				NT				18.28				NT				NT			

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested

mg/L = Milligram Per Liter
mV = millivolt
SU = Standard Units
mS = milliSiemen
°C = degrees Celcius
ntu = Nephelometric Turbidity
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2007)
N = Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level

* Re-sampled 6/24/08 for Pesticides only

[1] = Chromium VI RBC used for screening
[2] = USEPA Action Level used for screening
[3] = Chlordane RBC used for screening
[4] = alpha-BHC RBC used for screening
[5] = Endosulfan RBC used for screening

=Exceeds MCL
=Exceeds Adjusted T-RBC

Data Qualifiers:
B = Not detected substantially above the level reported in laboratory or field blanks.
J = Analyte present. Reported value may not be accurate or precise.
,J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
UJ = Not detected, quantitation limit may be inaccurate or imprecise.
c = Calibration failure; poor or unstable response
m = MS/MSD recovery failure.
p = Preparation blank contamination
x = Trip blank contamination
z = Method blank and/or storage blank contamination

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Table 4-8
Summary of Risk Screening Results for Groundwater at SMWU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	C/N	Adjusted T-RBC	MCL	Minimum Detected Concentration	Maximum Detected Concentration	Number of Samples that Exceed Adj. T-RBC	Number of Samples that Exceed MCL	Number of Detections	Number of Samples
Perchlorate										
Perchlorate	14797-73-0	N	2.555	--	2	2.2	0	0	2	2
TAL Metals										
Aluminum, Total	7429-90-5	N	3,650	--	180	17,000	**1**	0	2	2
Antimony, Dissolved	7440-36-0	N	1.46	6	0.54	0.54	0	0	1	2
Arsenic, Total	7440-38-2	C	0.0446	10	3.9	3.9	**1**	0	1	2
Barium, Dissolved	7440-39-3	N	730	2,000	12	28	0	0	2	2
Barium, Total	7440-39-3	N	730	2,000	16	1,300	**1**	0	2	2
Beryllium, Total	7440-41-7	N	7.3	4	0.73	0.73	0	0	1	2
Cadmium, Total	7440-43-9	N	1.825	5	0.097	0.097	0	0	1	2
Calcium, Dissolved	7440-70-2	--	--	--	160,000	260,000	0	0	2	2
Calcium, Total	7440-70-2	--	--	--	240,000	260,000	0	0	2	2
Chromium, Dissolved [1]	7440-47-3	C	10.95	100	1.5	2.4	0	0	2	2
Chromium, Total [1]	7440-47-3	C	10.95	100	2.7	80	**1**	0	2	2
Cobalt, Dissolved	7440-48-4	--	--	--	1.4	8.9	0	0	2	2
Cobalt, Total	7440-48-4	--	--	--	1.6	12	0	0	2	2
Copper, Dissolved	7440-50-8	N	146	1,300	1.3	1.6	0	0	2	2
Copper, Total	7440-50-8	N	146	1,300	2.3	8.4	0	0	2	2
Iron, Dissolved	7439-89-6	N	2,555	--	31	31	0	0	1	2
Iron, Total	7439-89-6	N	2,555	--	320	24,000	**1**	0	2	2
Lead, Total [2]	7439-92-1	--	15	--	5.4	5.4	0	0	1	2
Magnesium, Dissolved	7439-95-4	--	--	--	47,000	89,000	0	0	2	2
Magnesium, Total	7439-95-4	--	--	--	48,000	130,000	0	0	2	2
Manganese, Dissolved	7439-96-5	N	73	--	3.7	260	**1**	0	2	2
Manganese, Total	7439-96-5	N	73	--	22	710	**1**	0	2	2
Nickel, Dissolved	7440-02-0	N	73	--	3.7	28	0	0	2	2
Nickel, Total	7440-02-0	N	73	--	3.7	62	0	0	2	2
Potassium, Dissolved	7440-09-7	--	--	--	1,100	5,100	0	0	2	2
Potassium, Total	7440-09-7	--	--	--	1,100	9,700	0	0	2	2
Sodium, Dissolved	7440-23-5	--	--	--	54,000	110,000	0	0	2	2
Sodium, Total	7440-23-5	--	--	--	56,000	110,000	0	0	2	2
Selenium, Dissolved	7782-49-2	N	18.25	50	ND	ND	0	0	0	2
Selenium, Total	7782-49-2	N	18.25	50	ND	ND	0	0	0	2
Silver, Total	7440-22-4	N	18.25	--	0.32	0.32	0	0	1	2
Vanadium, Dissolved	7440-62-2	N	3.65	--	1.7	1.7	0	0	1	2
Vanadium, Total	7440-62-2	N	3.65	--	0.98	24	**1**	0	2	2
Zinc, Dissolved	7440-66-6	N	1,095	--	7.4	20	0	0	2	2
Zinc, Total	7440-66-6	N	1,095	--	7.9	36	0	0	2	2
Pesticides [A]										
alpha-BHC	319-84-6	C	0.0106	--	0.056	0.056	**1**	0	1	2
alpha-Chlordane [3]	5103-71-9	C	0.191	2	0.1	0.14	0	0	2	2
beta-BHC	319-85-7	C	0.0372	--	0.0093	0.0093	0	0	1	2
delta-BHC [4]	319-86-8	C	0.0106	--	0.00465	0.00465	0	0	1	2
Endosulfan II [5]	33213-65-9	N	21.9	--	0.013	0.018	0	0	2	2
gamma-Chlordane [3]	5103-74-2	C	0.191	2	0.058	0.058	0	0	1	2
Heptachlor Epoxide	1024-57-3	C	0.0074	0.2	0.0585	0.0585	**1**	0	1	2

Table 4-8
Summary of Risk Screening Results for Groundwater at SMWU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	C/N	Adjusted T-RBC	MCL	Minimum Detected Concentration	Maximum Detected Concentration	Number of Samples that Exceed Adj. T-RBC	Number of Samples that Exceed MCL	Number of Detections	Number of Samples
TCL VOCs										
1,3-Dichlorobenzene	541-73-1	N	1.825	--	0.21	0.21	0	0	1	3
Acetone	67-64-1	N	547.5	--	16	16	0	0	1	3
Chloroform	67-66-3	C	0.155	80	0.28	0.28	**1**	0	1	3
Toluene	108-88-3	N	227.1	1,000	0.13	0.25	0	0	3	3
Explosives										
1,3-Dinitrobenzene	99-65-0	N	0.365	--	0.18	0.18	0	0	1	2
2,6-Dinitrotoluene	606-20-2	N	3.65	--	0.59	0.59	0	0	1	2
2-Amino-4,6-dinitrotoluene	35572-78-2	N	7.3	--	0.39	0.39	0	0	1	2
4-Amino-2,6-dinitrotoluene	1946-51-0	N	7.3	--	0.49	0.49	0	0	1	2

Notes:

CAS = Chemical Abstract Service
ug/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
T-RBC = Adjusted Tap Water RBC
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level
[A] = Pesticide data from the June 2008 groundwater sampling event used in the screening

[1] = Chromium VI RBC value was used
[2] = USEPA Action Level used for screening
[3] = Chlordane RBC used for screening
[4] = alpha-BHC RBC used for screening
[5] = Endosulfan RBC used for screening

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	38SB1A 10/3/2003 0-1		MDL	RL	38SB1B 10/3/2003 3.5		MDL	RL	38SB1C 10/3/2003 7-7.5		MDL	RL	38SB2A 10/3/2003 0-1		MDL	RL	38SB2B 10/3/2003 10-12		MDL	RL	38SB2B-DUP(SBD4) 10/3/2003 10-12		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	22,000		1.83	50	21,800		1.83	50	19,900		1.83	50	11,100		1.83	50	18,500		1.83	50	17,800		1.83	50
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.31	J	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***3.4***		0.0232	0.4	***1.6***		0.0232	0.4	***1.7***		0.0232	0.4	***0.8***		0.0232	0.4	***1.4***		0.0232	0.4	***1.6***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	94	,L,m	0.106	5	128	,L,m	0.106	5	117	,L,m	0.106	5	107	,L,m	0.106	5	119	,L,m	0.106	5	113	,L,m	0.106	5
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.67	J	0.0391	1	0.75	J	0.0391	1	0.53	J	0.0391	1	0.6	J	0.0391	1	0.55	J	0.0391	1	0.64	J	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.8		0.182	1	1.8		0.182	1	1.9		0.182	1	1.4		0.182	1	1.8		0.182	1	1.7		0.182	1
Calcium	7440-70-2	--	--	--	--	--	27,600	,K,m	16.6	1,250	2,690	,K,m	16.6	250	3,010	,K,m	16.6	250	1,150	,K,m	16.6	250	1,590	,K,m	16.6	250	1,550	,K,m	16.6	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	***75***		0.912	5	24		0.912	5	26		0.912	5	17		0.912	5	22		0.912	5	22		0.912	5
Cobalt	7440-48-4	--	--	--	--	--	7.9	,J,s	0.208	1	13	,J,s	0.208	1	9.1	,J,s	0.208	1	7.9	,J,s	0.208	1	12	,J,s	0.208	1	12	,J,s	0.208	1
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	57		0.368	1	15		0.368	1	12		0.368	1	7.2		0.368	1	13		0.368	1	13		0.368	1
Iron	7439-89-6	N	50,962	5,475	71,540	--	24,600		21.2	500	32,200		21.2	500	25,300		21.2	500	16,600		10.6	250	28,500		21.2	500	27,800		21.2	500
Lead [2]	7439-92-1	--	26.8	400	750	--	52		0.218	10	12		0.0218	1	9.9		0.0218	1	9.6		0.0218	1	12		0.0218	1	11		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	4,550		3.21	250	5,130		3.21	250	8,240		3.21	250	2,840		3.21	250	5,040		3.21	250	5,010		3.21	250
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	400		0.264	5	397		0.264	5	377		0.264	5	414		0.264	5	471		0.264	5	460		0.264	5
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.16		0.0077	0.1	0.015	J	0.0077	0.1	0.011	J	0.0077	0.1	0.01	J	0.0077	0.1	0.013	J	0.0077	0.1	0.01	J	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.4	2,044	--	33		0.0356	0.5	18		0.0356	0.5	15		0.0356	0.5	11		0.0356	0.5	16		0.0356	0.5	16		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	1,670		5	100	2,150		5	100	2,210		5	100	1,600		5	100	1,700		5	100	1,810		5	100
Selenium	7782-49-2	N	--	39.11	511	18.98	0.59	J	0.0502	1	0.67	J	0.0502	1	0.54	J	0.0502	1	0.55	J	0.0502	1	0.56	J	0.0502	1	0.61	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.13	J	0.0044	3	0.063	J	0.0044	3	0.075	J	0.0044	3	0.064	J	0.0044	3	0.047	J,B,p	0.0044	3	0.066	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	55	J	8.92	100	49	J	8.92	100	52	J	8.92	100	38	J	8.92	100	46	J	8.92	100	52	J	8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.17	J	0.027	0.5	0.25	J	0.027	0.5	0.22	J	0.027	0.5	0.15	J	0.027	0.5	0.22	J	0.027	0.5	0.23	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	35		0.207	1	50		0.207	1	41		0.207	1	24		0.207	1	43		0.207	1	43		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	90	,B,x	0.517	4	72	,B,x	0.517	4	55	,B,x	0.517	4	55	,B,x	0.517	4	65	,B,x	0.517	4	68	,B,x	0.517	4
Pesticides/PCBs (ug/kg)																														
Endosulfan I [4]	959-98-8	N	--	4.7E+04	6.1E+05	--	<28	U	1.27	28	NT				NT				NT				NT				NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	<28	U	0.417	28	NT				NT				NT				NT				NT			
Aroclor 1254 [5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	570		4.2	47	NT				NT				NT				NT				NT			
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<28	U	7.15	28	23	J	6.1	24	20	J	6.4	26	26		5.8	24	<24	U	5.9	24	<24	U	6.15	24
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	100	,B,z	7.15	28	96	,B,z	6.1	24	59	,B,z	6.4	26	200	,J,c	5.8	24	34	,B,z	5.9	24	38	,B,z	6.15	24
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	<7.1	U	1.02	7.1	<6.1	U	0.866	6.1	<6.4	U	0.909	6.4	<5.8	U	0.824	5.8	<5.9	U	0.838	5.9	19		0.873	6.2
Cyclohexane	110-82-7	--	--	--	--	--	<14	U	0.452	14	<12	U	0.386	12	<13	U	0.404	13	<12	U	0.367	12	<12	U	0.373	12	<12	U	0.389	12
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<7.1	U	0.605	7.1	<6.1	U	0.516	6.1	<6.4	U	0.541	6.4	<5.8	U	0.491	5.8	<5.9	U	0.499	5.9	<6.2	U	0.52	6.2
Methylcyclohexane	108-87-2	--	--	--	--	--	<14	U	1.21	14	<12	U	1.03	12	<13	U	1.08	13	<12	U	0.98	12	<12	U	0.997	12	<12	U	1.04	12
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<28	U,UJ,c	4.02	28	<24	U	3.43	24	<26	U,UJ,c	3.6	26	<24	U,UJ,c	3.26	24	<24	U,UJ,c	3.32	24	<24	U,UJ,c	3.46	24
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<7.1	U	0.664	7.1	<6.1	U	0.566	6.1	<6.4	U	0.594	6.4	3	J	0.538	5.8	<5.9	U	0.548	5.9	0.69	J	0.571	6.2
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<7.1	U	0.602	7.1	<6.1	U	0.514	6.1	<6.4	U	0.539	6.4	<5.8	U	0.488	5.8	<5.9	U	0.497	5.9	<6.2	U	0.518	6.2
VOC TICs (ug/kg)																														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Methyl-hexane	591-76-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
3-Methyl-hexane	589-34-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
4-Isopropyltoluene	99-87-6	--	--	--	--	--	NI				NI				NI				4.4	Q,NJ,t	0	10	NI				NI			
7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	471-841	--	--	--	--	--	NI				NI				NI				11	E,NJ,t	0	1	NI				NI			
Camphene	79-92-5	--	--	--	--	--	10	E,NJ,t	0	100	NI				NI				13	E,NJ,t	0	100	NI				NI			
Hexanal	66-25-1	--	--	--	--	--	8.8	E,NJ,t	0	1	NI				NI				NI				NI				NI			
Hexane	110-54-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Pentane, 2-methyl-	107-83-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Pentane, 3-ethyl-2,2-dimethyl-	16747-32-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
TCL SVOCs (ug/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	120	J	44.1	2,400	<210	U	3.78	210	<220	U	4.1	220	<200	U	3.78	200	<200	U	3.78	200	<210	U	3.78	210
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	120				ND				ND				ND				ND				ND			
4-Chloro-3-Methylphenol [6]	59-50-7	N	--	3.9E+05	5.1E+06	--	<2,400	U,UL,s	72.9	2,400	18	J,B,x	6.25	210	14	J,B,x	6.77	220	25	J,B,x	6.25	200	17	J,B,x	6.25	200	13	J,B,x	6.25	210
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	1,100	J,J,c	29	2,400	49	J,J,c	2.48	210	53	J,J,c	2.69	220	46	J	2.48	200	50	J	2.48	200	45	J	2.48	210
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	<2,400	U	62.7	2,400	<210	U	5.38	210	<220	U	5.82	220	52	J,B,x	5.38	200	<200	U	5.38	200	<210	U	5.38	210
Caprolactam	105-62-2	--	--	--	--	--	<4,700	U	89.3	4,700	<400	U	7.66	400	<420	U	8.29	420	<380	U	7.66	380	<390	U	7.66	390	110	J	7.66	410
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	14,000		53.5	2,400	100	J	4.58	210	140	J	4.97	220	42	J	4.58	200	23	J	4.58	200	22	J	4.58	210
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	<2,400	U	26.6	2,400	6	J,B,x	2.28	210	4	J,B,x	2.47	220	4	J,B,z	2.28	200	4	J,B,z	2.28	200	3	J,B,z	2.28	210
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	80	J	32.9	2,400	<210	U	2.82	210	<220	U	3.06	220	<200	U,UJ,l	2.82	200	<200	U,UJ,l	2.82	200	<210	U	2.82	210
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	150	J	66.5	2,400	<210	U	5.7	210	<220	U	6.18	220	<200	U	5.7	200	<200	U	5.7	200	<210	U	5.7	210
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	40	J	32.2	2,400	<210	U	2.76	210	<220	U	2.99	220	<200	U	2.76	200	<200	U	2.76	200	<210	U	2.76	210
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	50	J	20.7	2,400	<210	U	1.78	210	<220	U	1.92	220	<200	U	1.78	200	<200	U	1.78	200	<210	U	1.78	210
SVOC TICs (ug/kg)																														
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	NI				NI				NI				NI				NI				47	E,NJ,t	0	10
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NI				32	E,B,x	0	100	NI				160	E,B,x	0	100	120	E,B,x	0	100	110	E,B,x	0	100
.beta.-Sesquiphellan-drene	10001-221-02	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	1740-19-8	--	--	--	--	--	NI				NI				NI				290	E,NJ,t	0	10	NI				NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NI				50	E,B,x	0	100	47	E,B,x	0	100	45	E,B,x	0	100	34	E,B,x	0	100	30	E,B,x	0	100
1,5,9-Undecatriene, 2,6,10-trimethyl-, (	62951-96-6	--	--	--	--	--	NI				NI				NI				48	E,NJ,t	0	10	NI				NI			
1-HEXACOSANOL	506-52-5	--	--	--	--	--	NI				NI				NI				NI				63	E,NJ,t	0	10	NI			
1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	1235-74-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
10-Methylnonadecane	56862-62-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
13-Tertadecen-1-ol acetate	10001-307-98	--	--	--	--	--	NI				NI				NI				130	E,NJ,t	0	10	NI				NI			
1R-.alpha.-Pinene	7785-70-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	38SB1A 10/3/2003 0-1		MDL	RL	38SB1B 10/3/2003 3.5		MDL	RL	38SB1C 10/3/2003 7-7.5		MDL	RL	38SB2A 10/3/2003 0-1		MDL	RL	38SB2B 10/3/2003 10-12		MDL	RL	38SB2B-DUP(SBD4) 10/3/2003 10-12		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
2 (5H)-Furanone	497-23-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NI				87	E,NJ,t	0	100	87	E,NJ,t	0	100	86	E,NJ,t	0	100	NI				NI			
2,6,10,14,18,22-Tetracosahexaene,2,6,10,	111-02-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	4128-17-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	4602-84-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	22610-80-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	NI				NI				NI				NI				23	E,NJ,t	0	1700	NI			
2-Fluoro-4-nitrophenol	403-19-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Pentadecanone, 6,10,14-trimethyl-	502-69-2	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7-Nonenamide	90949-53-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
a-Pinene	80-56-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
beta-Pinene	127-91-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	2437-95-8	--	--	--	--	--	NI				NI				NI				130	E,NJ,t	0	10	NI				NI			
Cyclotetradecane	295-17-0	--	--	--	--	--	NI				NI				NI				55	E,NJ,t	0	10	NI				NI			
Ditriacontane	544-85-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	10001-630-47	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Docosane	629-97-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Eicosane	112-95-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	NI				NI				NI				570	E,B,x	0	10	530	E,B,x	0	10	480	E,B,x	0	10
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heneicosane	629-94-7	--	--	--	--	--	NI				NI				NI				72	E,NJ,t	0	1000	NI				NI			
Hentriacontane	630-04-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptacosane	593-49-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptadecane	629-78-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptadecane, 9-octyl-	7225-64-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexatriacontane	630-06-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Nonadecane, 9-methyl-	13287-24-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Octacosane	630-02-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Octadecane, 3-ethyl-5-(2-ethylbutyl)-	55282-12-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Stearic Acid	57-11-4	--	--	--	--	--	NI				NI				NI				100	E,B,x	0	1	NI				NI			
Tetratriacontane	14167-59-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
TCL PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	6.6	J,L,s	0.98	30	<28	U,UL,s	0.924	28	<26	U	0.84	26	<24	U	0.84	24	<25	U	0.84	25	<26	U,UL,s	0.84	26
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	<30	U,UL,s	1.12	30	<28	U,UL,s	1.06	28	<26	U	0.96	26	<24	U	0.96	24	<25	U	0.96	25	<26	U,UL,s	0.96	26
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	23	J,L,s	1.82	30	<28	U,UL,s	1.72	28	<26	U	1.56	26	<24	U	1.56	24	<25	U	1.56	25	<26	U,UL,s	1.56	26
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<30	U,UL,s	1.4	30	<28	U,UL,s	1.32	28	<26	U	1.2	26	<24	U	1.2	24	<25	U	1.2	25	<26	U,UL,s	1.2	26
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	29	J,L,s	1.68	30	<28	U,UL,s	1.58	28	<26	U	1.44	26	<24	U	1.44	24	<25	U	1.44	25	<26	U,UL,s	1.44	26
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	110	,J,l	2.38	30	<28	U,UL,s	2.24	28	<26	U	2.04	26	<24	U,UJ,l	2.04	24	<25	U,UJ,l	2.04	25	<26	U,UJ,l	2.04	26
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	4.6	J,L,s	1.82	30	<28	U,UL,s	1.72	28	<26	U	1.56	26	<24	U	1.56	24	<25	U	1.56	25	<26	U,UL,s	1.56	26
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	46	,L,s	0.84	30	<28	U,UL,s	0.792	28	<26	U	0.72	26	<24	U	0.72	24	<25	U	0.72	25	<26	U,UL,s	0.72	26
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	56	,L,s	1.26	30	<28	U,UL,s	1.19	28	<26	U	1.08	26	<24	U	1.08	24	<25	U	1.08	25	<26	U,UL,s	1.08	26
Explosives (mg/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				ND				ND				ND			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	0.3	J	0.0356	0.5	0.13	J	0.0356	0.5	0.11	J	0.0356	0.5	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	0.04	J	0.0356	0.5
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	70		0.1	0.1	82		0.1	0.1	78		0.1	0.1	86		0.1	0.1	85		0.1	0.1	81		0.1	0.1

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	38SB2C 10/3/2003 18-20		MDL	RL	38SB3A 10/3/2003 0-1		MDL	RL	38SB3B 10/3/2003 4		MDL	RL	38SB3C 10/3/2003 6		MDL	RL	38SB4A 11/16/2007 0-1		MDL	RL	38SB4A-DUP(DUP-6) 11/16/2007 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	10,600		1.83	50	26,400		9.15	250	22,000		1.83	50	20,000		1.83	50	8,500		2.1	10	7,500		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	<0.5	U	0.0518	0.5	0.26	J	0.0518	0.5	<0.5	U	0.0518	0.5	<0.5	U	0.0518	0.5	0.05	J	0.042	0.2	<0.2	U	0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***2.1***		0.0232	0.4	***4.6***		0.0232	0.4	***1.8***		0.0232	0.4	***1.5***		0.0232	0.4	***0.63***	,L,m	0.071	0.2	***0.64***	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	83	,L,m	0.106	5	116	,L,m	0.106	5	138	,L,m	0.106	5	131	,L,m	0.106	5	94		0.17	1	80		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.43	J	0.0391	1	0.91	J	0.0391	1	0.93	J	0.0391	1	0.63	J	0.0391	1	0.61	J	0.021	1	0.57	J	0.021	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.4		0.182	1	1.9		0.182	1	1.3		0.182	1	1.7		0.182	1	1.2	J,B,p	0.11	2	1.1	J,B,p	0.11	2
Calcium	7440-70-2	--	--	--	--	--	1,270	,K,m	16.6	250	6,740	,K,m	16.6	250	2,580	,K,m	16.6	250	2,630	,K,m	16.6	250	1,100		4.2	50	990		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	20		0.912	5	***82***		0.912	5	27		0.912	5	25		0.912	5	16		0.72	5	14		0.72	5
Cobalt	7440-48-4	--	--	--	--	--	9	,J,s	0.208	1	9.8	,J,s	0.208	1	12	,J,s	0.208	1	11	,J,s	0.208	1	6.8		0.37	2	6.1		0.37	2
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	8.8		0.368	1	85		0.368	1	18		0.368	1	15		0.368	1	7.3	,J,s	0.044	0.2	7.3	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	21,800		21.2	500	30,700		21.2	500	31,900		21.2	500	30,200		21.2	500	15,000	,J,s	0.48	10	13,000	,J,s	0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	7.3		0.0218	1	50		0.218	10	13		0.0218	1	12		0.0218	1	8	,J,s	0.022	0.2	6.4	,J,s	0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	3,420		3.21	250	5,590		3.21	250	4,960		3.21	250	4,640		3.21	250	2,500		5	50	2,200		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	375		0.264	5	414		0.264	5	472		0.264	5	478		0.264	5	360		0.16	1	310		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	<0.1	U	0.0077	0.1	0.033	J	0.0077	0.1	0.021	J	0.0077	0.1	0.016	J	0.0077	0.1	0.013	J	0.0075	0.05	0.019	J	0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	11		0.0356	0.5	35		0.0356	0.5	18		0.0356	0.5	16		0.0356	0.5	9.4	,J,s	0.036	0.1	9.2	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,520		5	100	2,410		5	100	2,040		5	100	1,880		5	100	1,100		5.3	50	1,000		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.43	J	0.0502	1	0.64	J	0.0502	1	0.78	J	0.0502	1	0.65	J	0.0502	1	0.16	J,L,m	0.089	0.3	0.13	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.051	J	0.0044	3	0.14	J	0.0044	3	0.061	J	0.0044	3	0.056	J	0.0044	3	0.037	J	0.013	0.1	0.033	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	53	J	8.92	100	46	J	8.92	100	55	J	8.92	100	53	J	8.92	100	29	J	13	100	25	J	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.12	J	0.027	0.5	0.19	J	0.027	0.5	0.25	J	0.027	0.5	0.22	J	0.027	0.5	0.11		0.0049	0.1	0.11		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	24		0.207	1	42		0.207	1	49		0.207	1	45		0.207	1	15		0.034	0.1	15		0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	47	,B,x	0.517	4	100	,B,x	0.517	4	73	,B,x	0.517	4	65	,B,x	0.517	4	49		1	5	42		1	5
Pesticides/PCBs (ug/kg)																														
Endosulfan I [4]	959-98-8	N	--	4.7E+04	6.1E+05	--	NT				NT				NT				NT				<3.8	U	1	3.8	<3.8	U	1	3.8
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				NT				NT				NT				<3.8	U	0.61	3.8	<3.8	U	0.62	3.8
Aroclor 1254 [5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				NT				NT				NT				<38	U	5	38	<38	U	5.1	38
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<22	U	5.4	22	<36	U	8.9	36	26		6.6	26	28		6.25	24	NT				NT			
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	28	,B,z	5.4	22	130	,B,c	8.9	36	110	,B,z	6.6	26	110	,B,z	6.25	24	NT				NT			
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	<5.4	U	0.767	5.4	<8.9	U	1.26	8.9	<6.6	U	0.937	6.6	<6.2	U	0.888	6.2	NT				NT			
Cyclohexane	110-82-7	--	--	--	--	--	<11	U	0.341	11	<18	U	0.562	18	<13	U	0.417	13	<12	U	0.395	12	NT				NT			
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<5.4	U	0.457	5.4	<8.9	U	0.753	8.9	<6.6	U	0.558	6.6	<6.2	U	0.529	6.2	NT				NT			
Methylcyclohexane	108-87-2	--	--	--	--	--	<11	U	0.913	11	<18	U	1.5	18	<13	U	1.12	13	<12	U	1.06	12	NT				NT			
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	<22	U,UJ,c	3.03	22	<36	U,UJ,c	5	36	<26	U,UJ,c	3.71	26	<24	U,UJ,c	3.51	24	NT				NT			
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<5.4	U	0.501	5.4	<8.9	U	0.826	8.9	<6.6	U	0.612	6.6	<6.2	U	0.58	6.2	NT				NT			
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<5.4	U	0.455	5.4	<8.9	U	0.749	8.9	<6.6	U	0.556	6.6	<6.2	U	0.526	6.2	NT				NT			
VOC TICs (ug/kg)																														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Methyl-hexane	591-76-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
3-Methyl-hexane	589-34-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
4-Isopropyltoluene	99-87-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	471-841	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Camphene	79-92-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexanal	66-25-1	--	--	--	--	--	NI				NI				5.6	E,NJ,t	0	1	NI				NI				NI			
Hexane	110-54-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Pentane, 2-methyl-	107-83-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Pentane, 3-ethyl-2,2-dimethyl-	16747-32-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
TCL SVOCs (ug/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	<180	U	3.47	180	<3,000	U	56.7	3,000	<220	U	4.1	220	<210	U	3.78	210	NT				NT			
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	ND				ND				ND				ND				NT				NT			
4-Chloro-3-Methylphenol [6]	59-50-7	N	--	3.9E+05	5.1E+06	--	13	J,B,x	5.73	180	<3,000	U,UL,s	93.8	3,000	<220	U	6.77	220	17	J,B,x	6.25	210	NT				NT			
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	52	J	2.28	180	1,300	J,J,c	37.3	3,000	98	J	2.69	170	53	J	2.48	210	NT				NT			
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	<180	U	4.93	180	<3,000	U	80.6	3,000	<220	U	5.82	220	41	J,B,x	5.38	210	NT				NT			
Caprolactam	105-62-2	--	--	--	--	--	85	J	7.02	350	<5,900	U	115	5,900	<430	U	8.29	430	130	J	7.66	410	NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	24	J	4.2	180	8,600		68.8	3,000	500		4.97	220	66	J	4.58	210	NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	3	J,B,z	2.09	180	<3,000	U	34.2	3,000	5	J,B,x	2.47	220	4	J,B,x	2.28	210	NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	<180	U	2.59	180	170	J	42.3	3,000	9	J	3.06	220	<210	U	2.82	210	NT				NT			
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	<180	U	5.23	180	160	J	85.5	3,000	17	J	6.18	220	<210	U	5.7	210	NT				NT			
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	<180	U	2.53	180	110	J	41.4	3,000	7	J	2.99	220	<210	U	2.76	210	NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<180	U	1.63	180	90	J	26.6	3,000	5	J	1.92	220	<210	U	1.78	210	NT				NT			
SVOC TICs (ug/kg)																														
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	130	E,B,x	0	100	NI				NI				NI				NI				NI			
.beta.-Sesquiphellan-drene	10001-221-02	--	--	--	--	--	NI				NI				NI				24	E,NJ,t	0	1	NI				NI			
1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	1740-19-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NI				NI				NI				53	E,NJ,t	0	10	NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	31	E,B,x	0	100	NI				47	E,B,x	0	100	NI				NI				NI			
1,5,9-Undecatriene, 2,6,10-trimethyl-, (	62951-96-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-HEXACOSANOL	506-52-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	1235-74-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
10-Methylnonadecane	56862-62-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
13-Tertadecen-1-ol acetate	10001-307-98	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1R-.alpha.-Pinene	7785-70-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	38SB2C 10/3/2003 18-20		MDL	RL	38SB3A 10/3/2003 0-1		MDL	RL	38SB3B 10/3/2003 4		MDL	RL	38SB3C 10/3/2003 6		MDL	RL	38SB4A 11/16/2007 0-1		MDL	RL	38SB4A-DUP(DUP-6) 11/16/2007 0-1		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
2 (5H)-Furanone	497-23-4	--	--	--	--	--	NI				72	E,NJ,t	0	50	NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	70	E,NJ,t	0	100	NI				NI				NI				NI				NI			
2,6,10,14,18,22-Tetracosahexaene,2,6,10,	111-02-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	4128-17-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	4602-84-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	22610-80-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	52	E,NJ,t	0	1700	NI				NI				NI				NI				NI			
2-Fluoro-4-nitrophenol	403-19-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Pentadecanone, 6,10,14-trimethyl-	502-69-2	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7-Nonenamide	90949-53-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
a-Pinene	80-56-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
beta-Pinene	127-91-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	2437-95-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Cyclotetradecane	295-17-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Ditriacontane	544-85-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	10001-630-47	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Docosane	629-97-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Eicosane	112-95-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	630	E,B,x	0	10	NI				NI				570	E,B,x	0	10	NI				NI			
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	NI				NI				NI				53	E,NJ,t	0	10	NI				NI			
Heneicosane	629-94-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hentriacontane	630-04-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptacosane	593-49-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptadecane	629-78-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptadecane, 9-octyl-	7225-64-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexatriacontane	630-06-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Nonadecane, 9-methyl-	13287-24-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Octacosane	630-02-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Octadecane, 3-ethyl-5-(2-ethylbutyl)-	55282-12-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Stearic Acid	57-11-4	--	--	--	--	--	NI				NI				NI				120	E,B,x	0	1	NI				NI			
Tetratriacontane	14167-59-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
TCL PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<23	U,UL,s	0.77	23	13	J	1.26	38	<38	U,UL,s	1.25	38	<26	U	0.84	26	NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	<23	U,UL,s	0.88	23	82		1.44	38	<38	U,UL,s	1.43	38	<26	U	0.96	26	NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<23	U,UL,s	1.43	23	15	J	2.34	38	<38	U,UL,s	2.33	38	<26	U	1.56	26	NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<23	U,UL,s	1.1	23	7.5	J	1.8	38	<38	U,UL,s	1.79	38	<26	U	1.2	26	NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<23	U,UL,s	1.32	23	28	J	2.16	38	<38	U,UL,s	2.15	38	<26	U	1.44	26	NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	<23	U,UJ,l	1.87	23	180		3.06	38	<38	U,UL,s	3.04	38	<26	U	2.04	26	NT				NT			
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	<23	U,UL,s	1.43	23	8.9	J	2.34	38	<38	U,UL,s	2.33	38	<26	U	1.56	26	NT				NT			
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	<23	U,UL,s	0.66	23	100		1.08	38	<38	U,UL,s	1.07	38	<26	U	0.72	26	NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<23	U,UL,s	0.99	23	98		1.62	38	<38	U,UL,s	1.61	38	<26	U	1.08	26	NT				NT			
Explosives (mg/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				ND				ND				ND			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	<0.5	U,UL,h	0.0356	0.5	0.57		0.0356	0.5	0.24	J	0.0356	0.5	0.24	J	0.0356	0.5	NT				NT			
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	93		0.1	0.1	56		0.1	0.1	76		0.1	0.1	80		0.1	0.1	87		0.1	0.1	86		0.1	0.1

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	38SB5A 11/16/2007 0-1		MDL	RL	38SB6A 11/16/2007 0-1		MDL	RL	38SB7A 11/15/2007 0-1		MDL	RL	38SB7A-DUP(DUP-5) 11/15/2007 0-1		MDL	RL	38SB7B 11/15/2007 1.5-3		MDL	RL	38SB7C 11/15/2007 7-8		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	10,000		100	500	8,700		2.1	10	21,000		2.1	10	21,000		2.1	10	20,000		2.1	10	17,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.064	J	0.042	0.2	0.12	J	0.042	0.2	0.43		0.042	0.2	0.22		0.042	0.2	0.1	J	0.042	0.2	0.11	J	0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***0.95***	,L,m	0.071	0.2	***1.1***	,L,m	0.071	0.2	***2.8***	,L,m	0.071	0.2	***3.1***	,L,m	0.071	0.2	***1.5***	,L,m	0.071	0.2	***1.7***	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	120		0.17	1	110		0.17	1	120		0.17	1	120		0.17	1	130		0.17	1	110		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.8	J	0.021	1	0.72	J	0.021	1	0.5	J	0.021	1	0.43	J	0.021	1	0.7	J	0.021	1	0.31	J	0.021	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.4	J	0.11	2	1.2	J,B,p	0.11	2	1.4	J	0.11	2	1.2	J	0.11	2	1.7	J	0.11	2	1.4	J	0.11	2
Calcium	7440-70-2	--	--	--	--	--	1,600		4.2	50	1,900		4.2	50	11,000		4.2	50	9,600		4.2	50	2,200		4.2	50	2,300		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	17		0.72	5	16		0.72	5	***57***		0.72	5	***52***		0.72	5	26		0.72	5	20		0.72	5
Cobalt	7440-48-4	--	--	--	--	--	8.2		0.37	2	7.1		0.37	2	10		0.37	2	9.9		0.37	2	11		0.37	2	9.1		0.37	2
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	8.6	,J,s	0.044	0.2	9.5	,J,s	0.044	0.2	35	,J,s	0.044	0.2	38	,J,s	0.044	0.2	13	,J,s	0.044	0.2	13	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	18,000	,J,s	120	2,500	16,000	,J,s	0.48	10	26,000	,J,s	0.48	10	27,000	,J,s	0.48	10	28,000	,J,s	0.48	10	25,000	,J,s	0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	30	,J,s	0.022	0.2	25	,J,s	0.022	0.2	33	,J,s	0.022	0.2	29	,J,s	0.022	0.2	11	,J,s	0.022	0.2	9.5	,J,s	0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	2,600		5	50	2,600		5	50	4,700		5	50	4,700		5	50	4,600		5	50	4,200		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	600		1.6	10	470		0.16	1	450		0.16	1	450		0.16	1	490		0.16	1	400		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.031	J	0.0075	0.05	0.07		0.0075	0.05	0.14		0.0075	0.05	0.14		0.0075	0.05	0.031	J	0.0075	0.05	0.027	J	0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	11	,J,s	0.036	0.1	10	,J,s	0.036	0.1	25	,J,s	0.036	0.1	25	,J,s	0.036	0.1	16	,J,s	0.036	0.1	14	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	1,300		5.3	50	1,300		5.3	50	2,400		5.3	50	2,400		5.3	50	2,400		5.3	50	2,000		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.16	J,L,m	0.089	0.3	0.23	J,L,m	0.089	0.3	0.12	J,L,m	0.089	0.3	0.1	J,L,m	0.089	0.3	0.14	J,L,m	0.089	0.3	0.12	J,L,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.042	J	0.013	0.1	0.044	J	0.013	0.1	0.1		0.013	0.1	0.092	J	0.013	0.1	0.047	J	0.013	0.1	0.045	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	35	J	13	100	34	J	13	100	65	J	13	100	64	J	13	100	62	J	13	100	63	J	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.2		0.0049	0.1	0.14		0.0049	0.1	0.18		0.0049	0.1	0.2		0.0049	0.1	0.21		0.0049	0.1	0.19		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	18		0.034	0.1	16		0.034	0.1	38		0.034	0.1	39		0.034	0.1	43		0.034	0.1	37		0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	120		1	5	97		1	5	72		1	5	76		1	5	65		1	5	50		1	5
Pesticides/PCBs (ug/kg)																														
Endosulfan I [4]	959-98-8	N	--	4.7E+04	6.1E+05	--	<3.7	U	1	3.7	<3.7	U	1	3.7	<4.4	U	1.2	4.4	4.6	J	1.4	5.1	<4	U	1.1	4	<3.9	U	1	3.9
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	<3.7	U	0.6	3.7	1.2	J,J,g	0.6	3.7	2.4	J	0.72	4.4	4.5	J,J,g	0.83	5.1	<4	U	0.64	4	<3.9	U	0.63	3.9
Aroclor 1254 [5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	17	J	5	37	120		5	37	260	,J,f	5.9	44	510	,J,f	6.8	51	<40	U	5.3	40	<39	U	5.2	39
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	NT				NT				NT				NT				NT				NT			
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	NT				NT				NT				NT				NT				NT			
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	NT				NT				NT				NT				NT				NT			
Cyclohexane	110-82-7	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	NT				NT				NT				NT				NT				NT			
Methylcyclohexane	108-87-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	NT				NT				NT				NT				NT				NT			
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	NT				NT				NT				NT				NT				NT			
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	NT				NT				NT				NT				NT				NT			
VOC TICs (ug/kg)																														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Methyl-hexane	591-76-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
3-Methyl-hexane	589-34-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
4-Isopropyltoluene	99-87-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	471-841	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Camphene	79-92-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexanal	66-25-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexane	110-54-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Pentane, 2-methyl-	107-83-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Pentane, 3-ethyl-2,2-dimethyl-	16747-32-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
TCL SVOCs (ug/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	NT				NT				NT				NT				NT				NT			
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	NT				NT				NT				NT				NT				NT			
4-Chloro-3-Methylphenol [6]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT				NT				NT				NT				NT			
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	NT				NT				NT				NT				NT				NT			
Caprolactam	105-62-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT				NT				NT				NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	NT				NT				NT				NT				NT				NT			
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
SVOC TICs (ug/kg)																														
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
.beta.-Sesquiphellan-drene	10001-221-02	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	1740-19-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,5,9-Undecatriene, 2,6,10-trimethyl-, (	62951-96-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-HEXACOSANOL	506-52-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	1235-74-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
10-Methylnonadecane	56862-62-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
13-Tertadecen-1-ol acetate	10001-307-98	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1R-.alpha.-Pinene	7785-70-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	38SB5A 11/16/2007 0-1		MDL	RL	38SB6A 11/16/2007 0-1		MDL	RL	38SB7A 11/15/2007 0-1		MDL	RL	38SB7A-DUP(DUP-5) 11/15/2007 0-1		MDL	RL	38SB7B 11/15/2007 1.5-3		MDL	RL	38SB7C 11/15/2007 7-8		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
2 (5H)-Furanone	497-23-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10,14,18,22-Tetracosahexaene,2,6,10,	111-02-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	4128-17-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	4602-84-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	22610-80-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Fluoro-4-nitrophenol	403-19-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Pentadecanone, 6,10,14-trimethyl-	502-69-2	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7-Nonenamide	90949-53-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
a-Pinene	80-56-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
beta-Pinene	127-91-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	2437-95-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Cyclotetradecane	295-17-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Ditriacontane	544-85-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	10001-630-47	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Docosane	629-97-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Eicosane	112-95-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heneicosane	629-94-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hentriacontane	630-04-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptacosane	593-49-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptadecane	629-78-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptadecane, 9-octyl-	7225-64-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexatriacontane	630-06-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Nonadecane, 9-methyl-	13287-24-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Octacosane	630-02-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Octadecane, 3-ethyl-5-(2-ethylbutyl)-	55282-12-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Stearic Acid	57-11-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Tetratriacontane	14167-59-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
TCL PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	NT				NT				NT				NT				NT				NT			
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Explosives (mg/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				ND				ND				ND			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	89		0.1	0.1	89		0.1	0.1	75		0.1	0.1	65		0.1	0.1	83		0.1	0.1	85		0.1	0.1

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID							38SB8A				38SB8B				38SB8C				38SB9A				38SB9B				38SB9C			
Sample Date			Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	11/15/2007		MDL	RL	11/15/2007		MDL	RL	11/15/2007		MDL	RL	11/15/2007		MDL	RL	11/15/2007		MDL	RL	11/15/2007		MDL	RL
Sample Depth (ft bgs)							0-1				1-3				7-8				0-1				2-4				7-8			
	CAS #	C/N					Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	22,000		2.1	10	21,000		2.1	10	17,000		2.1	10	21,000		2.1	10	23,000		2.1	10	16,000		2.1	10
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.12	J	0.042	0.2	0.11	J	0.042	0.2	0.11	J	0.042	0.2	0.13	J	0.042	0.2	0.12	J	0.042	0.2	0.1	J	0.042	0.2
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***1.7***	,L,m	0.071	0.2	***1.7***	,L,m	0.071	0.2	***1.5***	,L,m	0.071	0.2	***1.7***	,L,m	0.071	0.2	***1.7***	,L,m	0.071	0.2	***1.4***	,L,m	0.071	0.2
Barium	7440-39-3	N	209	1,564	20,440	6,015	150		0.17	1	160		0.17	1	120		0.17	1	160		0.17	1	180		0.17	1	110		0.17	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.64	J	0.021	1	0.44	J	0.021	1	0.49	J	0.021	1	0.68	J	0.021	1	0.6	J	0.021	1	0.32	J	0.021	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.8	J	0.11	2	1.7	J	0.11	2	1.7	J	0.11	2	1.8	J	0.11	2	2		0.11	2	1.6	J	0.11	2
Calcium	7440-70-2	--	--	--	--	--	2,600		4.2	50	2,300		4.2	50	2,200		4.2	50	2,700		4.2	50	2,400		4.2	50	2,000		4.2	50
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	34		0.72	5	27		0.72	5	23		0.72	5	35		0.72	5	29		0.72	5	20		0.72	5
Cobalt	7440-48-4	--	--	--	--	--	11		0.37	2	11		0.37	2	9.9		0.37	2	12		0.37	2	13		0.37	2	10		0.37	2
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	18	,J,s	0.044	0.2	14	,J,s	0.044	0.2	12	,J,s	0.044	0.2	19	,J,s	0.044	0.2	14	,J,s	0.044	0.2	12	,J,s	0.044	0.2
Iron	7439-89-6	N	50,962	5,475	71,540	--	28,000	,J,s	0.48	10	29,000	,J,s	0.48	10	25,000		0.48	10	28,000	,J,s	0.48	10	31,000	,J,s	0.48	10	24,000	,J,s	0.48	10
Lead [2]	7439-92-1	--	26.8	400	750	--	17	,J,s	0.022	0.2	13	,J,s	0.022	0.2	10	,J,s	0.022	0.2	18	,J,s	0.022	0.2	14	,J,s	0.022	0.2	9.2	,J,s	0.022	0.2
Magnesium	7439-95-4	--	--	--	--	--	5,100		5	50	5,000		5	50	4,400		5	50	5,100		5	50	5,500		5	50	4,300		5	50
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	540		0.16	1	490		0.16	1	440		0.16	1	530		0.16	1	550		0.16	1	510		0.16	1
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.056		0.0075	0.05	0.031	J	0.0075	0.05	0.022	J	0.0075	0.05	0.069		0.0075	0.05	0.035	J	0.0075	0.05	0.019	J	0.0075	0.05
Nickel	7440-02-0	N	62.8	156.4	2,044	--	18	,J,s	0.036	0.1	16	,J,s	0.036	0.1	14	,J,s	0.036	0.1	18	,J,s	0.036	0.1	17	,J,s	0.036	0.1	12	,J,s	0.036	0.1
Potassium	7440-09-7	--	--	--	--	--	2,400		5.3	50	2,100		5.3	50	1,800		5.3	50	2,200		5.3	50	2,200		5.3	50	1,900		5.3	50
Selenium	7782-49-2	N	--	39.11	511	18.98	0.16	J,L,m	0.089	0.3	0.11	J,L,m	0.089	0.3	0.12	J,L,m	0.089	0.3	0.14	J,L,m	0.089	0.3	0.14	J,L,m	0.089	0.3	<0.3	U,UL,m	0.089	0.3
Silver	7440-22-4	N	--	39.11	511	31.03	0.051	J	0.013	0.1	0.052	J	0.013	0.1	0.042	J	0.013	0.1	0.049	J	0.013	0.1	0.052	J	0.013	0.1	0.039	J	0.013	0.1
Sodium	7440-23-5	--	--	--	--	--	68	J	13	100	75	J	13	100	63	J	13	100	65	J	13	100	73	J	13	100	62	J	13	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.24		0.0049	0.1	0.24		0.0049	0.1	0.19		0.0049	0.1	0.23		0.0049	0.1	0.24		0.0049	0.1	0.18		0.0049	0.1
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	43		0.034	0.1	44		0.034	0.1	38		0.034	0.1	42		0.034	0.1	45		0.034	0.1	34		0.034	0.1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	73		1	5	66		1	5	53		1	5	73		1	5	71		1	5	52		1	5
Pesticides/PCBs (ug/kg)																														
Endosulfan I [4]	959-98-8	N	--	4.7E+04	6.1E+05	--	<4.1	U	1.1	4.1	<4	U	1.1	4	<4	U	1.1	4	<4.1	U	1.1	4.1	<4	U	1.1	4	<4	U	1.1	4
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	<4.1	U	0.66	4.1	<4	U	0.65	4	<4	U	0.64	4	<4.1	U	0.67	4.1	<4	U	0.65	4	<4	U	0.64	4
Aroclor 1254 [5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	26	J	5.5	41	<40	U	5.3	40	<40	U	5.3	40	56		5.5	41	<40	U	5.4	40	<40	U	5.3	40
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	NT				NT				NT				NT				NT				NT			
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	NT				NT				NT				NT				NT				NT			
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	NT				NT				NT				NT				NT				NT			
Cyclohexane	110-82-7	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	NT				NT				NT				NT				NT				NT			
Methylcyclohexane	108-87-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	NT				NT				NT				NT				NT				NT			
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	NT				NT				NT				NT				NT				NT			
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	NT				NT				NT				NT				NT				NT			
VOC TICs (ug/kg)																														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Methyl-hexane	591-76-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
3-Methyl-hexane	589-34-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
4-Isopropyltoluene	99-87-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	471-841	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Camphene	79-92-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexanal	66-25-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexane	110-54-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Pentane, 2-methyl-	107-83-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Pentane, 3-ethyl-2,2-dimethyl-	16747-32-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
TCL SVOCs (ug/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	NT				NT				NT				NT				NT				NT			
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	NT				NT				NT				NT				NT				NT			
4-Chloro-3-Methylphenol [6]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT				NT				NT				NT				NT			
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT				NT				NT				NT				NT			
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	NT				NT				NT				NT				NT				NT			
Caprolactam	105-62-2	--	--	--	--	--	NT				NT				NT				NT				NT				NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT				NT				NT				NT				NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	NT				NT				NT				NT				NT				NT			
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
SVOC TICs (ug/kg)																														
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
.beta.-Sesquiphellan-drene	10001-221-02	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	1740-19-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,5,9-Undecatriene, 2,6,10-trimethyl-, (	62951-96-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-HEXACOSANOL	506-52-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	1235-74-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
10-Methylnonadecane	56862-62-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
13-Tertadecen-1-ol acetate	10001-307-98	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1R-.alpha.-Pinene	7785-70-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	38SB8A 11/15/2007 0-1		MDL	RL	38SB8B 11/15/2007 1-3		MDL	RL	38SB8C 11/15/2007 7-8		MDL	RL	38SB9A 11/15/2007 0-1		MDL	RL	38SB9B 11/15/2007 2-4		MDL	RL	38SB9C 11/15/2007 7-8		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
2 (5H)-Furanone	497-23-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10,14,18,22-Tetracosahexaene,2,6,10,	111-02-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	4128-17-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	4602-84-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	22610-80-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Fluoro-4-nitrophenol	403-19-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Pentadecanone, 6,10,14-trimethyl-	502-69-2	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7-Nonenamide	90949-53-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
a-Pinene	80-56-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
beta-Pinene	127-91-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	2437-95-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Cyclotetradecane	295-17-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Ditriacontane	544-85-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	10001-630-47	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Docosane	629-97-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Eicosane	112-95-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heneicosane	629-94-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hentriacontane	630-04-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptacosane	593-49-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptadecane	629-78-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptadecane, 9-octyl-	7225-64-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexatriacontane	630-06-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Nonadecane, 9-methyl-	13287-24-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Octacosane	630-02-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Octadecane, 3-ethyl-5-(2-ethylbutyl)-	55282-12-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Stearic Acid	57-11-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Tetratriacontane	14167-59-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
TCL PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				NT				NT				NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				NT				NT				NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				NT				NT				NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				NT				NT				NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				NT				NT				NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				NT				NT				NT			
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	NT				NT				NT				NT				NT				NT			
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				NT				NT				NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				NT				NT				NT			
Explosives (mg/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				ND				ND				ND			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				NT				NT				NT			
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	81		0.1	0.1	83		0.1	0.1	83		0.1	0.1	80		0.1	0.1	82		0.1	0.1	84		0.1	0.1

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	38SB10A 11/15/2007 0-1		MDL	RL	38SB10B 11/15/2007 3-4		MDL	RL	38SB10C 11/15/2007 7-8		MDL	RL	QSB1A 10/2/2003 0-1		MDL	RL	QSB1A-DUP(SBD3) 10/2/2003 0-1		MDL	RL	QSB1B 10/2/2003 10-12		MDL	RL
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	24,000		2.1	10	19,000		2.1	10	15,000		2.1	10	16,000		91.5	500	12,600		91.5	500	14,000		91.5	500
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.39		0.042	0.2	0.13	J	0.042	0.2	0.11	J	0.042	0.2	0.19	J,B,p	0.0518	0.5	0.2	J,B,p	0.0518	0.5	0.15	J,B,p	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***5.1***	,L,m	0.071	0.2	***1.6***	,L,m	0.071	0.2	***1.5***	,L,m	0.071	0.2	***1.2***		0.0232	0.4	***1.6***		0.0232	0.4	***0.97***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	120		0.17	1	140		0.17	1	96		0.17	1	148		0.53	5	113		0.53	5	110		0.53	10
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.68	J	0.021	1	0.48	J	0.021	1	0.42	J	0.021	1	0.82	J	0.0391	1	0.57	J	0.0391	1	0.66	J	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.6	J	0.11	2	1.8	J	0.11	2	1.6	J	0.11	2	0.88	J,B,p	0.182	1	1.1	,B,p	0.182	1	1.3	,B,p	0.182	1
Calcium	7440-70-2	--	--	--	--	--	7,400		4.2	50	2,400		4.2	50	1,900		4.2	50	10,100	,J,f	16.6	250	36,300	,J,f	166	2,500	2,260		16.6	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	***74***		0.72	5	26		0.72	5	23		0.72	5	21		0.912	5	17		0.912	5	18		0.912	5
Cobalt	7440-48-4	--	--	--	--	--	9.6		0.37	2	12		0.37	2	8.9		0.37	2	7.6		0.208	1	5.9		0.208	1	8.1		0.208	1
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	80	,J,s	0.088	0.4	13	,J,s	0.044	0.2	11	,J,s	0.044	0.2	10		0.368	1	13		0.368	1	7.6		0.368	1
Iron	7439-89-6	N	50,962	5,475	71,540	--	29,000	,J,s	0.48	10	30,000	,J,s	0.48	10	25,000	,J,s	0.48	10	22,600		212	1,000	16,700		106	500	19,600		106	500
Lead [2]	7439-92-1	--	26.8	400	750	--	52	,J,s	0.045	0.4	13	,J,s	0.022	0.2	9.5	,J,s	0.022	0.2	15	,J,f	0.0218	1	32	,J,f	0.0218	1	7.2		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	5,300		5	50	5,100		5	50	4,100		5	50	3,530	,K,m	16.05	250	2,880	,K,m	16.05	250	3,280	,K,m	16.05	250
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	400		0.16	1	490		0.16	1	440		0.16	1	519		2.64	10	415		2.64	10	372		2.64	10
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	0.27		0.0075	0.05	0.028	J	0.0075	0.05	0.024	J	0.0075	0.05	0.015	J	0.0077	0.1	0.025	J	0.0077	0.1	<0.1	U	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.4	2,044	--	32	,J,s	0.036	0.1	14	,J,s	0.036	0.1	12	,J,s	0.036	0.1	13		0.0356	0.5	14		0.0356	0.5	13		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	2,100		5.3	50	2,000		5.3	50	1,500		5.3	50	2,180		25	100	1,810		25	100	1,580		25	100
Selenium	7782-49-2	N	--	39.11	511	18.98	0.14	J,L,m	0.089	0.3	0.18	J,L,m	0.089	0.3	0.11	J,L,m	0.089	0.3	0.59	J	0.0502	1	0.63	J	0.0502	1	0.49	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.098	J	0.013	0.1	0.041	J	0.013	0.1	0.038	J	0.013	0.1	0.067	J	0.0044	3	0.075	J	0.0044	3	0.051	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	62	J	13	100	55	J	13	100	59	J	13	100	64	J,B,p	8.92	100	65	J,B,p	8.92	100	59	J,B,p	8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.17		0.0049	0.1	0.22		0.0049	0.1	0.16		0.0049	0.1	0.14	J	0.027	0.5	0.13	J	0.027	0.5	0.15	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	36		0.034	0.1	41		0.034	0.1	33		0.034	0.1	29		0.207	1	23		0.207	1	29		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	83		1	5	65		1	5	49		1	5	67		0.517	4	55		0.517	4	55		0.517	4
Pesticides/PCBs (ug/kg)																														
Endosulfan I [4]	959-98-8	N	--	4.7E+04	6.1E+05	--	<4.7	U,UL,s	1.3	4.7	<4	U	1.1	4	<3.9	U	1.1	3.9	<25	U	1.09	25	<27	U	1.27	27	NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	1.1	J,L,s	0.76	4.7	<4	U	0.65	4	<3.9	U	0.64	3.9	<25	U	0.358	25	<27	U	0.417	27	NT			
Aroclor 1254 [5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	130	,L,s	6.2	47	<40	U	5.4	40	<39	U	5.2	39	53		3.6	41	51		4.2	45	NT			
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	NT				NT				NT				25		6.15	24	23	J	6.75	28	<24	U	5.95	24
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	NT				NT				NT				110		6.15	24	57	,B,z	6.75	28	36	,B,z	5.95	24
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	NT				NT				NT				<6.2	U	0.873	6.2	<6.8	U	0.959	6.8	<6	U	0.845	6
Cyclohexane	110-82-7	--	--	--	--	--	NT				NT				NT				0.9	J	0.389	12	<14	U	0.427	14	<12	U	0.376	12
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	NT				NT				NT				0.75	J	0.52	6.2	<6.8	U	0.571	6.8	<6	U	0.503	6
Methylcyclohexane	108-87-2	--	--	--	--	--	NT				NT				NT				4.2	J	1.04	12	<14	U	1.14	14	<12	U	1.01	12
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	NT				NT				NT				4.2	J,J,c	3.46	24	5.7	J,J,c	3.79	28	4.8	J,J,c	3.34	24
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	NT				NT				NT				<6.2	U	0.571	6.2	<6.8	U	0.626	6.8	<6	U	0.552	6
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	NT				NT				NT				4.1	J	0.518	6.2	<6.8	U	0.568	6.8	<6	U	0.501	6
VOC TICs (ug/kg)																														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NI				NI				NI				2.7	Q,NJ,t	0	10	NI				NI			
2-Methyl-hexane	591-76-4	--	--	--	--	--	NI				NI				NI				8.4	E,NJ,t	0	100	NI				NI			
3-Methyl-hexane	589-34-4	--	--	--	--	--	NI				NI				NI				7	E,NJ,t	0	100	NI				NI			
4-Isopropyltoluene	99-87-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	471-841	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Camphene	79-92-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexanal	66-25-1	--	--	--	--	--	NI				NI				NI				11	E,NJ,t	0	1	NI				NI			
Hexane	110-54-3	--	--	--	--	--	NI				NI				NI				14	E,NJ,t	0	100	NI				NI			
Pentane, 2-methyl-	107-83-5	--	--	--	--	--	NI				NI				NI				11	E,NJ,t	0	8	NI				NI			
Pentane, 3-ethyl-2,2-dimethyl-	16747-32-3	--	--	--	--	--	NI				NI				NI				5.7	E,NJ,t	0	1	NI				NI			
TCL SVOCs (ug/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	NT				NT				NT				77	J	3.78	210	120	J	4.41	230	<200	U	3.78	200
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	NT				NT				NT				77				120				ND			
4-Chloro-3-Methylphenol [6]	59-50-7	N	--	3.9E+05	5.1E+06	--	NT				NT				NT				18	J	6.25	210	<230	U,UL,s	7.29	230	29	J	6.25	200
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	NT				NT				NT				86	J	2.48	210	160	J	2.9	230	49	J	2.48	200
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	NT				NT				NT				<210	U	5.38	210	<230	U	6.27	230	<200	U	5.38	200
Caprolactam	105-62-2	--	--	--	--	--	NT				NT				NT				<410	U,UJ,c	7.66	410	<440	U,UJ,c	8.93	440	<390	U,UJ,c	7.66	390
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	NT				NT				NT				1,100		4.58	210	1,800		5.35	230	38	J	4.58	200
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	NT				NT				NT				21	J,B,z	2.28	210	16	J,B,z	2.66	230	18	J,B,z	2.28	200
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				4	J	2.82	210	<230	U	3.29	230	<200	U	2.82	200
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	NT				NT				NT				21	J	5.7	210	16	J	6.65	230	<200	U	5.7	200
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				<210	U	2.76	210	<230	U	3.22	230	<200	U	2.76	200
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				2	J	1.78	210	3	J	2.07	230	<200	U	1.78	200
SVOC TICs (ug/kg)																														
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	NI				NI				NI				NI				NI				120	E,B,x	0	100
.beta.-Sesquiphellan-drene	10001-221-02	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	1740-19-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	NI				NI				NI				32	E,B,x	0	100	27	E,B,x	0	100	51	E,B,x	0	100
1,5,9-Undecatriene, 2,6,10-trimethyl-, (	62951-96-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-HEXACOSANOL	506-52-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	1235-74-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
10-Methylnonadecane	56862-62-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
13-Tertadecen-1-ol acetate	10001-307-98	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1R-.alpha.-Pinene	7785-70-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID							38SB10A				38SB10B				38SB10C				QSB1A				QSB1A-DUP(SBD3)				QSB1B			
Sample Date			Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	11/15/2007		MDL	RL	11/15/2007		MDL	RL	11/15/2007		MDL	RL	10/2/2003		MDL	RL	10/2/2003		MDL	RL	10/2/2003		MDL	RL
Sample Depth (ft bgs)	CAS #	C/N					0-1				3-4				7-8				0-1				0-1				10-12			
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
2 (5H)-Furanone	497-23-4	--	--	--	--	--	NI				NI				NI				NI				63	E,NJ,t	0	50	NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10,14,18,22-Tetracosahexaene,2,6,10,	111-02-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	4128-17-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	4602-84-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	22610-80-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	NI				NI				NI				NI				NI				27	E,NJ,t	0	1,700
2-Fluoro-4-nitrophenol	403-19-0	--	--	--	--	--	NI				NI				NI				NI				25	E,NJ,t	0	1	NI			
2-Pentadecanone, 6,10,14-trimethyl-	502-69-2	--	--	--	--	--	NI				NI				NI				NI				40	E,NJ,t	0	1	NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	NI				NI				NI				NI				NI				210	E,NJ,t	0	10
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	NI				NI				NI				24	E,NJ,t	0	1	NI				42	E,NJ,t	0	1
7-Nonenamide	90949-53-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
a-Pinene	80-56-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
beta-Pinene	127-91-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	2437-95-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Cyclotetradecane	295-17-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Ditriacontane	544-85-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	10001-630-47	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Docosane	629-97-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Eicosane	112-95-8	--	--	--	--	--	NI				NI				NI				NI				NI				27	E,B,x	0	1,000
Erucylamide	112-84-5	--	--	--	--	--	NI				NI				NI				NI				NI				540	E,NJ,t	0	10
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heneicosane	629-94-7	--	--	--	--	--	NI				NI				NI				NI				30	E,B,x	0	1,000	NI			
Hentriacontane	630-04-6	--	--	--	--	--	NI				NI				NI				NI				220	E,NJ,t	0	10	NI			
Heptacosane	593-49-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptadecane	629-78-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptadecane, 9-octyl-	7225-64-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexatriacontane	630-06-8	--	--	--	--	--	NI				NI				NI				NI				NI				42	E,NJ,t	0	10
Nonadecane, 9-methyl-	13287-24-6	--	--	--	--	--	NI				NI				NI				NI				NI				23	E,NJ,t	0	1
Octacosane	630-02-4	--	--	--	--	--	NI				NI				NI				NI				NI				36	E,NJ,t	0	10
Octadecane, 3-ethyl-5-(2-ethylbutyl)-	55282-12-7	--	--	--	--	--	NI				NI				NI				NI				NI				29	E,NJ,t	0	1
Stearic Acid	57-11-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Tetratriacontane	14167-59-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
TCL PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	NT				NT				NT				<26	U	0.84	26	<29	U	0.98	29	<57	U,UJ,s	0.84	57
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	NT				NT				NT				<26	U	0.96	26	<29	U	1.12	29	<57	U,UJ,s	0.96	57
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	NT				NT				NT				<26	U	1.56	26	<29	U	1.82	29	<57	U,UJ,s	1.56	57
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	NT				NT				NT				<26	U	1.2	26	<29	U	1.4	29	<57	U,UJ,s	1.2	57
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	NT				NT				NT				<26	U	1.44	26	<29	U	1.68	29	<57	U,UJ,s	1.44	57
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	NT				NT				NT				<26	U,UJ,l	2.04	26	7.8	J,J,l	2.38	29	<57	U,UJ,l	2.04	57
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	NT				NT				NT				<26	U	1.56	26	<29	U	1.82	29	<57	U,UJ,s	1.56	57
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	NT				NT				NT				<26	U	0.72	26	1.6	J	0.84	29	<57	U,UJ,s	0.72	57
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	NT				NT				NT				<26	U	1.08	26	3.8	J	1.26	29	<57	U,UJ,s	1.08	57
Explosives (mg/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	<2.5	U	0.1	2.5	0.31	J	0.142	0.5	0.2	J	0.142	0.5	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				0.31				0.2				ND			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	NT				NT				NT				0.81		0.0356	0.5	1.3		0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	71		0.1	0.1	82		0.1	0.1	84		0.1	0.1	81		0.1	0.1	74		0.1	0.1	84		0.1	0.1

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID							QSB1C				QSB2A				QSB2B				QSB2C				QSB3A				QSB3B			
Sample Date			Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	10/2/2003		MDL	RL	10/2/2003		MDL	RL	10/2/2003		MDL	RL	10/2/2003		MDL	RL	10/2/2003		MDL	RL	10/2/2003		MDL	RL
Sample Depth (ft bgs)	CAS #	C/N					17-19				0-1				10-12				18-20				0-1				10-12			
							Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (mg/kg)																														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	3,360		18.3	100	7,820		45.8	250	14,200		91.5	500	7,970		45.75	250	14,500		91.5	500	9,890		91.5	500
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.15	J,B,p	0.0518	0.5	0.13	J,B,p	0.0518	0.5	0.28	J,B,p	0.0518	0.5	0.16	J,B,p	0.0518	0.5	0.17	J,B,p	0.0518	0.5	0.15	J,B,p	0.0518	0.5
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***0.54***		0.0232	0.4	***0.64***		0.0232	0.4	***0.9***		0.0232	0.4	***0.7***		0.0232	0.4	***1.4***		0.0232	0.4	***0.76***		0.0232	0.4
Barium	7440-39-3	N	209	1,564	20,440	6,015	27		0.106	1	96		0.106	1	116		0.53	5	66		0.106	1	137		0.53	5	75		0.106	1
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.18	J	0.0391	1	0.58	J	0.0391	1	0.74	J	0.0391	1	0.41	J	0.0391	1	0.89	J	0.0391	1	0.62	J	0.0391	1
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.4	,B,p	0.182	1	0.95	J,B,p	0.182	1	1.6	,B,p	0.182	1	0.88	J,B,p	0.182	1	1.6	,B,p	0.182	1	1.2	,B,p	0.182	1
Calcium	7440-70-2	--	--	--	--	--	622		16.6	250	943		16.6	250	1,900		16.6	250	1,230		16.6	250	25,600		166	2,500	2,000		16.6	250
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	6		0.912	5	12		0.912	5	17		0.912	5	10		0.912	5	19		0.912	5	14		0.912	5
Cobalt	7440-48-4	--	--	--	--	--	3.3		0.208	1	5.9		0.208	1	8.4		0.208	1	5.6		0.208	1	8.4		0.208	1	6.7		0.208	1
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	1.5		0.368	1	6		0.368	1	8.3		0.368	1	5.3		0.368	1	12		0.368	1	6.5		0.368	1
Iron	7439-89-6	N	50,962	5,475	71,540	--	6,530		42.4	200	12,700		106	500	20,000		106	500	12,500		106	500	20,600		212	1,000	15,500		106	500
Lead [2]	7439-92-1	--	26.8	400	750	--	2.6		0.0218	1	9.6		0.0218	1	7.6		0.0218	1	4.4		0.0218	1	21		0.0218	1	5.5		0.0218	1
Magnesium	7439-95-4	--	--	--	--	--	855	,K,m	3.21	50	2,220	,K,m	6.05	250	3,370	,K,m	16.05	250	1,890	,K,m	16.05	250	3380	,K,m	16.05	250	2,730	,K,m	16.05	250
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	81		0.264	1	319		1.32	5	441		2.64	100	222		1.32	5	511		2.64	10	273		1.32	5
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1	<0.1	U	0.0077	0.1	0.019	J	0.0077	0.1	<0.1	U	0.0077	0.1
Nickel	7440-02-0	N	62.8	156.4	2,044	--	4.4		0.0356	0.5	8.5		0.0356	0.5	13		0.0356	0.5	7.1		0.0356	0.5	15		0.0356	0.5	9.6		0.0356	0.5
Potassium	7440-09-7	--	--	--	--	--	439		5	20	1,070		25	100	1,230		25	100	876		5	20	1,330		25	100	1,270		25	100
Selenium	7782-49-2	N	--	39.11	511	18.98	0.24	J	0.0502	1	0.35	J	0.0502	1	0.47	J	0.0502	1	0.33	J	0.0502	1	0.67	J	0.0502	1	0.41	J	0.0502	1
Silver	7440-22-4	N	--	39.11	511	31.03	0.026	J	0.0044	3	0.036	J	0.0044	3	0.055	J	0.0044	3	0.032	J	0.0044	3	0.063	J	0.0044	3	0.033	J	0.0044	3
Sodium	7440-23-5	--	--	--	--	--	31	J,B,p	8.92	100	63	J,B,p	8.92	100	67	J,B,p	8.92	100	55	J,B,p	8.92	100	60	J,B,p	8.92	100	56	J,B,p	8.92	100
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.039	J	0.027	0.5	0.1	J	0.027	0.5	0.15	J	0.027	0.5	0.08	J	0.027	0.5	0.16	J	0.027	0.5	0.11	J	0.027	0.5
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	8.3		0.207	1	17		0.207	1	30		0.207	1	18		0.207	1	28		0.207	1	24		0.207	1
Zinc	7440-66-6	N	202	2,346	30,660	13,622	17		0.517	4	58		0.517	4	61		0.517	4	33		0.517	4	65		0.517	4	45		0.517	4
Pesticides/PCBs (ug/kg)																														
Endosulfan I [4]	959-98-8	N	--	4.7E+04	6.1E+05	--	NT				NT				NT				NT				NT				NT			
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				NT				NT				NT				NT				NT			
Aroclor 1254 [5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				NT				NT				NT				NT				NT			
TCL VOCs (ug/kg)																														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	17	J	5.4	22	<24	U	5.9	24	<24	U	5.95	24	<22	U	5.5	22	23	J	6.4	26	<22	U	5.75	22
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	36	,B,z	5.4	22	42	,B,z	5.9	24	24	,B,z	5.95	24	22	,B,z	5.5	22	56	,B,z	6.4	26	24	,B,z	5.75	22
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	<5.4	U	0.767	5.4	<5.9	U	0.838	5.9	<6	U	0.845	6	<5.5	U	0.781	5.5	<6.4	U	0.909	6.4	<5.7	U	0.817	5.7
Cyclohexane	110-82-7	--	--	--	--	--	<11	U	0.341	11	<12	U	0.373	12	<12	U	0.376	12	<11	U	0.348	11	<13	U	0.404	13	<11	U	0.363	11
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<5.4	U	0.457	5.4	<5.9	U	0.499	5.9	<6	U	0.503	6	<5.5	U	0.465	5.5	<6.4	U	0.541	6.4	<5.7	U	0.486	5.7
Methylcyclohexane	108-87-2	--	--	--	--	--	<11	U	0.913	11	<12	U	0.997	12	<12	U	1.01	12	<11	U	0.93	11	<13	U	1.08	13	<11	U	0.972	11
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	4.1	J,J,c	3.03	22	4.5	J,J,c	3.32	24	4.9	J,J,c	3.34	24	4	J,J,c	3.09	22	6.8	J,J,c	3.6	26	4.8	J,J,c	3.23	22
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<5.4	U	0.501	5.4	<5.9	U	0.548	5.9	0.65	J	0.552	6	<5.5	U	0.51	5.5	<6.4	U	0.594	6.4	<5.7	U	0.534	5.7
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<5.4	U	0.455	5.4	<5.9	U	0.497	5.9	<6	U	0.501	6	<5.5	U	0.463	5.5	<6.4	U	0.539	6.4	<5.7	U	0.484	5.7
VOC TICs (ug/kg)																														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Methyl-hexane	591-76-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
3-Methyl-hexane	589-34-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
4-Isopropyltoluene	99-87-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	471-841	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Camphene	79-92-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexanal	66-25-1	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Hexane	110-54-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Pentane, 2-methyl-	107-83-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Pentane, 3-ethyl-2,2-dimethyl-	16747-32-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
TCL SVOCs (ug/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	<180	U	3.47	180	<200	U	3.78	200	<200	U	3.78	200	<190	U	3.47	190	120	J	4.1	220	<200	U	3.47	200
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	ND				ND				ND				ND				120				ND			
4-Chloro-3-Methylphenol [6]	59-50-7	N	--	3.9E+05	5.1E+06	--	12	J	5.73	180	15	J	6.25	200	15	J	6.25	200	10	J	5.73	190	<220	U	6.77	220	9	J	5.73	200
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	42	J	2.28	180	46	J	2.48	200	45	J	2.48	200	44	J	2.28	190	290		2.69	220	45	J	2.28	200
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	<180	U	4.93	180	<200	U	5.38	200	<200	U	5.38	200	<190	U	4.93	190	44	J,B,x	5.82	220	<200	U	4.93	200
Caprolactam	105-62-2	--	--	--	--	--	<350	U,UJ,c	7.02	350	<390	U,UJ,c	7.66	390	<390	U,UJ,c	7.66	390	<360	U,UJ,c	7.02	360	<420	U,UJ,c	8.29	420	<380	U,UJ,c	7.02	380
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	31	J	4.2	180	26	J	4.58	200	26	J	4.58	200	23	J	4.2	190	1,700		4.97	220	27	J	4.2	200
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	13	J,B,z	2.09	180	14	J,B,z	2.28	200	13	J,B,z	2.28	200	11	J,B,z	2.09	190	18	J,B,z	2.47	220	14	J,B,z	2.09	200
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	<180	U	2.59	180	<200	U	2.82	25	<200	U	2.82	200	<190	U	2.59	190	8	J	306	220	<200	U	2.59	200
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	<180	U	5.23	180	<200	U	5.7	200	<200	U	5.7	200	<190	U	5.23	190	32	J	6.18	220	<200	U	5.23	200
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	<180	U	2.53	180	<200	U	2.76	25	<200	U	2.76	200	<190	U	2.53	190	3	J	2.99	220	<200	U	2.53	200
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<180	U	1.63	180	<200	U	1.78	25	<200	U	1.78	200	<190	U	1.63	190	4	J	1.92	220	<200	U	1.63	200
SVOC TICs (ug/kg)																														
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	80	E,B,x	0	100	300	E,B,x	0	100	NI				69	E,B,x	0	100	NI				62	E,B,x	0	100
.beta.-Sesquiphellan-drene	10001-221-02	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	1740-19-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	30	E,B,x	0	100	NI				40	E,B,x	0	100	33	E,B,x	0	100	28	E,B,x	0	100	35	E,B,x	0	100
1,5,9-Undecatriene, 2,6,10-trimethyl-, (	62951-96-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-HEXACOSANOL	506-52-5	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	1235-74-1	--	--	--	--	--	NI				120	E,NJ,t	0	100	NI				NI				NI				NI			
10-Methylnonadecane	56862-62-5	--	--	--	--	--	NI				NI				27	E,NJ,t	0	1	NI				NI				NI			
13-Tertadecen-1-ol acetate	10001-307-98	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
1R-.alpha.-Pinene	7785-70-8	--	--	--	--	--	NI				70	E,NJ,t	0	10	NI				NI				NI				NI			

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID			Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	QSB1C 10/2/2003 17-19		MDL	RL	QSB2A 10/2/2003 0-1		MDL	RL	QSB2B 10/2/2003 10-12		MDL	RL	QSB2C 10/2/2003 18-20		MDL	RL	QSB3A 10/2/2003 0-1		MDL	RL	QSB3B 10/2/2003 10-12		MDL	RL
Sample Date																														
Sample Depth (ft bgs)	CAS #	C/N					Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
2 (5H)-Furanone	497-23-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	NI				NI				67	E,B,x	0	100	NI				NI				NI			
2,6,10,14,18,22-Tetracosahexaene,2,6,10,	111-02-4	--	--	--	--	--	55	E,NJ,t	0	1	NI				NI				NI				NI				NI			
2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	4128-17-0	--	--	--	--	--	NI				NI				NI				40	E,NJ,t	0	10	NI				NI			
2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	4602-84-0	--	--	--	--	--	NI				NI				NI				NI				NI				40	E,NJ,t	0	10
2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	22610-80-6	--	--	--	--	--	NI				NI				NI				NI				23	E,NJ,t	0	10	NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	21	E,NJ,t	0	1,700	NI				NI				NI				NI				23	E,NJ,t	0	1,700
2-Fluoro-4-nitrophenol	403-19-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
2-Pentadecanone, 6,10,14-trimethyl-	502-69-2	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	26	E,NJ,t	0	1	22	E,NJ,t	0	1	23	E,NJ,t	0	1	19	E,NJ,t	0	1	NI				21	E,NJ,t	0	1
7-Nonenamide	90949-53-4	--	--	--	--	--	NI				NI				77	E,NJ,t	0	10	NI				NI				NI			
a-Pinene	80-56-8	--	--	--	--	--	NI				230	E,NJ,t	0	1,700	NI				NI				NI				NI			
beta-Pinene	127-91-3	--	--	--	--	--	NI				35	E,NJ,t	0	1,700	NI				NI				NI				NI			
Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	2437-95-8	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Cyclotetradecane	295-17-0	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Ditriacontane	544-85-4	--	--	--	--	--	NI				24	E,NJ,t	0	100	NI				NI				NI				NI			
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	10001-630-47	--	--	--	--	--	NI				47	E,NJ,t	0	10	49	E,NJ,t	0	10	NI				NI				NI			
Docosane	629-97-0	--	--	--	--	--	NI				NI				NI				NI				230	E,NJ,t	0	10	33	E,NJ,t	0	10
Eicosane	112-95-8	--	--	--	--	--	29	E,B,x	0	1,000	28	E,B,x	0	1,000	NI				NI				180	E,B,x	0	1000	NI			
Erucylamide	112-84-5	--	--	--	--	--	380	E,NJ,t	0	10	NI				400	E,NJ,t	0	10	360	E,NJ,t	0	10	NI				310	E,NJ,t	0	10
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heneicosane	629-94-7	--	--	--	--	--	39	E,B,x	0	1,000	NI				29	E,B,x	0	1,000	23	E,B,x	0	1,000	NI				21	E,B,x	0	1,000
Hentriacontane	630-04-6	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Heptacosane	593-49-7	--	--	--	--	--	31	E,NJ,t	0	10	NI				NI				NI				NI				NI			
Heptadecane	629-78-7	--	--	--	--	--	NI				NI				NI				24	E,NJ,t	0	1,000	NI				NI			
Heptadecane, 9-octyl-	7225-64-1	--	--	--	--	--	NI				NI				36	E,NJ,t	0	1	NI				NI				NI			
Hexatriacontane	630-06-8	--	--	--	--	--	NI				NI				NI				27	E,NJ,t	0	10	NI				NI			
Nonadecane, 9-methyl-	13287-24-6	--	--	--	--	--	45	E,NJ,t	0	1	NI				NI				NI				NI				NI			
Octacosane	630-02-4	--	--	--	--	--	42	E,NJ,t	0	10	NI				45	E,NJ,t	0	10	NI				410	E,NJ,t	0	10	NI			
Octadecane, 3-ethyl-5-(2-ethylbutyl)-	55282-12-7	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Stearic Acid	57-11-4	--	--	--	--	--	NI				NI				NI				NI				NI				NI			
Tetratriacontane	14167-59-0	--	--	--	--	--	34	E,B,x	0	10	29	E,B,x	0	10	42	E,B,x	0	10	NI				NI				33	E,B,x	0	10
TCL PAHs (ug/kg)																														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<23	U	0.77	23	<25	U	0.84	25	<25	U	0.84	25	<23	U	0.77	23	<27	U,UJ,s	0.91	27	<24	U,UJ,s	0.84	24
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	<23	U	0.88	23	<25	U	0.96	25	<25	U	0.96	25	<23	U	0.88	23	<21	U,UJ,s	1.04	21	<24	U,UJ,s	0.96	24
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<23	U	1.43	23	<25	U	1.56	25	<25	U	1.56	25	<23	U	1.43	23	<27	U,UJ,s	1.69	27	<24	U,UJ,s	1.56	24
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<23	U	1.1	23	<25	U	1.2	25	<25	U	1.2	25	<23	U	1.1	23	<27	U,UJ,s	1.3	27	<24	U,UJ,s	1.2	24
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<23	U	1.32	23	<25	U	1.44	25	<25	U	1.44	25	<23	U	1.32	23	<27	U,UJ,s	1.56	27	<24	U,UJ,s	1.44	24
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	<23	U,UJ,l	1.87	23	<25	U,UJ,l	2.04	25	<25	U,UJ,l	2.04	25	<23	U,UJ,l	1.87	23	6.4	J,J,l	2.21	27	<24	U,UJ,l	2.04	24
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	<23	U	1.43	23	<25	U	1.56	25	<25	U	1.56	25	<23	U	1.43	23	<27	U,UJ,s	1.69	27	<24	U,UJ,s	1.56	24
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	<23	U	0.66	23	<25	U	0.72	25	<25	U	0.72	25	<23	U	0.66	23	<21	U,UJ,s	0.78	21	<24	U,UJ,s	0.72	24
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<23	U	0.99	23	<25	U	1.08	25	<25	U	1.08	25	<23	U	0.99	23	3	J,J,s	1.17	27	<24	U,UJ,s	1.08	24
Explosives (mg/kg)																														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5	<0.5	U	0.142	0.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND				ND				ND				ND				ND			
Cyanide (mg/kg)																														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	<0.5	U	0.0356	0.5	<0.5	U	0.0356	0.5	0.06	J	0.0356	0.5	0.04	J	0.0356	0.5	2.2		0.0356	0.5	<0.5	U	0.0356	0.5
Percent Solids (%)																														
Percent Solids	--	--	--	--	--	--	93		0.1	0.1	85		0.1	0.1	84		0.1	0.1	91		0.1	0.1	78		0.1	0.1	87		0.1	0.1

Table 4-9
Summary of Detected Chemicals in Soil Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	QSB3C 10/2/2003 17-19 Result	QSB3C LQ, VQ, r	MDL	RL	QSB4A 11/16/2007 0-1 Result	QSB4A LQ, VQ, r	MDL	RL
TAL Metals (mg/kg)														
Aluminum	7429-90-5	N	40,041	7,821	102,200	--	5,130		45.8	250	NT			
Antimony	7440-36-0	N	--	3.13	40.88	13.2	0.11	J,B,p	0.0518	0.5	NT			
Arsenic	7440-38-2	C	15.8	0.426	1.91	0.026	***0.63***		0.0232	0.4	NT			
Barium	7440-39-3	N	209	1,564	20,440	6,015	42		0.106	1	NT			
Beryllium	7440-41-7	N	1.02	15.64	204.4	1,154	0.28	J	0.0391	1	NT			
Cadmium	7440-43-9	N	0.69	3.91	51.1	27.45	1.3	,B,p	0.182	1	NT			
Calcium	7440-70-2	--	--	--	--	--	1,080		16.6	250	NT			
Chromium [1]	7440-47-3	N	65.3	23.46	306.6	42.048	8.8		0.912	5	NT			
Cobalt	7440-48-4	--	--	--	--	--	4.4		0.208	1	NT			
Copper	7440-50-8	N	53.5	312.9	4,088	10,518	3.3		0.368	1	NT			
Iron	7439-89-6	N	50,962	5,475	71,540	--	8,730		42.4	200	NT			
Lead [2]	7439-92-1	--	26.8	400	750	--	3.5		0.0218	1	NT			
Magnesium	7439-95-4	--	--	--	--	--	1,280	,K,m	16.05	250	NT			
Manganese	7439-96-5	N	2,543	156.4	2,044	951.9	151		1.32	5	NT			
Mercury [3]	7439-97-6	--	0.13	2.35	30.66	--	<0.1	U	0.0077	0.1	NT			
Nickel	7440-02-0	N	62.8	156.4	2,044	--	5.9		0.0356	0.5	NT			
Potassium	7440-09-7	--	--	--	--	--	651		5	20	NT			
Selenium	7782-49-2	N	--	39.11	511	18.98	0.31	J	0.0502	1	NT			
Silver	7440-22-4	N	--	39.11	511	31.03	0.028	J	0.0044	3	NT			
Sodium	7440-23-5	--	--	--	--	--	49	J,B,p	8.92	100	NT			
Thallium	7440-28-0	N	2.11	0.548	7.154	3.64	0.058	J	0.027	0.5	NT			
Vanadium	7440-62-2	N	108	7.821	102.2	730.1	12		0.207	1	NT			
Zinc	7440-66-6	N	202	2,346	30,660	13,622	25		0.517	4	NT			
Pesticides/PCBs (ug/kg)														
Endosulfan I [4]	959-98-8	N	--	4.7E+04	6.1E+05	--	NT				<4.1	U	1.1	4.1
Endrin	72-20-8	N	--	2.3E+03	3.1E+04	5.4E+03	NT				3.3	J,J,g	0.67	4.1
Aroclor 1254 [5]	11097-69-1	C	--	1.6E+02	1.4E+03	1.1E+03	NT				400		5.5	41
TCL VOCs (ug/kg)														
2-Butanone	78-93-3	N	--	4.7E+06	6.1E+07	2.9E+04	<22	U	5.45	22	NT			
Acetone	67-64-1	N	--	7.0E+06	9.2E+07	2.2E+04	18	J,B,z	5.45	22	NT			
cis-1,2-Dichloroethene	156-59-2	N	--	7.8E+04	1.0E+06	--	<5.4	U	0.774	5.4	NT			
Cyclohexane	110-82-7	--	--	--	--	--	<11	U	0.344	11	NT			
Ethylbenzene	100-41-4	N	--	7.8E+05	1.0E+07	1.5E+04	<5.4	U	0.461	5.4	NT			
Methylcyclohexane	108-87-2	--	--	--	--	--	<11	U	0.921	11	NT			
Methylene chloride	75-09-2	C	--	8.5E+04	3.8E+05	1.9E+01	5.6	J,J,c	3.06	22	NT			
Toluene	108-88-3	N	--	6.3E+05	8.2E+06	2.7E+04	<5.4	U	0.506	5.4	NT			
Xylenes	1330-20-7	N	--	1.6E+06	2.0E+07	3.0E+03	<5.4	U	0.459	5.4	NT			
VOC TICs (ug/kg)														
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	NI				NI			
2-Methyl-hexane	591-76-4	--	--	--	--	--	NI				NI			
3-Methyl-hexane	589-34-4	--	--	--	--	--	NI				NI			
4-Isopropyltoluene	99-87-6	--	--	--	--	--	NI				NI			
7,7-Dimethyl-2-methylene-bicyclo[2.2.1]h	471-841	--	--	--	--	--	NI				NI			
Camphene	79-92-5	--	--	--	--	--	NI				NI			
Hexanal	66-25-1	--	--	--	--	--	NI				NI			
Hexane	110-54-3	--	--	--	--	--	NI				NI			
Pentane, 2-methyl-	107-83-5	--	--	--	--	--	NI				NI			
Pentane, 3-ethyl-2,2-dimethyl-	16747-32-3	--	--	--	--	--	NI				NI			
TCL SVOCs (ug/kg)														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+04	2.0E+05	5.7E+02	<180	U	3.47	180	NT			
Dinitrotoluene Mix	--	C	--	9.4E+02	4.2E+03	--	ND				NT			
4-Chloro-3-Methylphenol [6]	59-50-7	N	--	3.9E+05	5.1E+06	--	17	J	5.73	180	NT			
Bis(2-ethylhexyl) Phthalate	117-81-7	C	--	4.6E+04	2.0E+05	2.9E+06	43	J	2.28	180	NT			
Butyl Benzyl Phthalate	85-68-7	N	--	1.6E+06	2.0E+07	1.7E+07	<180	U	4.93	180	NT			
Caprolactam	105-62-2	--	--	--	--	--	<360	U,UJ,c	7.02	360	NT			
Di-n-butylphthalate	84-74-2	N	--	7.8E+05	1.0E+07	5.0E+06	24	J	4.2	180	NT			
Diethylphthalate	84-66-2	N	--	6.3E+06	8.2E+07	4.5E+05	13	J,B,z	2.09	180	NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	<180	U	2.59	180	NT			
N-Nitrosodiphenylamine	86-30-6	C	--	1.3E+05	5.8E+05	7.6E+02	<180	U	5.23	180	NT			
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	<180	U	2.53	180	NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<180	U	1.63	180	NT			
SVOC TICs (ug/kg)														
(M) 1-Eicosanol	629-96-9	--	--	--	--	--	NI				NI			
(Z)-9-Octadecenamide	301-02-0	--	--	--	--	--	79	E,B,x	0	100	NI			
.beta.-Sesquiphellan-drene	10001-221-02	--	--	--	--	--	NI				NI			
1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene	1740-19-8	--	--	--	--	--	NI				NI			
1,2-Benzenedicarboxylic acid, butyl 2-me	17851-53-5	--	--	--	--	--	NI				NI			
1,2-Benzenedicarboxylicacid, bis(2-methy	84-69-5	--	--	--	--	--	36	E,B,x	0	100	NI			
1,5,9-Undecatriene, 2,6,10-trimethyl-, (	62951-96-6	--	--	--	--	--	NI				NI			
1-HEXACOSANOL	506-52-5	--	--	--	--	--	NI				NI			
1-Phenanthrenecarboxylicacid, 1,2,3,4,4a	1235-74-1	--	--	--	--	--	NI				NI			
10-Methylnonadecane	56862-62-5	--	--	--	--	--	NI				NI			
13-Tertadecen-1-ol acetate	10001-307-98	--	--	--	--	--	NI				NI			
1R-.alpha.-Pinene	7785-70-8	--	--	--	--	--	NI				NI			

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Sample ID / Sample Date / Sample Depth (ft bgs)	CAS #	C/N	Facility-Wide Background Point Estimate[A]	Adjusted Soil RBC (Residential)	Adjusted Soil RBC (Industrial)	Soil to Groundwater SSL (DAF 20)	QSB3C 10/2/2003 17-19 Result	QSB3C 10/2/2003 17-19 LQ, VQ, r	MDL	RL	QSB4A 11/16/2007 0-1 Result	QSB4A 11/16/2007 0-1 LQ, VQ, r	MDL	RL
2 (5H)-Furanone	497-23-4	--	--	--	--	--	NI				NI			
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	--	--	--	--	--	70	E,B,x	0	100	NI			
2,6,10,14,18,22-Tetracosahexaene,2,6,10,	111-02-4	--	--	--	--	--	NI				NI			
2,6,10-Dodecatrien-1-ol,3,7,11-trimethyl	4128-17-0	--	--	--	--	--	NI				NI			
2,6,10-Dodecatriene-1-ol,3,7,11-trimethy	4602-84-0	--	--	--	--	--	NI				NI			
2-Cyclopenten-1-one, 3-methyl-2-(1,3-pen	22610-80-6	--	--	--	--	--	NI				NI			
2-Ethyl-1-Hexanol	104-76-7	--	--	--	--	--	NI				NI			
2-Fluoro-4-nitrophenol	403-19-0	--	--	--	--	--	NI				NI			
2-Pentadecanone, 6,10,14-trimethyl-	502-69-2	--	--	--	--	--	NI				NI			
3-Hexene-2,5-dione	4436-75-3	--	--	--	--	--	85	E,NJ,t	0	10	NI			
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,	10001-439-24	--	--	--	--	--	25	E,NJ,t	0	1	NI			
7-Nonenamide	90949-53-4	--	--	--	--	--	NI				NI			
a-Pinene	80-56-8	--	--	--	--	--	NI				NI			
beta-Pinene	127-91-3	--	--	--	--	--	NI				NI			
Bicyclo[3.1.1]hept-2-ene,2,6,6-trimethyl	2437-95-8	--	--	--	--	--	NI				NI			
Cyclotetradecane	295-17-0	--	--	--	--	--	NI				NI			
Ditriacontane	544-85-4	--	--	--	--	--	23	E,NJ,t	0	100	NI			
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10	10001-630-47	--	--	--	--	--	NI				NI			
Docosane	629-97-0	--	--	--	--	--	32	E,NJ,t	0	10	NI			
Eicosane	112-95-8	--	--	--	--	--	NI				NI			
Erucylamide	112-84-5	--	--	--	--	--	NI				NI			
Ethanol, 2-(hexadecyloxy)-	2136-71-2	--	--	--	--	--	NI				NI			
Heneicosane	629-94-7	--	--	--	--	--	27	E,B,x	0	1000	NI			
Hentriacontane	630-04-6	--	--	--	--	--	NI				NI			
Heptacosane	593-49-7	--	--	--	--	--	NI				NI			
Heptadecane	629-78-7	--	--	--	--	--	NI				NI			
Heptadecane, 9-octyl-	7225-64-1	--	--	--	--	--	NI				NI			
Hexatriacontane	630-06-8	--	--	--	--	--	NI				NI			
Nonadecane, 9-methyl-	13287-24-6	--	--	--	--	--	NI				NI			
Octacosane	630-02-4	--	--	--	--	--	NI				NI			
Octadecane, 3-ethyl-5-(2-ethylbutyl)-	55282-12-7	--	--	--	--	--	NI				NI			
Stearic Acid	57-11-4	--	--	--	--	--	NI				NI			
Tetratriacontane	14167-59-0	--	--	--	--	--	31	E,B,x	0	10	NI			
TCL PAHs (ug/kg)														
Anthracene	120-12-7	N	--	2.3E+06	3.1E+07	4.7E+05	<23	U,UJ,s	0.77	23	NT			
Benzo(a)anthracene	56-55-3	C	--	2.2E+02	3.9E+03	4.8E+02	<23	U,UJ,s	0.88	23	NT			
Benzo(b)fluoranthene	205-99-2	C	--	2.2E+02	3.9E+03	1.5E+03	<23	U,UJ,s	1.43	23	NT			
Benzo(k)fluoranthene	207-08-9	C	--	2.2E+03	3.9E+04	1.5E+04	<23	U,UJ,s	1.1	23	NT			
Chrysene	218-01-9	C	--	2.2E+04	3.9E+05	4.8E+04	<23	U,UJ,s	1.32	23	NT			
Fluoranthene	206-44-0	N	--	3.1E+05	4.1E+06	6.3E+06	<23	U,UJ,l	1.87	23	NT			
Fluorene	86-73-7	N	--	3.1E+05	4.1E+06	1.4E+05	<23	U,UJ,s	1.43	23	NT			
Phenanthrene [7]	85-01-8	N	--	2.3E+05	3.1E+06	--	<23	U,UJ,s	0.66	23	NT			
Pyrene	129-00-0	N	--	2.3E+05	3.1E+06	6.8E+05	<23	U,UJ,s	0.99	23	NT			
Explosives (mg/kg)														
2,4-Dinitrotoluene	121-14-2	N	--	1.6E+01	2.0E+02	5.7E-01	<0.5	U	0.142	0.5	<2.5	U	0.1	2.5
Dinitrotoluene Mix	--	C	--	9.4E-01	4.2E+00	--	ND				ND			
Cyanide (mg/kg)														
Cyanide	57-12-5	N	--	1.6E+02	2.0E+03	1.5E+02	<0.5	U	0.0356	0.5	NT			
Percent Solids (%)														
Percent Solids	--	--	--	--	--	--	92		0.1	0.1	80		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
ft bgs = Feet Below Ground Surface
mg/kg = Milligram Per Kilogram
µg/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested
NR = Not Reported
NI = Not Identified
-- = No Value Available

[A] = Facility Background = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001)
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan RBC value was used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol RBC value was used
[7] = Pyrene RBC value was used

= Concentration Exceeds Adjusted Soil Residential RBC

= Concentration Exceeds Adjusted Soil Industrial RBC

underline = Concentration Exceeds Site Background Values

bold italic = Concentration Exceeds SSL DAF20

Laboratory Qualifiers

B	Analyte found in associated blank as well as in the sample.
E	Concentration exceeded the upper level of the calibration range of the instrument for that specific analysis. For TICs, compound not present in calibration standard, calculated using total peak areas ion chromatographs and response factor of
J	Estimated value.
U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
Q	Not estimated. TIC detected in sample, quantified using a response factor from the initial calibration.

Validation Qualifiers

B	Not detected substantially above the level reported in laboratory or field blanks.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.

Reason Codes

GC/MS Organics

c	Calibration failure; poor (RRF) or unstable (%D) response
f	Field duplicate imprecision
l	MS/MSD recovery failure
s	Surrogate failure
t	Tentatively identified Compound
x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination

GC and HPLC Organics

c	Calibration failure; poor or unstable (%D) response
f	Field duplicate imprecision
g	Dual column confirmation imprecision
l	MS/MSD recovery failure
s	No confirmation column
x	Trip blank contamination
z	Method blank and/or storage blank contamination

Inorganics and Conventionals

f	Field duplicate imprecision
m	MS/MSD recovery failure
p	Preparation blank contamination
s	Serial dilution failure

Table 4-10
Summary of Risk Screening Results for Soil - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	Facility Background	C/N	Adjusted R-RBC	C/N	Adjusted I-RBC	SSL DAF20	Minimum Detected Concentration	Maximum Detected Concentration	# of Samples that Exceed Adj. R-RBC[A]	# of Samples that Exceed Adj. I-RBC[A]	# of Samples that Exceed SSL[A]	# of Detections	# of Samples
TAL Metals (mg/kg)														
Aluminum	7429-90-5	40,041	N	7,821	N	102,200	--	3,360	26,400	0	0	--	33	33
Antimony	7440-36-0	--	N	3.13	N	40.88	13.2	0.0355	0.39	0	0	0	26	33
Arsenic	7440-38-2	15.8	C	0.426	C	1.91	0.026	0.54	5.1	0	0	0	33	33
Barium	7440-39-3	209	N	1,564	N	20,440	6,015	27	180	0	0	0	33	33
Beryllium	7440-41-7	1.02	N	15.64	N	204	1,154	0.18	0.93	0	0	0	33	33
Cadmium	7440-43-9	0.69	N	3.91	N	51.1	27.45	0.88	2	0	0	0	33	33
Calcium	7440-70-2	--	--	--	--	--	--	622	27,600	--	--	--	33	33
Chromium[1]	7440-47-3	65.3	N	23.46	N	306.6	42.048	6	82	**3**	0	**3**	33	33
Cobalt	7440-48-4	--	--	--	--	--	--	3.3	13	--	--	--	33	33
Copper	7440-50-8	53.5	N	312.9	N	4,088	10,518	1.5	85	0	0	0	33	33
Iron	7439-89-6	50,962	N	5,475	N	71,540	--	6,530	32,200	0	0	--	33	33
Lead[2]	7439-92-1	26.8	--	400	--	750	--	2.6	52	0	0	--	33	33
Magnesium	7439-95-4	--	--	--	--	--	--	855	8,240	--	--	--	33	33
Manganese	7439-96-5	2,543	N	156.43	N	2,044	951.9	81	600	0	0	0	33	33
Mercury[3]	7439-97-6	0.13	--	2.35	--	30.66	--	0.01	0.27	0	0	--	25	33
Nickel	7440-02-0	62.8	N	156.43	N	2,044	--	4.4	35	0	0	--	33	33
Potassium	7440-09-7	--	--	--	--	--	--	439	2,410	--	--	--	33	33
Selenium	7782-49-2	--	N	39.11	N	511	18.98	0.11	0.78	0	0	0	32	33
Silver	7440-22-4	--	N	39.11	N	511	31.03	0.026	0.14	0	0	0	33	33
Sodium	7440-23-5	--	--	--	--	--	--	27	75	--	--	--	33	33
Thallium	7440-28-0	2.11	N	0.548	N	7.154	3.638	0.04	0.25	0	0	0	33	33
Vanadium	7440-62-2	108	N	7.821	N	102.2	730.1	8.3	50	0	0	0	33	33
Zinc	7440-66-6	202	N	2,346	N	30,660	13,622	17	120	0	0	0	33	33
Pesticides/PCBs (ug/kg)														
Endosulfan I[4]	959-98-8	--	N	4.7E+04	N	6.1E+05	--	2.6	2.6	0	0	--	1	18
Endrin	72-20-8	--	N	2.3E+03	N	3.1E+04	5.4E+03	1.1	3.45	0	0	0	4	18
Aroclor 1254[5]	11097-69-1	--	N	1.6E+02	C	1.4E+03	1.1E+03	17	570	**3**	0	0	9	18
TCL VOCs (ug/kg)														
2-Butanone (MEK)	78-93-3	--	N	4.7E+06	N	6.1E+07	2.9E+04	17	28	0	0	0	8	18
Acetone	67-64-1	--	N	7.0E+06	N	9.2E+07	2.2E+04	18	200	0	0	0	18	18
cis-1,2-Dichloroethene	156-59-2	--	N	7.8E+04	N	1.0E+06	--	9.726	9.726	0	0	--	1	18
Cyclohexane	110-82-7	--	--	--	--	--	--	0.557	0.557	--	--	--	1	18
Ethylbenzene	100-41-4	--	N	7.8E+05	N	1.0E+07	1.5E+04	0.518	0.518	0	0	0	1	18
Methylcyclohexane	108-87-2	--	--	--	--	--	--	2.385	2.385	--	--	--	1	18
Methylene chloride	75-09-2	--	C	8.5E+04	C	3.8E+05	1.9E+01	4	6.8	0	0	0	9	18
Toluene	108-88-3	--	N	6.3E+05	N	8.2E+06	2.7E+04	0.493	3	0	0	0	3	18
Xylenes	1330-20-7	--	N	1.6E+06	N	2.0E+07	3.0E+03	2.192	2.192	0	0	0	1	18
TCL SVOCs (ug/kg)														
2,4-Dinitrotoluene	121-14-2	--	N	1.6E+04	N	2.0E+05	5.7E+02	98.5	120	0	0	0	3	18
Dinitrotoluene Mix	--	--	C	9.4E+02	C	4.2E+03	--	98.5	120	0	0	--	3	18
4-Chloro-3-Methylphenol[6]	59-50-7	--	N	3.9E+05	N	5.1E+06	--	9	29	0	0	--	14	18
Bis(2-ethylhexyl) Phthalate	117-81-7	--	C	4.6E+04	C	2.0E+05	2.9E+06	42	1,300	0	0	0	18	18
Butyl Benzyl Phthalate	85-68-7	--	N	1.6E+06	N	2.0E+07	1.7E+07	41	52	0	0	0	3	18
Caprolactam	105-60-2	--	N	3.9E+06	N	5.1E+07	--	57.07	130	0	0	--	3	18
Di-n-butylphthalate	84-74-2	--	N	7.8E+05	N	1.0E+07	5.0E+06	22.5	14,000	0	0	0	18	18
Diethylphthalate	84-66-2	--	N	6.3E+06	N	8.2E+07	4.5E+05	3	18.5	0	0	0	16	18
Fluoranthene	206-44-0	--	N	3.1E+05	N	4.1E+06	6.3E+06	2.823	170	0	0	0	5	18
N-Nitrosodiphenylamine	86-30-6	--	C	1.3E+05	C	5.8E+05	7.6E+02	17	160	0	0	0	5	18
Phenanthrene[7]	85-01-8	--	N	2.3E+05	N	3.1E+06	--	3	110	0	0	--	4	18
Pyrene	129-00-0	--	N	2.3E+05	N	3.1E+06	6.8E+05	2.5	90	0	0	0	5	18
TCL Explosives (mg/kg)														
2,4-Dinitrotoluene	121-14-2	--	N	1.6E+01	N	2.0E+02	5.7E-01	0.255	0.255	0	0	0	1	34
Dinitrotoluene Mix	--	--	C	9.4E-01	C	4.2E+00	--	0.255	0.255	0	0	--	1	34
Cyanide (mg/kg)														
Cyanide	57-12-5	--	N	1.6E+02	N	2.0E+03	1.5E+02	0.0296	2.2	0	0	0	11	18

Table 4-10
Summary of Risk Screening Results for Soil - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
µg/kg = Microgram per kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
Facility Background = Facility-Wide Background Point Estimate as Reported in the Facility-Wide Background Study Report (IT 2001)
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
R-RBC = Adjusted Residential RBC
I-RBC = Adjusted Industrial RBC
SSL DAF20 = Soil Screening Level at a Dilution Attenuation Factor of 20
-- = No screening value available

[A] = For inorganics, number of samples that exceed background (if available) and screening level
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan RBC value was used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol RBC value was used
[7] = Pyrene RBC value was used

Table 4-11
Summary of Detected Chemicals in Groundwater Analytical Samples at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS	C/N	Adjusted Tap Water RBC	MCL	Units	38MW1 2/12/2008		MDL	RL	38MW2 2/12/2008		MDL	RL	38MW2-DUP(DUP-1P) 2/12/2008		MDL	RL	38MW3 2/13/2008		MDL	RL	38MW3* 6/24/2008		MDL	RL	38MW3-DUP (DUP-1)* 6/24/2008		MDL	RL
						Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
Perchlorate																													
Perchlorate	14797-73-0	N	2.555	--	ug/L	1.2		0.08	0.2	0.32		0.08	0.2	0.31		0.08	0.2	0.44		0.08	0.2	NT				NT			
TAL Metals																													
Aluminum, Total	7429-90-5	N	3,650	--	ug/L	120	J	44	200	93	J	44	200	NT				1,900		44	200	NT				NT			
Arsenic, Total	7440-38-2	C	0.0446	10	ug/L	<3	U	0.74	3	<3	U	0.74	3	NT				0.99	J	0.74	3	NT				NT			
Barium, Dissolved	7440-39-3	N	730	2,000	ug/L	47		0.52	2	35		0.52	2	NT				77		0.52	2	NT				NT			
Barium, Total	7440-39-3	N	730	2,000	ug/L	51		0.52	2	37		0.52	2	NT				100		0.52	2	NT				NT			
Cadmium, Total	7440-43-9	N	1.825	5	ug/L	<0.2	U	0.062	0.2	<0.2	U	0.062	0.2	NT				0.12	J	0.062	0.2	NT				NT			
Calcium, Dissolved	7440-70-2	--	--	--	ug/L	150,000		40	500	89,000		40	500	NT				120,000		40	500	NT				NT			
Calcium, Total	7440-70-2	--	--	--	ug/L	150,000		40	500	91,000		40	500	NT				120,000		40	500	NT				NT			
Chromium, Dissolved [1]	7440-47-3	C	10.95	100	ug/L	1.6	J,B,p	0.31	2	1.4	J,B,p	0.31	2	NT				1.4	J,B,p	0.31	2	NT				NT			
Chromium, Total [1]	7440-47-3	C	10.95	100	ug/L	3.3		0.31	2	1.9	J,B,x	0.31	2	NT				9.2		0.31	2	NT				NT			
Cobalt, Dissolved	7440-48-4	--	--	--	ug/L	2.2		0.096	1	0.9	J	0.096	1	NT				2.2		0.096	1	NT				NT			
Cobalt, Total	7440-48-4	--	--	--	ug/L	1.8		0.096	1	1.2		0.096	1	NT				4.6		0.096	1	NT				NT			
Copper, Dissolved	7440-50-8	N	146	1,300	ug/L	1.1		0.33	1	0.99	J	0.33	1	NT				1		0.33	1	NT				NT			
Copper, Total	7440-50-8	N	146	1,300	ug/L	1		0.33	1	1.2		0.33	1	NT				4.4		0.33	1	NT				NT			
Iron, Dissolved	7439-89-6	N	2,555	--	ug/L	11	J	5.7	20	9.7	J	5.7	20	NT				<20	U	5.7	20	NT				NT			
Iron, Total	7439-89-6	N	2,555	--	ug/L	340		5.7	20	540		5.7	20	NT				5,500		5.7	20	NT				NT			
Lead, Total [2]	7439-92-1	--	15	--	ug/L	<1	U	0.33	1	<1	U	0.33	1	NT				1.9		0.33	1	NT				NT			
Magnesium, Dissolved	7439-95-4	--	--	--	ug/L	51,000		38	500	22,000		38	500	NT				30,000		38	500	NT				NT			
Magnesium, Total	7439-95-4	--	--	--	ug/L	48,000		38	500	23,000		38	500	NT				33,000		38	500	NT				NT			
Manganese, Dissolved	7439-96-5	N	73	--	ug/L	36		0.43	3	4.7		0.43	3	NT				2,400		4.3	30	1,000		1.2	12	1,100		1.2	12
Manganese, Total	7439-96-5	N	73	--	ug/L	50		0.43	3	26		0.43	3	NT				2,600		4.3	30	980		1.2	12	1,000		1.2	12
Nickel, Dissolved	7440-02-0	N	73	--	ug/L	3		0.28	2	1	J,B,p	0.28	2	NT				4.7		0.28	2	NT				NT			
Nickel, Total	7440-02-0	N	73	--	ug/L	2.6		0.28	2	1.2	J,B,x	0.28	2	NT				11		0.28	2	NT				NT			
Potassium, Dissolved	7440-09-7	--	--	--	ug/L	770		54	200	630		54	200	NT				1,200		54	200	NT				NT			
Potassium, Total	7440-09-7	--	--	--	ug/L	750		54	200	740		54	200	NT				1,900		54	200	NT				NT			
Sodium, Dissolved	7440-23-5	--	--	--	ug/L	16,000		84	500	13,000		84	500	NT				8,800		84	500	NT				NT			
Sodium, Total	7440-23-5	--	--	--	ug/L	16,000		84	500	13,000		84	500	NT				8,900		84	500	NT				NT			
Vanadium, Total	7440-62-2	N	3.65	--	ug/L	0.86	J	0.83	5	0.86	J	0.83	5	NT				5.8		0.83	5	NT				NT			
Zinc, Dissolved	7440-66-6	N	1,095	--	ug/L	12	,B,p	0.84	10	6.9	J,B,p	0.84	10	NT				15	,B,p	0.84	10	NT				NT			
Zinc, Total	7440-66-6	N	1,095	--	ug/L	6.8	J,B,p	0.84	10	6.6	J,B,p	0.84	10	NT				18		0.84	10	NT				NT			
Pesticides																													
beta-BHC	319-85-7	C	0.0372	--	ug/L	<0.05	U	0.0032	0.05	<0.05	U	0.0032	0.05	NT				0.016	J,J,g	0.0032	0.05	NT				NT			
Endosulfan II [3]	33213-65-9	N	21.9	--	ug/L	<0.1	U	0.0018	0.1	0.0047	J	0.0018	0.1	NT				<0.1	U	0.0018	0.1	NT				NT			
TCL VOCs																													
Chloroform	67-66-3	C	0.155	80	ug/L	1.7		0.061	1	<1	U	0.061	1	NT				<1	U	0.061	1	NT				NT			
Chloromethane	74-87-3	N	18.98	--	ug/L	<1	U	0.06	1	<1	U	0.06	1	NT				0.34	J	0.06	1	NT				NT			
Toluene	108-88-3	N	227.1	1,000	ug/L	0.18	J,B,z	0.072	1	0.16	J,B,z	0.072	1	NT				0.23	J,B,z	0.072	1	NT				NT			
Field Parameters																													
Dissolved Oxygen	--	--	--	--	mg/L	5.02				3.94				3.94				3.9				NT				NT			
Oxidation Reduction Potential	--	--	--	--	mV	104				220				220				182				NT				NT			
pH	--	--	--	--	SU	6.51				6.67				6.67				6.45				NT				NT			
Conductivity	--	--	--	--	mS	1.1				0.708				0.708				0.86				NT				NT			
Temperature	--	--	--	--	°C	16.67				16.02				16.02				14.39				NT				NT			
Turbidity	--	--	--	--	ntu	8.97				12.11				12.11				25.5				NT				NT			

Notes:

CAS = Chemical Abstracts Service
mg/L = Milligram Per Liter
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
SVOC = Semi-volatile Organic Compound
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested

mV = millivolt
SU = Standard Units
mS = milliSiemen
°C = degrees Celcius
NTU = Nephelometric Turbidity
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2007)
N = Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level

[1] = Chromium VI RBC used for screening
[2] = USEPA Action Level used for screening
[3] = Endosulfan RBC used for screening

* Re-sampled on 6/24/08 for Manganese only

=Exceeds MCL

=Exceeds Adjusted T-RBC

Data Qualifiers:
B = Not detected substantially above the level reported in laboratory or field blanks.
J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
f = Field duplicate imprecision
m = MS/MSD recovery failure.
p = Preparation blank contamination
x = Field and/or equipment blank contamination
y = Trip blank contamination
z = Method blank and/or storage blank contamination

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Table 4-12
Summary of Risk Screening Results for Groundwater at SMWU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	C/N	Adjusted T-RBC	MCL	Minimum Detected Concentration	Maximum Detected Concentration	Number of Samples that Exceed Adj. T-RBC	Number of Samples that Exceed MCL	Number of Detections	Number of Samples
Perchlorate										
Perchlorate	14797-73-0	N	2.555	--	0.315	1.2	0	--	3	3
TAL Metals										
Aluminum, Total	7429-90-5	N	3,650	--	93	1,900	0	--	3	3
Arsenic, Total	7440-38-2	C	0.0446	10	0.99	0.99	**1**	0	1	3
Barium, Dissolved	7440-39-3	N	730	2,000	35	77	0	0	3	3
Barium, Total	7440-39-3	N	730	2,000	37	100	0	0	3	3
Cadmium, Total	7440-43-9	N	1.825	5	0.12	0.12	0	0	1	3
Calcium, Dissolved	7440-70-2	--	--	--	89,000	150,000	--	--	3	3
Calcium, Total	7440-70-2	--	--	--	91,000	150,000	--	--	3	3
Chromium, Dissolved [1]	7440-47-3	C	10.95	100	1.4	1.6	0	0	3	3
Chromium, Total [1]	7440-47-3	C	10.95	100	1.9	9.2	0	0	3	3
Cobalt, Dissolved	7440-48-4	--	--	--	0.9	2.2	--	--	3	3
Cobalt, Total	7440-48-4	--	--	--	1.2	4.6	--	--	3	3
Copper, Dissolved	7440-50-8	N	146	1,300	0.99	1.1	0	0	3	3
Copper, Total	7440-50-8	N	146	1,300	1	4.4	0	0	3	3
Iron, Dissolved	7439-89-6	N	2,555	--	9.7	11	0	--	2	3
Iron, Total	7439-89-6	N	2,555	--	340	5,500	**1**	--	3	3
Lead, Total [2]	7439-92-1	--	15	--	1.9	1.9	0	--	1	3
Magnesium, Dissolved	7439-95-4	--	--	--	22,000	51,000	--	--	3	3
Magnesium, Total	7439-95-4	--	--	--	23,000	48,000	--	--	3	3
Manganese, Dissolved	7439-96-5	N	73	--	4.7	1,050	**1**	--	2	2
Manganese, Total	7439-96-5	N	73	--	26	990	**1**	--	2	2
Nickel, Dissolved	7440-02-0	N	73	--	1	4.7	0	--	3	3
Nickel, Total	7440-02-0	N	73	--	1.2	11	0	--	3	3
Potassium, Dissolved	7440-09-7	--	--	--	630	1,200	--	--	3	3
Potassium, Total	7440-09-7	--	--	--	740	1,900	--	--	3	3
Sodium, Dissolved	7440-23-5	--	--	--	8,800	16,000	--	--	3	3
Sodium, Total	7440-23-5	--	--	--	8,900	16,000	--	--	3	3
Vanadium, Total	7440-62-2	N	3.65	--	0.86	5.8	**1**	--	3	3
Zinc, Dissolved	7440-66-6	N	1,095	--	6.9	15	0	--	3	3
Zinc, Total	7440-66-6	N	1,095	--	6.6	18	0	--	3	3
Pesticides										
beta-BHC	319-85-7	C	0.0372	--	0.016	0.016	0	--	1	3
Endosulfan II [3]	33213-65-9	N	21.9	--	0.0047	0.0047	0	--	1	3
TCL VOCs										
Chloroform	67-66-3	C	0.155	80	1.7	1.7	**1**	0	1	3
Chloromethane	74-87-3	N	18.98	--	0.34	0.34	0	--	1	3
Toluene	108-88-3	N	227.1	1,000	0.16	0.23	0	0	3	3

Notes:

CAS = Chemical Abstract Service
ug/L = Microgram Per Liter
T-RBC = Adjusted Tap Water RBC
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
C/N = Carcinogenic/Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level

[1] = Chromium VI RBC value was used
[2] = USEPA Action Level used for screening
[3] = Endosulfan RBC used for screening

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5.0 FATE AND TRANSPORT ASSESSMENT

This section discusses the fate and transport of site-related COPCs identified in the nature and extent assessment. Primary fate and transport mechanisms occurring at the site are discussed. The objective of the fate and transport analysis is to identify the primary mechanisms affecting the distribution and migration of COPCs and their ultimate fate. COPCs identified at the sites are summarized in the following table.

COPCs from Nature and Extent Assessment

Human Health Soil COPCs	Soil Constituents Above SSL DAF20	Human Health Groundwater COPCs
Aluminum (SWMUs 35, 37, 38 & AOC Q) Chromium (SWMUs 35, 37, 38 & AOC Q) Lead (SWMU 35) Manganese (SWMU 38 & AOC Q) Mercury (SWMU 37) Aroclor 1254 (SWMUs 35, 37, 38 & AOC Q) Aroclor 1260 (SWMU 35) Nitroglycerin(SWMU 35)	Chromium (SWMUs 35, 37, 38 & AOC Q) Dieldrin (SWMU 37) Aroclor 1254 (SWMU 35) TCE (SWMU 37) 2,4-DNT (SWMU 37)	Manganese(SWMUs 35, 37, 38 & AOC Q) Chloroform(SWMUs 35, 37, 38 & AOC Q) Alpha-BHC (SWMU 37) Heptachlor Epoxide (SWMU 37)

The potential for transport of chemicals in environmental media is largely controlled by the physiochemical properties of the chemicals and the matrix through which they travel or migrate. Table 5-1a describes the physiochemical properties of chemicals that affect their fate in environmental media. Table 5-1b describes the fate processes affecting metals including: ion exchange, chemical speciation, and oxidation-reduction potential. Table 5-1c describes the fate processes affecting organic chemicals including: sorption, volatilization, hydrolysis, and abiotic and biotic degradation. Chemicals can be transported with little attenuation or retardation due to these fate processes or they can be delayed or transformed so that minimal migration occurs. The physical and chemical properties of organic COPCs detected in soil and/or groundwater are summarized in Table 5-2.

Primary fate and transport mechanisms for COPCs potentially present at the site include the following:

- Volatilization of chemicals from soil and groundwater;
- Erosion of particulate-bound chemicals from soil;
- Degradation of chemicals in soil and groundwater;
- Leaching of chemicals from soil with infiltrating water; and
- Transport of chemicals with groundwater flow.

Fate and transport processes for site media are discussed in the following sections.

5.1 FATE AND TRANSPORT - SOIL

Fate and transport processes for soil are discussed in the following sections including volatilization, erosion and mass transport, and degradation of chemicals in soil, and leaching of chemical from soil with infiltrating water.

5.1.1 Volatilization

Volatilization can significantly affect the distribution of a chemical in the environment. This process will result in the mass and concentration of a chemical in soil and/or groundwater as the chemical volatilizes to soil gas and ultimately discharges to the atmosphere. Volatilization reactions are most significant in surface soil that is in direct (or near-direct) contact with the atmosphere. These reactions may also occur in groundwater with VOCs. Chemical volatility is typically quantified by a chemical's Henry's constant, which may be calculated from the chemical's vapor pressure, molecular weight, and solubility. The lower

the Henry's constant, the less volatile the chemical. Values of Henry's constant for soil COPCs are summarized in Table 5-2.

One VOC was identified as a COPC for the soil-to-groundwater migration pathway at SWMU 37 based on two detections in subsurface samples above calculated site-specific SSLs. Low concentrations of VOCs were detected in sludge and soil at SWMU 35, SWMU 37, SWMU 38, and AOC Q and therefore, volatilization is not expected to be a significant influence on the fate of these compounds in soil. Other COPCs at the sites are characterized by low Henry's constants (i.e., < 0.01) and are not VOCs, and therefore, volatilization is not expected to be a significant influence on the fate of these compounds at SWMU 35, SWMU 37, SWMU 38, and AOC Q.

5.1.2 Erosion Processes in Soil

Erosion processes can substantially affect the distribution of soil-bound particulates in the environment and thus influence the distribution of constituents in soil. High winds can scour fine particles from the soil surface and redistribute these particles downwind. Mass transport from surface water runoff during heavy precipitation events can also scour fine soil particles from surface soil, eventually depositing the particles during sedimentation downstream. This potential migration pathway is unlikely due to the presence of constituents of concern location primarily within the drying beds, which are topographically lower than surrounding areas and have internal drainage. Potential migration of COPCs at the site by wind erosion or mass transport is unlikely a significant pathway given that the site areas are covered by heavy vegetation cover (field grass). Chemical sampling did not indicate evidence of transport of COPCs outside of identified disposal areas.

5.1.3 Degradation of Chemicals in Soil

Many organic chemicals that are found in the environment are subject to naturally occurring biotic (biologically based) and abiotic (non-biologically based) transformation reactions. These reactions result in degradation of the chemical. Biodegradation reactions can occur under aerobic (in the presence of oxygen) and anaerobic (in the absence of oxygen) conditions. During biodegradation, naturally occurring microorganisms in the subsurface transform a chemical to another state as a direct or indirect consequence of their metabolic processes. In many cases, biodegradation reactions break down organic chemicals to less toxic forms.

Several naturally occurring abiotic reactions can significantly affect the fate of chemicals in the environment. Common abiotic reactions include photodegradation and hydrolysis. Photodegradation is the process of decomposition of a chemical upon exposure to radiant energy such as the action of light, and is most significant to chemicals in surface soil that are in direct contact with sunlight. Hydrolysis is the degradation reaction of the chemical with components of water (e.g., hydroxyl and hydronium ions) and is therefore most important in saturated environments.

5.1.3.1 Metals

Metal COPCs, such as aluminum, calcium, chromium, copper, lead, manganese, and mercury will not be significantly influenced by degradation processes in soil.

5.1.3.2 Pesticides - Dieldrin

Pesticides were detected at low concentrations in soil at the site. Dieldrin was identified as a COPC for the soil-to-groundwater migration pathway. Dieldrin does not degrade readily in soil or water. Most dieldrin adsorbs strongly to soil and is extremely resistant to biodegradation, persisting for many years in the upper soil layers.

5.1.3.3 PCBs

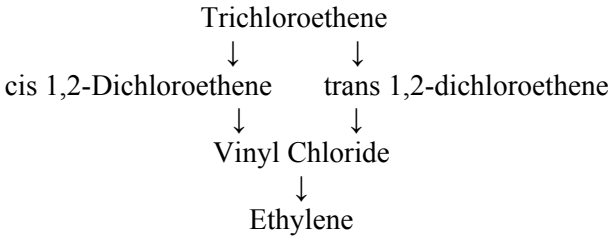
PCBs are very persistent in the environment and are extremely resistant to oxidation and hydrolysis. PCBs are resistant to chemical degradation by oxidation or hydrolysis (HSDB 2007). Aroclors are PCB

mixtures of more than 90 different congeners of chlorobiphenyl. Detected Aroclors at the site have a high degree of chlorination (54% for 1254 and 60% for 1260), which contain higher proportions of the more heavily chlorinated congeners. The persistence of PCBs generally increases with an increase in the degree of chlorination. Aroclor 1254 and 1260 are generally resistant to biodegradation in soil, with limited degradation involving anaerobic reactions, which result in reductive dechlorination to lower chlorinated PCBs; however, this degradation does not necessarily lead to a reduction in toxicity (HSDB 2007). Some biodegradation of lower chlorinated PCBs can occur under aerobic conditions through biotic degradation by microorganisms. Lower chlorinated PCBs tend to degrade more readily than higher chlorinated PCBs.

5.1.3.4 VOCs

VOCs were detected at low concentrations in soil at the sites. TCE was identified as a COPC for the soil-to-groundwater migration pathway. TCE is resistant to aerobic degradation in soil although biodegradation may proceed co-metabolically. Under anaerobic conditions, TCE is slowly biodegraded through reductive dechlorination, with the extent and rate of degradation dependant on the degree of the reducing environment. The reductive dechlorination pathway for TCE is shown below. Degradation by products of TCE have not been detected in soil, sludge, or groundwater samples collected at SWMU 35, SWMU 37, SWMU 38, and AOC Q.

TCE Degradation Pathway – Reductive Dechlorination



5.1.3.5 Explosives – 2,4-DNT and Nitroglycerin

2,4-DNT is an impurity of trinitrotoluene (TNT) and may undergo some degradation in soil by microorganisms with a reduction of the nitro group to form amino groups including 4-amino-2-nitrotoluene and 2-amino-4-nitrotoluene. DNT may undergo photolysis in uppermost surface soil layers based on a rapid rate of photolysis observed in water. DNT is not expected to undergo hydrolysis in soil due to a lack of functional hydrolyzable functional groups (HSDB 2007). Degradation by products of 2,4-DNT have not been detected in soil, sludge, or groundwater samples collected at SWMU 35, SWMU 37, SWMU 38, and AOC Q.

Nitroglycerin undergoes rapid biodegradation using batch reactors and digestors but its rate of biodegradation in soil is unknown. Hydrolysis of nitroglycerin in soil may be important under alkaline conditions but is not expected to be an operable degradation process at the site due to the neutral pH of the soil (HSDB 2007).

5.1.4 Leaching of Chemicals from Soil to Groundwater

Chemicals in soil have the potential to migrate to greater depths with infiltrating water. As precipitation infiltrates, chemicals may be leached from the soil and carried to greater depths and potentially to groundwater. Factors affecting leaching are discussed below followed by specific assessments for COPCs identified in Section 4.0 for the soil-to-groundwater migration pathway based on comparisons to default DAF20 SSLs. The degree to which a chemical is leached is strongly influenced by the chemical's tendency to partition to the solid or aqueous phases, which is largely a function of the chemical's solubility and particle affinity.

Water Solubility

Water solubility of a chemical is the mass of chemical that will dissolve in a unit volume of water at a specific temperature. Chemicals with a high solubility can often be readily dissolved in water and therefore are susceptible to being mobilized from the soil matrix with infiltrating water and migrating downward to groundwater. Chemicals with a low solubility tend to partition to soil.

The solubility of organic chemicals is typically a function of the hydrophobic nature of the chemical. Many organic chemicals are non-polar and therefore do not dissolve readily into water, which is a polar solution. Several of the COPCs identified in soil at the sites, such as PCBs, have low water solubility. Water solubility data for COPCs are summarized in Table 5-2.

Adsorption

The aqueous concentration of chemicals in soil systems can also be substantially influenced by adsorption reaction to the soil matrix. Adsorption is the ability of a substance to bind to the surface of soil particles from reactions that occur between the chemical and the soil particle surface. Organic compounds are frequently non-polar, and therefore, tend to interact with organic matter commonly associated with the soil matrix. The tendency for a chemical to be adsorbed to the organic fraction of soil (or sediment) can be measured by the chemical's organic carbon partition coefficient (K_{oc}). The lower the K_{oc} values the more leaching potential from soil to water as summarized below. Organic compounds with a K_{oc} less than 100 liters per kilogram (L/kg), such as chloroform, have a high potential to leach from soil to water. Progressively higher values of K_{oc} greater than 500 L/kg indicate lower leaching potential. Organic compounds with K_{oc} values in the range of 1E+04 to 1E+06 L/kg, such as PCBs, are generally immobile or nearly immobile in soil. Values of K_{oc} for COPCs are summarized in Table 5-2.

Site-specific distribution coefficients (K_d) can be estimated for each organic COPC, as the product of the K_{oc} of the chemical and the fraction of the organic carbon (f_{oc}) in the soil matrix. The distribution coefficient is a measure of the ratio of chemical mass that partitions to the solid and liquid phases under equilibrium conditions. The fraction of organic carbon in site soil is estimated as 0.62% based on physical data collected at the sites. An order of magnitude higher organic carbon level was measured in a sludge sample collected from SWMU 35 (4%) and in soil immediately below this sludge (9%). Calculated K_d values are presented in Table 5-2. The relatively mobility of site COPCs for the soil-to-groundwater migration pathway have been estimated in the following table based on solubility, K_{oc} and K_d values.

Relative Mobility of COPCs in Soil for the Soil-to-Groundwater Migration Pathway

Immobile	Slight	Low	Moderate	High	Very High
Aroclor 1254	Chromium	Dieldrin	TCE	2,4-DNT	None

COPCs classified as immobile, slightly mobile, or low are unlikely to leach from soil to groundwater at levels of potential concern. Other factors that will influence the degree of leaching for COPCs with a higher mobility include: source area size, concentrations detected, and soil type and permeability.

5.1.4.1 Metals

Chromium was detected in one or more samples at concentrations at each site above their SSL DAF20s and facility-wide background point estimates. Metals detected above facility background without soil-to-groundwater SSLs included: aluminum, lead, and mercury.

Aluminum

Aluminum compounds generally exist in soil in the form of silicates, hydroxides, and oxides. During soil acidification, aluminum ions are released from silicates (i.e., solubilized). At pH values above 5, aluminum ions become strongly bound to soil and exist predominantly in an undissolved form such as

gibbsite (HSDB 2007 and ATSDR 1999c). The adsorption of aluminum to clay surfaces is a major factor in controlling aluminum mobility and has been observed to be very rapid (ATSDR 1999c). Aluminum is expected to be strongly adsorbed to soil and sludge at the site due to its neutral pH (above 5.5). Dissolved aluminum was not detected in groundwater samples collected at the site.

Chromium

The fate of chromium in soil is dependent on the speciation of chromium, which is a function of oxidation reduction potential and pH of the soil. Chromium is typically found in the III valence state, which has very low solubility and low reactivity resulting in low mobility in the environment. The neutral pH soil and sludge at the site will reduce the mobility and leachability of chromium. Site data do not indicate appreciable leaching of chromium to soil below the sludge layer. Dissolved chromium was not identified as a COPC in groundwater, with detected concentrations below the adjusted T-RBC.

Lead

Most lead is retained strongly in soil and very little leaches to groundwater. Elevated lead concentrations above 400 mg/kg were limited to two surface soil/sludge samples collected from the SWMU 35 drying bed. Soil samples collected from below the sludge layer did not indicate appreciable leaching of lead to subsurface soil at levels above background. Dissolved lead was not detected in site groundwater.

Mercury

Mercury has been detected in site surface soil and sludge samples collected from inside the drying beds at levels above the background point estimate of 0.13 mg/kg. Subsurface samples collected below the sludge had mercury concentrations below the background point estimate. Mercury compounds released to soil tend to be strongly adsorbed to soil and typically do not significantly leach. Adsorption of mercury increases with the percent of organic matter in the soil. In contrast to most other metals, acidification of soils does not increase the solubility of mercury compounds. Inorganic mercury compounds can be methylated by microorganisms that are indigenous to the soil environment. This process is mediated by various microbial populations under both aerobic and anaerobic conditions. Sulfur-reducing bacteria are responsible for most of the mercury methylation in the environment; however, yeast populations are also able to methylate mercury (HSDB 2007). Mercury is expected to have low mobility in the site soil and sludge contained in the drying bed given its low mobility and appreciable organic matter present in the sludge. Mercury was not detected in site groundwater.

5.1.4.2 PCBs

PCBs have a low solubility in water and high K_{oc} values, and will tend to be immobile in the environment and remain adsorbed to soil (Table 5-2). At SWMU 35, Aroclor 1254 was detected in 1 of 22 soil samples at a concentration higher than its SSL. PCBs are not considered a potential concern for the soil-to-groundwater migration pathway given their immobile nature, the limited detections above the SSL, the lack of detected concentrations above SSLs in the subsurface soil, and the lack of detections in site groundwater.

5.1.4.3 VOCs

The VOC COPC identified for the soil-to-groundwater migration pathway was TCE at SWMU 37. This compound has moderate solubility, a lower K_{oc} value, and high mobility in subsurface soil (Table 5-2). At SWMU 37, TCE was detected in 2 of 9 soil samples collected at low-level concentrations (6.8 and 63 µg/kg) above its SSL DAF20 (0.26 µg/kg). This chemical is not considered at potential concern for the soil-to-groundwater migration pathway given the infrequent low-level detections, lack of identified source area, and the lack of detections in site groundwater.

5.1.4.4 Pesticides

The pesticide COPC identified for the soil-to-groundwater migration pathway was dieldrin at SWMU 37. Pesticides have low mobility in the subsurface due their lower solubility and higher K_{oc} values and therefore will tend to remain absorbed to soil (Table 5-2). At SWMU 37, dieldrin was detected at concentrations above its SSL DAF20 in one soil samples collected from the surface soil/sludge within the drying bed. Appreciable leaching of dieldrin to subsurface soil below sludge was not apparent. Dieldrin is not considered a potential concern for the soil-to-groundwater migration pathway given its low mobility in soil, single detection above its SSL DAF20, limited apparent leaching relative to the depth of groundwater, and the lack of detections of dieldrin in site groundwater.

5.1.4.5 Explosives

The explosive COPC identified for the soil-to-groundwater migration pathway was 2,4-DNT at SWMU 37. It has a moderate solubility in water. The K_{oc} values are moderate for DNT mixtures. Based on their solubility and K_{oc} values, explosives are expected to have some mobility in soil and potential to leach to groundwater if present at sufficiently high concentrations. 2,4-DNT was detected in 3 of 24 samples with one sample above its SSL DAF20. Appreciable leaching of 2,4-DNT to subsurface soil below surface soil/sludge was not observed at concentrations above the SSL DAF20. 2,4-DNT is not considered a potential concern for the soil-to-groundwater migration pathway given the lack of appreciable leaching to subsurface soil, limited detections above the SSL, and the lack of detections in site groundwater.

5.2 FATE AND TRANSPORT - GROUNDWATER

Fate and transport processes for site-related COPCs in groundwater are discussed in the following sections. COPCs identified in groundwater include: manganese and chloroform (all sites) and alpha-BHC, and heptachlor epoxide (SWMU 37).

5.2.1 Volatilization

Volatilization of a chemical from groundwater will result in a reduction of its mass and concentration as the chemical volatilizes to soil gas and ultimately discharges to the atmosphere. This process may also occur in groundwater with VOCs. Some volatilization of chloroform may occur in site groundwater under ambient conditions due to its higher Henry's constant and volatility, and therefore, may have some influence on the fate of this compound in the subsurface.

5.2.2 Degradation of Chemicals in Groundwater

Inorganic groundwater COPCs are not subject to transformation and degradation in groundwater.

5.2.2.1 Chloroform

Chloroform will tend to persist in groundwater under aerobic conditions, where dissolved oxygen levels are greater than 0.5%. Degradation of chloroform may occur in groundwater under anaerobic conditions if appropriate microbial bacteria are present (USGS 2006). In this case, chloroform (trichloromethane) would be transformed to dichloromethane (methylene chloride) by reductive dechlorination (dehalogenation). Monitored groundwater conditions in the area of the SWMU 35 sludge drying bed range from anaerobic to aerobic and therefore may not be strongly conducive to degradation of chloroform, although the levels of chloroform detected are less than 1 µg/L. In the area of SWMU 37, SWMU 38, and AOC Q, groundwater conditions are generally aerobic based on dissolved oxygen (0.88% to 6.34%) and ORP readings and therefore would not be conducive to degradation of chloroform, although the levels of chloroform detected in the associated monitoring wells are low ranging from non detect to less than 2 µg/L.

5.2.2.2 Pesticides

Alpha-BHC

Alpha-BHC is an isomer form of BHC. Technical-grade BCH, a pesticide previously used in the United States, typically contained alpha, beta, and delta forms of BHC in addition to the primary gamma form. BHC can be persistent in the environment but some degradation may occur in the environment primarily under anaerobic conditions. In the area of SWMU 37, groundwater conditions are generally aerobic based on dissolved oxygen (0.88% to 6.34%) and ORP readings therefore would not be favorable for the reductive degradation pathway.

Heptachlor Epoxide

Heptachlor epoxide is not produced commercially, but rather is formed by the chemical and biological transformation of heptachlor in the environment. Heptachlor epoxide adsorbs strongly to soil and is extremely resistant to biodegradation (HSDB 2007). Heptachlor epoxide remaining in groundwater at the site is not expected to significantly biodegrade with other fate processes such as dispersion likely acting to reduce concentrations over time.

5.2.3 Dispersion Processes in Groundwater

As water containing dissolved phase constituents flows through a porous medium it will mix with water not containing dissolved phase constituents and as a result it will dilute (mechanical dispersion). Mixing that occurs along the direction of groundwater flow is called longitudinal dispersion and mixing that occurs perpendicular to the direction of groundwater is called lateral dispersion. Longitudinal dispersion is influenced by pore size, flow path length through the porous media, and the friction in the pore. Lateral dispersion occurs due to the splitting and branching of water as it flow paths through porous media.

Dispersion processes are likely an important process influencing the fate and transport of dissolved phase constituents in site groundwater given the porous alluvium and variety of interconnections that can exist in weathered and fractured bedrock. Dispersion can also occur through the matrix of the rock.

5.2.4 Adsorption and Retardation

The migration rate of organic chemicals in groundwater can be slowed relative to groundwater flow due to attenuation reactions such as adsorption, particularly when flowing through porous media. In porous media, the effect of adsorption reaction on chemical migration rates is typically quantified by using a retardation factor (R), which may be estimated from the chemical-specific K_d in liters per kilogram, soil bulk density (ρ_b) in kilograms per liter and porosity (n). However, the rates of retardation in fractured and karst bedrock aquifers are difficult to quantify and therefore, have not been estimated for site groundwater. Based on the chemical and physical properties of chloroform, lower rates of adsorption and retardation are expected for these constituents in site groundwater.

5.3 FATE AND TRANSPORT SUMMARY

Volatilization was not identified as an important fate and transport process at the sites given the low concentrations of VOCs detected in soil and sludge. Mass transport and erosion of COPCs contained in sludge was not observed outside of the drying beds. Significant leaching of organic and inorganic COPCs from the calcium sulfate sludge to underlying soil was not apparent from the data collected.

Groundwater samples collected from the drying bed areas did not indicate appreciable leaching of constituents detected in calcium sulfate sludge to groundwater. Although low level concentrations of chloroform were detected at SWMU 35, SWMU 37, and SWMU 38/AOC Q, chloroform was not detected in soil at the sites and chloroform was detected in upgradient wells at the sites. It is important to note that studies and groundwater investigations have shown the presence of chloroform in most groundwater samples collected at the facility regardless of location. The concentrations of chloroform detected in monitoring wells at the sites are low level concentrations below the range of chloroform levels

present in the water transmitted through water lines at the facility. The sites are located downgradient of developed areas containing water lines that could be leaking, which may have been the source of chloroform. In addition, as presented in Section 6.0 chloroform was not identified as a risk driver in the human health risk assessments. At SWMU 37, data suggests the site is not the source of pesticides in groundwater since the pesticides detected in groundwater were not detected in soil at the site and pesticides were also detected in background well 37MW1. At SWMU 38, a specific site-specific source related to disposal activities for the manganese concentrations detected above the T-RBC in well 38MW3 was not identified. Manganese concentrations within material in the drying bed (87 to 550 mg/kg) were similar to manganese concentrations in soil outside the drying bed (222 to 600 mg/kg) where no indication of impacts from site use were noted (i.e., no sludge present). Manganese concentrations at the site also were within the low-to-mid range of concentrations of manganese in the background data set (16.7 to 2,040 mg/kg). The occurrence of dissolved manganese at concentrations above the T-RBC at one well location 38MW3 may be due to natural geologic conditions (i.e., weathering of bedrock containing manganese and alluvial deposition).

Table 5-1a
Chemical Properties Affecting Fate and Transport
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, VIrginia

Property	Description
Specific Gravity	Specific gravity is the ratio of the density of a chemical to the density of water and its tendency to float (specific gravity <1) or sink (specific gravity >1) in water. Chemicals that are immiscible in water can exist as non-aqueous phase liquids and are referred to as light non-aqueous phase liquid if their specific gravity is less than one, or dense non-aqueous phase liquid if their specific gravity is greater than one.
Water Solubility	Water solubility of a chemical is the mass of chemical that will dissolve in a unit volume of water at a specific temperature. Chemicals with a high solubility tend to remain dissolved in water rather than partition to soil or sediment are less likely to volatilize, and more likely to biodegrade. Chemicals with a low solubility tend to partition to soil or sediment, are more likely to volatilize and less likely to biodegrade.
Vapor Pressure	Vapor pressure of a chemical is how readily it will volatilize to the atmosphere. Volatilization from water is dependent upon vapor pressure and Henry's law constant. Vapor pressures in their pure state range from 0.001 to 760 millimeters mercury (mm Hg) for liquids to less than 1E-10 mm Hg for solids.
Henry's Law Constant	Henry's law constant of a chemical is a measure of how a chemical will partition between air and water at equilibrium. It is the ratio of the vapor pressure to the water solubility (atm-m^3/mole) and can be used to calculate the rate of volatilization of a chemical from water. Chemicals with a high Henry's law constant more readily volatilize from water.
Organic Carbon Partition Coefficient (K_{oc})	K_{oc} is a measure of the tendency for a chemical to be sorbed to the organic fraction of soil and sediment. The lower the K_{oc} values the more leaching potential from soil or sediment to water. Chemicals with a K_{oc} less than 100 milliliters per gram (mL/g) have a high potential to leach from soil or sediment to water, while K_{oc} values in the range of 100 to 500 mL/g indicate a moderate leaching potential.
Octanol-Water Partition Coefficient (Ko_w)	K_{ow} describes the partitioning of an organic chemical between a polar phase (water) and a relatively nonpolar phase (1-octanol). It is equated to the partitioning (sorption) in an aquifer of a chemical between the water and the porous media organic content. A chemical with a high K_{ow} is hydrophobic and may be relatively immobile in an aqueous system but may be mobilized in the presence of an organic solvent.

Table 5-1b
Fate Processes Affecting Metals
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Process	Description
Ion Exchange	Ion exchange is a specific category of adsorption due to an affinity of the solid surface for the chemical. Ion exchange occurs when the adsorbent charge deficiency can be neutralized more efficiently by ions in solution than by those ions currently adsorbed. As an example, if sodium ions (monovalent) have accumulated at the interface and suddently calcium ions (divalent) appear, the surface excess can be more efficiently neutralized by the calcium ions than by the sodium ions; thus, the sodium ions will desorb and the calcium ions will adsorb and an exchange of ions will occur. Clay minerals are frequently the dominant source of ion exchange in the subsurface. The surface charge of clays and many other mineral surfaces is a function of pH. At low pH (excess hydrogen ions), the surface can exhibit a positive net charge while at higher pH (excess hydroxyl ions) the surface can exhibit a negative charge (Knox et al 1993). The surface area of the exchange site significantly influences the level of adsorption; this parameter is typically discussed in terms of the cation exchange capacity (CEC) of the medium and is expressed in units of milliequivalents of exchanging cations per 100 grams of solids (meq/100 g). CEC values indicate the likely type of clay present; the higher the CEC value the greater the absorption potential.
Chemical Speciation	Most metals occur in more than one ionic form (species) in solid and aqueous media. These species form from hydrolysis, oxidation reduction reactions, and complexation reactions, which may have different valences and mobilities in soil water, groundwater, and surface water due to different affinities for adsorption and different solubilty controls. Simple ionic specifies frequently combine ligands to form ionic or neutral-charge aqueous complexes. Environmental conditions that affect speciation of metals include pH, redox potential, and organic ligands.
Oxidation Reduction Potential (ORP)	Redox refers to the transfer of electrons and resultant specifies change of ions or compounds. Oxidation is the loss of electrons and reduction is the gain of electrons. Redox can cause changes in the mobility of many metals, such as site COPCs iron, manganese, and arsenic. The ability of a redox reaction to occur is a function of the redox potential. Redox potential is typically defined in terms of the negative logarithm of the free-electron activity (pE). The redox potential can also be expressed in terms of volts (Eh). Low values of pE indicate high electron activity and favor electron-rich species (reduced). High values of pE indicate low electron activity and favor electron-poor species (oxidized) (Knox et al 1993).

Table 5-1c
Fate Processes Affecting Organics
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Process	Description
Sorption	Sorption includes the processes of adsorption and absorption. Adsorption is a mass transfer process where a substance is transferred from a phase to the surface of a medium (e.g. soil or sediment) where it is bounded by chemical or physical forces. Absorption is the partitioning between two phases (Knox et al. 1993). Sorption reactions are either sorbent or solvent-motivated. Sorbent-motived reactions occur when there is an attraction between the sorbent and the solute and the chemical accumulates at the surface due to the affinity of the surface for the chemical. Solvent-motivated reactions occur when the chemical is hydrophobic, such as nonionic organics, where the chemical will accumulate at an interface or partition into a nonionic phase (associate with the organic content of the medium). For nonionic organics, the fraction of organic content (foc) of the subsurface material is the dominant soil characteristic affecting sorption (Knox et al. 1993). Primary indicators of the partitioning of a chemical are the organic carbon water partition coefficient (Koc), soil/water distribution coefficient (Kd), the octanol water partitioning coeffient (Kow), and the calculated retardation factor.
Hydrolosis	Hydrolysis is the degradation process via chemical reactions (oxidation, reduction, hydrolysis) without the participation of organisms. Hydrolysis is a chemical decomposition process that uses water to split chemical bonds of substances. There are two types of hydrolysis, acid and enzymatic. Hydrolysis is limited to chemical that contain hydrolyzable groups and is effected by the contaminants hydrolysis half life.
Volatilization	Volatilization is the process by which a contaminant changes from a liquid phase to a gas phase. This process applies to organic comtaminants migrating from the soil or surface water. Volatile organic chemicals are a class of chemicals that easily evaporate or mix with the atmosphere. The potential volatilization of a chemical is affected by the compounds vapor pressure, solubility, organic carbon partitioning coefficient, and the temperature.
Abiotic Degradation	Abiotic degradation includes degradation processes in which organisms do not participate. Photolysis describes the abiotic degradation process via photochemical reactions such as photooxidation, photomineralisation without the participation of organisms. As described above, hydrolysis is an additional process of abiotic degradation.
Biotic Degradation	Biotic degradations the process in which chemical degradation of a contaminant is aided by soil organisms. Biotic degradation can be either aerobic or anaerobic. The rate of metabolism/cometabolism is affected by the contaminant's biochemical oxygen demand, chemical oxygen demand, degree of halogenation, etc. Reactions include but are not limited to oxidation/reduction and hydrolysis, as described above.

Table 5-2
Physical Constants for Organic COPCs
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Molecular Weight (g/mol)	Henry's Law Constant (atm-m^3/mol)	Unitless Henry's Law Constant	Soil-Water Partition Coefficient (K_d)	Organic Carbon Partition Coef. (Koc) (L/kg)	Log of Octanol-Water Partition Coef. (log Kow)	Octanol-Water Partition Coef. (Kow) (L/kg)	Water Solubility (mg/L)	Vapor Pressure (mm Hg)
Alpha-BHC	319846	290.83	1.06E-05	4.35E-04	1.67E+01	2.70E+03	3.42	2.63E+03	2.00E+00	3.52E-05
Aroclor 1254	11097691	326.44	2.83E-04	1.16E-02	5.02E+03	8.10E+05	6.79	6.17E+06	1.20E-02	6.53E-06
Aroclor 1260	11096825	395.33	3.34E-04	1.37E-02	1.28E+03	2.07E+05	8.27	1.86E+08	2.84E-04	4.05E-05
Chloroform	67663	119.38	3.66E-03	1.50E-01	2.48E-01	4.00E+01	1.97	9.33E+01	7.95E+03	1.97E+02
Dieldrin	60571	380.91	1.51E-05	6.19E-04	7.92E+01	1.28E+04	6.2	1.58E+06	1.95E-01	3.00E-06
2,4-Dinitrotoluene	121142	182.14	9.26E-08	3.80E-06	5.95E-01	9.60E+01	3.15	9.55E+01	2.70E+02	1.47E-04
Heptachlor Epoxide	1024573	389.32	9.50E-06	3.90E-04	5.16E+02	8.32E+04	5.4	2.51E+05	2.00E-01	1.95E-05
Nitroglycerin	55630	227.09	4.33E-08	1.78E-06	8.11E-01	1.31E+02	1.62	4.17E+01	1.38E+03	4.00E-02
Trichloroethene	79016	131.39	1.03E-02	4.22E-01	8.06E-01	1.30E+02	2.42	2.63E+02	1.47E+03	6.90E+01

Notes:
CAS = Chemical Abstract System
g/mol = Grams per mole
atm-m^3/mol = Cubic meters atmosphere per mole
L/kg = Liters per kilogram
mg/L = Milligrams per liter
mm Hg = Millimeters Mercury

6.0 HUMAN HEALTH RISK ASSESSMENT

This HHRA evaluates the probability and magnitude of potential adverse effects on human health associated with exposure to site-related chemicals in soil and groundwater. SWMUs 35 and 37 are evaluated separately while SWMU 38 and AOC Q are evaluated together due to their close proximity and the use of AOC Q as an overflow pond for SWMU 38 resulting in similar depositional histories. Refer to Section 2.0 for additional information regarding the sites' backgrounds. The HHRAs were conducted for the sites consistent with guidance included in EPA's *Interim Final Risk Assessment Guidance for Superfund* (RAGS), as well as other USEPA guidance (USEPA 1989; 1991; 1997b; 2001a,b; 2002c; and 2004b). Guidance documents are also noted on the RAGS Part D tables provided in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q).

This HHRA consists of the following seven sections:

- **Section 6.1: Data Summary and Selection of COPCs:** Relevant site data are gathered, examined, and discussed. Basic constituent statistics and screening levels are summarized. COPCs are identified by comparison to screening criteria as discussed in Section 6.1.2;
- **Section 6.2: Exposure Assessment:** Potentially exposed populations (i.e., receptors) and exposure routes are identified, and exposure point concentrations (EPCs) are calculated for COPCs. Standard exposure factors and health-protective assumptions are used to assess the magnitude, frequency, and duration of exposure for each exposure route and intakes are calculated;
- **Section 6.3: Toxicity Assessment:** Toxicity criteria for COPCs are gathered and presented;
- **Section 6.4: Risk Characterization:** Quantitative risks and hazards are estimated and summarized by combining toxicity criteria with intakes for each exposure route;
- **Section 6.5: Summary:** The results of the HHRA are summarized;
- **Section 6.6: Uncertainties Analysis:** Uncertainties, "including uncertainties in the physical setting definition for the sites, in the models used, in the exposure parameters, and in the toxicity assessment" (USEPA 1989) are discussed; and
- **Section 6.7: Conclusions:** The conclusions of the HHRA are presented.

As previously stated, the tabulated risk assessment results are presented in accordance with USEPA guidance described in RAGS: Volume I - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments) (USEPA 2001b). RAGS Part D requires the risk assessment results to be presented in a series of standardized tables, which are presented in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q).

6.1 DATA SUMMARY AND SELECTION OF COPCS

6.1.1 Data Summary

Table 6-1 identifies the samples used in the SWMU 35, SWMU 37, and SWMU 38/AOC Q COPC screenings for soil, respectively. Refer to Section 4.0 for complete data tables for detected analytes for each media and disposal area. Additional information regarding the data used in the HHRAs is summarized below:

- If a constituent was measured by two methods, results from the more sensitive analytical method were used. For example, explosives were analyzed as part of the SVOC method, as well as, by a explosives specific method. Results from the specific method were used;
- J-flagged data (estimated concentration) and B-flagged data (detected in an associated blank) are considered detections and are used without modification;

- Rejected results (R-flagged) are not used;
- Chemicals that were not detected in at least one sample were considered as uncertain analytes in the evaluation of risk; and
- Data from duplicate sample pairs are averaged and treated as one result. If an analyte is detected in one of the sample pair, one half the detection limit of the non-detect is averaged with the detected result and the result is considered detected.

Additional information regarding specific soil and groundwater samples used in the HHRA is provided in Sections 6.1.1.1 and 6.1.1.2.

6.1.1.1 Surface Soil and Total Soil

Prior to the RFI, historical soil analytical data (1990 and 1992) were considered screening level data and excluded from the risk assessment given the age of the data, the use of non SW-846 analytical methods, the lack of available data validation reports/information, and the availability of sufficient newer validated SSP and RFI data to more appropriately characterize conditions at the site. As presented in Table 6-1, soil samples collected during sampling events completed in 2003 for the SSP and 2007 for the RFI were used for the COPC screenings. In addition as presented in Table 6-1, the soil samples for each area have also been divided into surface soil (0 to 1 ft bgs) and subsurface soil (1 to 15 ft bgs). The two soil data groupings used for COPC screenings and the HHRAs are surface soil (0 to 1 ft bgs) and total soil (0 to 15 ft bgs). Total soil data grouping consists of combining surface and subsurface soil to address mixing of potential soil constituents during construction or land development activities. Soil samples collected a depth of greater than 15 ft bgs were excluded from the HHRAs since it is unlikely soil below this depth would be disturbed and mixed with surface soil during excavation.

Ten surface soil samples and 12 subsurface soil samples were used for the HHRA for SWMU 35, 10 surface soil samples and 11 subsurface soil samples were used for the HHRA for SWMU 37, and 14 surface soil samples and 16 subsurface soil samples were used for the HHRA for SWMU 38/AOC Q. Figures 3-1, 3-2, and 3-3 show the soil sample locations for SWMU 35, SWMU 37, and SWMU 38/AOC Q, respectively.

6.1.1.2 Groundwater

Groundwater samples collected during the sampling events completed in February 2008, resampling in June 2008, and June 2010 for the RFI were used for the COPC screenings. Four wells (35MW1, 35MW2, D-2, and D-4) were sampled at SWMU 35, four wells (37MW1, 37MW2, 37MW3, and 37MW4) were sampled at SWMU 37, and three wells (38MW1, 38MW2, and 38MW3) were sampled at SWMU 38/AOC Q. Data from downgradient and crossgradient wells were used in the COPC screenings (Table 6-1). Dissolved metals data was used in the RFI. Figures 3-1, 3-2, and 3-3 show the groundwater sample locations for SWMU 35, SWMU 37, and SWMU 38/AOC Q, respectively.

6.1.2 Identification of COPCs

COPCs were identified for the sites by comparing the MDC to the following screening levels for each media: USEPA Region III R-RBCs and I-RBCs (surface soil and total soil) and USEPA T-RBCs (groundwater) as presented in the October 2007 USEPA Region III RBC and Alternate RBC Tables (USEPA 2007a). In accordance with USEPA Region III guidance, RBCs for non-carcinogenic chemicals were adjusted downward to a HQ of 0.1 to ensure that chemicals with additive effects were not prematurely eliminated during screening.

For nutrients detected in soil (calcium, potassium, magnesium, and sodium) that have no available RBC, the MDC was compared to the recommended daily allowance (RDA)-derived soil ingestion screening criteria. Table 6-2 presents the equation, exposure parameters, and RDAs used, as well as the calculated

screening criteria for the adult resident and child resident receptors. The lowest screening criterion for each nutrient (e.g., the screening criteria for the child resident) was selected as the screening criterion.

In addition, lead ALs of 400 mg/kg for residential receptors and 750 mg/kg for industrial receptors were used in the COPC identification since toxicity criteria were not available for lead (USEPA 1994).

Analytes detected at a maximum concentration greater than the corresponding adjusted RBC or screening values identified above (or those for which no screening criteria exists) were selected as COPCs. COPC screening tables for each area are presented in Appendices E.1 (SWMU 35), E.2 (SWMU 37) and E.3 (SWMU 38/AOC Q), Tables E.1-2.1 (COPC Determination Detects-Surface Soil), E.1-2.2 (COPC Determination Detects-Total Soil), E.1-2.3 (Non-Detect Screening-Soil), E.1-2.4 (COPC Determination Detects-Groundwater), and E.1-2.5 (Non-Detect Screening-Groundwater) for SWMU 35, and Tables E.2-2.1 (COPC Determination Detects-Surface Soil), E.2-2.2 (COPC Determination Detects-Total Soil), E.2-2.3 (Non-Detect Screening-Soil), E.2-2.4 (COPC Determination Detects-Groundwater), and E.2-2.5 (Non-Detect Screening-Groundwater) for SWMU 37, and Tables E.3-2.1 (COPC Determination Detects-Surface Soil), E.3-2.2 (COPC Determination Detects-Total Soil), E.3-2.3 (Non-Detect Screening-Soil), E.3-2.4 (COPC Determination Detects-Groundwater), and E.3-2.5 (Non-Detect Screening-Groundwater) for SWMU 38/AOC Q. A summary of the results of the human health COPC screenings for the sites are presented in the tables below.

SWMU 35 - Human Health COPCs Identified

Chemical	Surface Soil	Total Soil	Groundwater
Aluminum	X	X	
Arsenic	X	X	
Chromium	X	X	
Cobalt [1]	X	X	X
Iron	X	X	
Lead	X	X	
Manganese	X	X	X
Vanadium	X	X	
Aroclor 1254	X	X	
Aroclor 1260 [2]	X	X	
Dimethylphthalate [1,2]		X	
Nitroglycerin[3]	X	X	
Chloroform			X

Note: [1] COPC identified due to no screening value available
[2] Not carried through the HHRA due to low frequency of detection (1/10 surface soil samples and 1/22 total soil samples)
[3] Carried through the HHRA even though low frequency of detection 1/10 surface soil samples and 1/22 total soil samples) due to concentration above the industrial screening level indicating potential "hot spot"

SWMU 37 - Human Health COPCs Identified

Chemical	Surface Soil	Total Soil	Groundwater
Aluminum	X	X	
Arsenic	X	X	
Chromium	X	X	

Chemical	Surface Soil	Total Soil	Groundwater
Cobalt [1]	X	X	X
Iron	X	X	
Manganese	X	X	X
Mercury	X	X	
Vanadium	X	X	
Aroclor 1254	X	X	
Methylcyclohexane [1,2]		X	
Di-n-octylphthalate [1,2]		X	
Dimethylphthalate [1,2]		X	
Alpha-BHC			X
Heptachlor Epoxide			X
Chloroform			X

Note: [1] COPC identified due to no screening value available
[2] Not carried through the HHRA due to low frequency of detection (1/6 samples)

SWMU 38/AOC Q - Human Health COPCs Identified

Chemical	Surface Soil	Total Soil	Groundwater
Aluminum	X	X	
Arsenic	X	X	
Chromium	X	X	
Cobalt [1]	X	X	X
Iron	X	X	
Manganese	X	X	X
Vanadium	X	X	
Aroclor 1254	X	X	
Cyclohexane [1,2]	X	X	
Methylcyclohexane [1,2]	X	X	
Chloroform			X

Note: [1] COPC identified due to no screening value available
[2] Not carried through the HHRA due to low frequency of detection (1/6 surface soil samples and 1/14 total soil samples)

Also note that a chemical was not carried through the HHRA if the frequency of detection is low in the HHRA data set. For example at SWMU 35, dimethylphthalate was detected in 1 of 22 soil samples collected at low levels; therefore, dimethylphthalate is not carried through the risk assessment. Dimethylphthalate was not detected in groundwater. Other chemicals not carried through the risk assessment due to frequency detection include the following: Aroclor 1260 (SWMU 35), dimethylphthalate and di-n-octylphthalate (SWMU 37), and cyclohexane and methylcyclohexane (SWMU 38/AOC Q). Note that although nitroglycerin at SWMU 35 had a low frequency of detection (1 of 22 soil samples), the detection was above the industrial screening level indicating a potential "hot spot"; therefore, nitroglycerin was carried through the HHRA.

6.2 EXPOSURE ASSESSMENT

The objective of the exposure assessment is to estimate "the type and magnitude of exposures to chemicals of potential concern" (USEPA 1989). When combined with chemical-specific toxicity information (summarized in the toxicity assessment), these exposures produce estimations of potential risks.

6.2.1 Conceptual Site Model/Receptor Characterization

6.2.1.1 SWMU 35

A refined conceptual site model (CSM) for SWMU 35 is presented on Figure 6-1. SWMU 35 is an inactive unit previously used for the drying of calcium sulfate sludge. Calcium sulfate precipitated and settled in settling lagoons then was removed from the lagoons and placed in SWMU 35. The sludge was then removed from SWMU 35 and disposed of in various locations at RFAAP (Dames & Moore 1992). RFAAP reported that "sediment" from SWMU 10 was potentially deposited in SWMU 35, most likely during the early 1980s (Dames and Moore 1994). During the RFI investigation, sludge was encountered in SWMU 35 (approximate sludge thickness of 5 ft). The site consists of a depressed area surrounded by an earthen berm where precipitation and overland flow infiltrate into subsurface soil. Surface water and sediment are not present within the site area; however, the New River is located approximately 120 ft north of the site. Due to the nature of the runoff at the site, the depression of the site prevents runoff from reaching the river. Groundwater is present at approximately 17 to 21 ft bgs with groundwater flow toward the north and the New River.

A refined CSM for SWMUs 37, 38, and AOC Q is presented on Figure 6-2. SWMUs 37, SWMU 38, and AOC Q are inactive units previously used for the drying of calcium sulfate sludge. Calcium sulfate precipitated and settled in settling lagoons then was removed from the lagoons and placed in SWMU 37, SWMU 38, and AOC Q. During the RFI investigation, a surface layer of sludge was encountered in SWMU 37 (approximate sludge thickness of 2 to 4.5 ft) and in SWMU 38/AOC Q (approximate sludge thickness of 0.5 ft). The sites consists of a depressed areas surrounded by earthen berms where precipitation and overland flow infiltrate into subsurface soil. Surface water and sediment are not present within the site areas; however, the New River is located approximately 300-400 ft northwest of the sites. Due to the nature of the runoff at the sites, the depression of the sites prevents runoff from reaching the river. Groundwater is present at approximately 24 to 30 ft bgs with local groundwater flow in the monitored area toward the north and northeast.

Groundwater in the main manufacturing area at RFAAP is not currently used as drinking water. Potentially affected media include surface soil, subsurface soil, and groundwater at the site. While the sites' groundwater discharge may be hydraulically connected to the New River, the completeness of this pathway is unknown. Site-related groundwater impacts were not identified during the assessment of the sites; therefore, an assessment of the New River was not conducted. Residential and recreational areas are located adjacent to the RFAAP. It is unlikely, however, that the land use within the MMA will change significantly in the foreseeable future. The MMA contains many buildings and facilities, and is likely to remain industrial in nature.

The SWMUs are not currently active; therefore, maintenance workers (e.g., groundskeepers) are the most likely receptors under current site conditions. Due to installation security, it is unlikely that trespassers could gain access to the SWMUs; however, risks associated with the maintenance worker are considered protective of the limited exposure experienced by the trespasser. Under future site conditions, maintenance workers continue to be receptors and although the development of the area is unlikely, construction workers and commercial workers may be hypothetical receptors if the area is developed. RFAAP is likely to remain a military installation; therefore, a residential scenario is considered unlikely. However, the residential scenario was evaluated for the sites to assess clean closure requirements under RCRA.

6.2.2 Identification of Exposure Pathways

The potential receptors identified for the sites include current/future maintenance workers, hypothetical future commercial workers, hypothetical future construction workers, hypothetical future child resident, hypothetical future adult resident, and hypothetical future lifetime resident. Carcinogenic risk is assessed for the hypothetical lifetime resident to account for cumulative lifetime risk. The exposure duration for the lifetime resident scenario is assumed to be 30 years total; therefore, for carcinogens, exposures are combined for hypothetical child resident (6 years) and adult resident (24 years). In Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q), Tables E.1-1, E.2-1, and E.3-1 summarize the selection of exposure pathways for each area and receptor listing the rationale for the inclusion or exclusion of each pathway. A conceptual site diagram for the sites is presented on Figure 6-3. The table below summarizes the exposure pathways and media evaluated for each of the potential receptor populations.

Media/Exposure Pathways	Exposure Scenarios			
	Current/Future	Future		
	Maintenance Worker	Commercial Worker	Construction Worker	Resident [1]
Surface Soil				
Ingestion	X			X
Dermal Absorption	X			X
Inhalation of Fugitive Dust	X			X
Inhalation of Outdoor Vapors [2]				
Total Soil [3]				
Ingestion	X	X	X	X
Dermal Absorption	X	X	X	X
Inhalation of Fugitive Dust	X	X	X	X
Inhalation of Outdoor Vapors [2]				
Inhalation of Indoor Vapors [2]				
Groundwater				
Ingestion		X		X
Dermal Absorption		X		X
Inhalation of Outdoor Vapors			X	
Inhalation of Indoor Vapors		X		X
Inhalation of Vapors while Showering [4]				X

X = Quantitative Evaluation

[1] The exposure duration for the lifetime resident scenario is assumed to be 30 years total; therefore, for carcinogens, exposures are combined for hypothetical child resident (6 years) and adult resident (24 years).

[2] VOCs not identified as COPC for soil; therefore, no assessment of vapors.

[3] The evaluation of total soil assumes that construction, excavation, or other activities "mix" the surface and subsurface soil, thus changing the constituent concentrations available on the surface.

[4] Inhalation of vapors while showering is evaluated using the adult resident only.

6.2.2.1 Current/Future Land Use Scenario

One receptor, the maintenance worker, was identified under the current land use scenario. The current maintenance worker is assumed to contact surface soil. It is assumed that the maintenance worker scenario is likely to exist in the future; therefore, exposure to total soil is possible if excavation activities occur in the future.

6.2.2.2 Future Land Use Scenario Only

In the event that construction occurs at the sites, soil that was previously found at depth may be brought to the surface and become available to receptors. Therefore, the future hypothetical industrial use scenarios of the construction worker and commercial worker are assumed to come into contact with total soil at the sites. In addition, potential future exposures to groundwater are evaluated in the HHRA. It is assumed that the commercial worker is exposed to groundwater via tap water. Due to a groundwater depth greater than 15ft, the construction worker is assessed only for the vapor pathway to account potential vapors released to ambient air from groundwater beneath excavation trenches, but is not assessed for the ingestion or dermal contact pathways.

Although the sites are assumed to remain industrial in nature, the residential scenario is evaluated in this HHRA to meet clean closure requirements under RCRA. Due to the presence of a distinct surficial layer of sludge at the sites, the future hypothetical resident is assessed for exposure surface soil and groundwater, as well as, total soil and groundwater.

6.2.3 Calculation of EPCs

The mean concentration of each COPC is estimated and is referred to as the EPC. To account for uncertainty when estimating EPCs from sample data, the 95% upper confidence limit of the mean (95% UCL) is used instead of the mean itself (USEPA 1989). Methods used to calculate 95% UCLs are based on guidance provided in the following documents *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites* (USEPA 2002b) and *On the Computation of a 95% Upper Confidence Limit of the Unknown Population Mean Based Upon Data Sets with Below Detection Limit Observations* (USEPA 2006).

In general, the method used to calculate a 95% UCL depends on: 1) number of samples, 2) the prevalence of non-detects, and 3) the data distribution (e.g., normal or lognormal). Non-detects introduce uncertainty in the data set because the true concentration may be between zero to just below the detection limit. Therefore, distributional assumptions are difficult to make for COPCs with a high rate of non-detects. ProUCL 4.0 (USEPA 2007b) is used to calculate EPCs for the sites. EPCs for soil COPCs are presented in Tables E.1-3.1 and E.1-3.2 of Appendix E.1 (SWMU 35), Tables E.2-3.1 and E.2-3.2 of Appendix E.2 (SWMU 37), and Tables E.3-3.1 and E.3-3.2 of Appendix E.3 (SWMU 38/AOC Q). EPC calculations for the sites are included in Appendix D.1. EPCs were not calculated for groundwater; therefore, the MDC for COPCs identified for groundwater were used in the risk assessment.

To address the inhalation of fugitive dust from soil exposure pathway, particulate emission factors (PEFs) were used to derive ambient air EPCs for non-volatile soil COPCs. PEFs were calculated in accordance with the Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (USEPA 2002c). The PEF calculations are provided in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q), Tables E.1-4.4, E.2-4.4, and E.3-4.4.

To evaluate inhalation of VOCs from groundwater, EPCs were calculated for VOCs in air using the models as summarized below. The Johnson and Ettinger model (Johnson et al 1991 – updated 2004) was used to estimate indoor air concentrations of volatiles migrating from groundwater through the soil and into a structure. Spreadsheets for this model were used to estimate air concentrations of VOCs in office buildings and residences for this HHRA. The spreadsheet is found in Appendix E.4 and the results

provided in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q), Tables E.1-4.6, E.2-4.6, and E.3-4.6. Note that VOCs were not identified as COPCs in soil for the sites.

EPCs of VOCs in air due to volatilization from groundwater were estimated for a showering scenario, applicable to the adult resident, using the Foster-Chrostowski (1987) shower room model. The model is provided in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q), Tables E.1-4.7, E.2-4.7, and E.3-4.7.

In the event that excavation work is performed on site, the worker may be exposed to volatile emissions from groundwater below the bottom of the trench. While USEPA does not have a standardized model for estimating concentrations of airborne VOCs in a trench or a pit, the VDEQ provides such a model on their Voluntary Remediation Program (VRP) web site (http://www.deq.state.va.us/vrprisk/). The equation and parameters are given in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q), Tables E.1-4.8, E.2-4.8, and E.3-4.8.

6.2.4 Quantification of Exposure: Calculation of Daily Intakes

For each receptor and pathway, chronic daily intake (CDI, expressed as milligrams of COPC per kilogram body weight per day) for each COPC is estimated by combining the EPC with exposure parameters such as ingestion rate, frequency of contact, duration, and frequency of exposure. In addition, intake parameters are selected so the combination of intake variables results in an estimate of the reasonable maximum exposure for that pathway (USEPA 1989). In addition, intake parameters are selected so the combination of intake variables results in an estimate of the reasonable maximum exposure for that pathway (USEPA 1989).

Intake formulas, exposure parameters, and chemical-specific parameters are provided in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q), Tables E.1-4.1 through E.1-4.8, Tables E.2-4.1 through E.2-4.8, and Tables E.3-4.1 through E.3-4.8. The results of the CDI calculations are presented for each receptor in Appendices E.1 (SWMU 35), E.2 (SWMU 37), E.3 (SWMU 38/AOC Q), Tables E.1-7.1 through E.1-7.10, Tables E.2-7.1 through E.2-7.10, and Tables E.3-7.1 through E.3-7.10.

6.3 TOXICITY ASSESSMENT

The methodology used for classifying health effects from exposure to chemicals is recommended by USEPA and considers chronic exposures. The chronic toxicity criteria were obtained from the October 2007 USEPA Region III RBC Table (available at http://www.epa.gov/reg3hwmd/risk/), which utilizes the following hierarchy:

- Tier 1 - USEPA's Integrated Risk Information System (IRIS);
- Tier 2 - Provisional Peer-Reviewed Toxicity Values (PPRTVs), as developed on a chemical-specific basis by the Office of Research and Development/National Center for Environmental Assessment (NCEA)/Superfund Health Risk Technical Support Center; and
- Tier 3 - other sources of toxicological reference values that include those from Cal EPA, Minimal Risk Levels (MRLs) from Agency for Toxic Substance Disease Registry (ATSDR), and finally the Human Health Effects Assessment Summary Tables (HEAST) toxicity values.

Toxicity criteria used to quantify non-carcinogenic hazards (risk reference doses – RfDs) and carcinogenic risks (e.g., slope factors – CSFs) are presented in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q), Tables E.1-5.1, E.1-5.2, E.1-6.1, and E.1-6-2 for SWMU 35, Tables E.2-5.1, E.2-5.2, E.2-6.1, and E.2-6-2 for SWMU 37, and Tables E.3-5.1, E.3-5.2, E.3-6.1, and E.3-6-2 for SWMU 38/AOC Q.

6.3.1 Health Effects Classification and Criteria Development

According to USEPA's science policy, there are two primary approaches to developing toxicity values or health effects criteria. The non-threshold approach is based on USEPA's scientific policy position that a

small number of molecular events can evoke changes in a single cell or a small number of cells. This is described as a non-threshold initiator mechanism because there is essentially no level of exposure (i.e., a threshold) to a constituent that will not result in some finite possibility of causing an adverse effect. Another assumption stemming from USEPA's science policy is that the dose-response curve is linear at low doses. For most carcinogens, toxicity criteria are based on the non-threshold approach.

The threshold approach is based on the assumption that organisms have repair and detoxification capabilities that must be exceeded by some critical concentration (threshold) before the adverse effect is manifested. For example, an organ can have a large number of cells performing the same or similar functions that must be significantly depleted before the effect on the organ is realized. This threshold view holds that a range of exposures from just above zero to some finite value can be tolerated by the organism without an appreciable risk of adverse effects. Toxicity criteria for non-carcinogens are based on the threshold approach. Furthermore, as additional information regarding the mechanisms of toxicity becomes available, the threshold approach may also apply to some carcinogens (*e.g.*, chloroform).

6.3.1.1 Cancer Slope Factors

For carcinogens, USEPA estimates the excess lifetime cancer risks associated with various levels of exposure by developing CSFs and unit risks. CSFs are expressed in terms of reciprocal dose, as units of: (mg chemical/kg body weight - day)$^{-1}$, and describe the upper-bound increase in an individual's risk of developing cancer over a 70-year lifetime per unit of exposure. Unit risks are expressed either as a reciprocal air concentration, in units of micrograms per meter cubed ($\mu g/m^3$)$^{-1}$ or as a reciprocal drinking water concentration, in units of micrograms per liter ($\mu g/L$)$^{-1}$. Similarly, they are defined as the probability of an individual developing cancer over a 70-year lifetime from exposure to one unit of concentration in air or water. Because regulatory efforts are geared to be protective of public health, including even the most sensitive members of the population, the CSFs are derived using conservative assumptions.

CSFs and unit risks are derived from the results of human epidemiological studies or chronic animal bioassays. Animal studies usually must be conducted using relatively high doses to detect possible adverse effects. Because humans are expected to be exposed to doses lower than doses used in the animal studies, the potential cancer risks at lower doses are estimated by using mathematical models. The data from animal studies are typically fitted to the linearized multistage model to obtain a dose-response relationship. In general, after the data are fit to the dose-response model, the 95% UCL of the slope of the resulting dose-response relationship at low doses is calculated. This upper-bound limit is subjected to various adjustments and an interspecies scaling factor is applied to derive the slope factor or unit risk for humans. Thus, the actual risks associated with a given intake of a potential carcinogen quantitatively evaluated based on animal data are generally regarded as not likely to exceed the risks estimated using these CSFs or unit risks and they may be as low as zero (USEPA 1986). Dose-response data derived from human epidemiological studies are fitted to dose-time-response curves. These models provide rough, but plausible, estimates of the upper limits on lifetime risk. CSFs and unit risks based on human epidemiological data are derived using conservative assumptions and are unlikely to underestimate risks for a given level of exposure.

Weight-of-evidence categories represent an assessment of the amount and quality of the data, which support the finding that specific chemicals and elements can cause cancer in humans. Although USEPA's guideline for carcinogen risk assessment (USEPA 1986) proposes a weight-of-evidence narrative, IRIS currently uses the original alphanumeric classification. Under the existing guidelines (USEPA 1986), chemicals are classified as either Group A, Group B1, Group B2, Group C, Group D, or Group E. Group A includes those substances for which high-quality studies have demonstrated a relationship between the exposure to the substance in question and the development of cancer in human populations. Groups B1, B2, and C represent chemicals with limited (B1) or insufficient (B2) human evidence of carcinogenicity, and sufficient (B1, B2) or insufficient (C) animal data. Group D substances are those for which there is

insufficient evidence or not evidence of carcinogenicity in humans or animals and Group E substances are those not having evidence of carcinogenicity available in adequate human or animal studies.

6.3.1.2 Reference Doses and Reference Concentrations

Toxicity criteria for non-carcinogens are generally developed using verified risk reference doses (RfDs) and reference concentrations (RfCs). These are developed by USEPA and listed in IRIS or can be obtained from HEAST (USEPA 1997b) and supplements. RfDs are expressed in units of dose (mg chemical/kg body weight-day) and are usually derived either from human studies involving workplace exposures or from animal studies. In addition, RfDs are estimates (with uncertainty spanning perhaps an order of magnitude) of the daily exposure to the human population (including sensitive subpopulations) that is likely to be without an appreciable risk of deleterious effects during a lifetime. The RfD is used as a reference point for gauging the potential effects of exposures. Usually, exposures (as chemical intakes or doses) that are less than the RfD are not likely to be associated with adverse health effects.

RfDs are developed for both chronic and sub-chronic exposures. Chronic RfDs are presented in IRIS or HEAST and are intended for use in evaluating exposures of durations greater than seven years. Sub-chronic RfDs are developed by USEPA's NCEA and are used to characterize the potential for the occurrence of non-carcinogenic effects associated with short-term exposures [two weeks to seven years as defined by USEPA (1989)]. The sub-chronic RfDs are developed similarly to chronic RfDs and are typically equal to chronic RfDs or are an order of magnitude greater (less stringent). Sub-chronic RfDs are presented in HEAST but are no longer being reviewed and updated in the same manner as IRIS. Because there is greater uncertainty associated with the sub-chronic RfDs, chronic RfDs have been used in this HHRA.

RfDs are derived using uncertainty factors that reflect scientific judgment regarding the various types of data used to estimate the RfD. RfDs are typically estimated from no observable adverse effect levels (NOAELs) or lowest observable adverse effect levels (LOAELs) in human or animal studies. Uncertainty factors, generally 10-fold factors, are intended to account for:

- The variation in sensitivity among members of the human population;
- The uncertainty in extrapolating animal data to the case of humans;
- The uncertainty in extrapolating from data obtained in a study that is less-than-lifetime exposure;
- The uncertainty in using LOAEL data, when necessary, rather than NOAEL data; and
- The inability of a single study to adequately address every possible adverse outcome in humans.

To derive RfDs, NOAELs or LOAELs are divided by one or more uncertainty factors, as appropriate. When taken together, these uncertainty factors may confer an extra margin of safety of up to a factor of 10,000 below a LOAEL. In some cases, modifying factors are also applied to RfDs to take into account other uncertainties in the toxicity database and reflect the professional judgment of those reviewing the database. The net result is that RfDs are generally considered to provide a conservative estimate of the likelihood of adverse non-carcinogenic effects.

6.3.1.3 Adjustment for Dermal Absorption

Toxicity criteria have not been developed by USEPA specifically for dermal absorption; instead, oral toxicity criteria are adjusted to assess this pathway. In order to have a meaningful comparison between the dermal absorption dose estimates, which represent internal (or absorbed) doses, and oral toxicity criteria, which typically represent potential (or administered) doses, toxicity criteria are modified to represent absorbed doses. The method for modifying toxicity criteria involves calculation of an absolute oral absorption factor for each chemical and use of this value to increase the chemical's CSF or to decrease the chemical's RfD, as shown in the following equations:

- Adjusted Dermal CSF = CSF/Absolute oral absorption factor
- Adjusted Dermal RfD = RfD x Absolute oral absorption factor

The absolute oral absorption factors should reflect the specific conditions under which the toxicological study was conducted (e.g., method of administration such as gavage, water or diet, and vehicle of administration such as solvent or solution). The absolute oral absorption factors and adjusted toxicity criteria for the COPCs used when evaluating dermal absorption are presented in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q), Tables E.1-5.1 and E.1-6.1, Tables E.2-5.1 and E.2-6.1, and Tables E.3-5.1 and E.3-6.1, respectively. The adjusted CSFs and RfDs presented in these tables were used to evaluate potential risks associated with dermal absorption.

6.4 RISK CHARACTERIZATION

Quantitative risks and hazards due to exposure to COPCs are estimated and summarized by combining toxicity criteria (presented in the Toxicity Assessment) with CDIs (calculated in the Exposure Assessment). Methods used to calculate risks and hazards are taken from USEPA (1989).

For exposures to potential carcinogens, the individual upper-bound excess lifetime cancer risk was calculated by multiplying the estimated CDI by the CSF. In order to assess the individual excess lifetime cancer risks associated with simultaneous exposure to COPCs, the risks derived from the individual chemicals are summed within each exposure pathway. For the residential scenario, carcinogenic risk was evaluated for the lifetime resident.

Non-carcinogenic adverse health effects are calculated by dividing the CDI of each COPC by its RfD, forming a HQ. HQs greater than one (1) indicate the potential for adverse health effects. To estimate non-carcinogenic adverse health effects due to simultaneous exposure to several COPCs, HQs for individual COPCs are summed within each exposure pathway to form a Hazard Index (HI). As with HQs, HIs that are greater than 1 indicate potential adverse health effects. In such cases, COPCs are divided into categories based on the target organ affected (e.g., liver, kidney) and target organ-specific HIs are recalculated by summing HQs that effect the same target organ. The target organ analyses are presented in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q) in Tables E.1-9.1 through E.1-9.10, E.2-9.1 through E.2-9.10, and E.3-9.1 through E.3-9.10. Non-carcinogenic hazards were evaluated for both child and adult residents independently.

Excess lifetime cancer risks derived in this report are compared to USEPA's target risk range for Superfund sites of 1E-06 to 1E-04 (USEPA 1989). In addition, USEPA's Office of Solid Waste and Emergency Response has issued a directive (USEPA 1991) clarifying the role of HHRA in the Superfund process. The directive states that, if the cumulative carcinogenic risk to a receptor (based on reasonable maximum exposure for both current and future land use) is less than 1E-04 and the non-carcinogenic HI is equal to or less than 1, action generally is not warranted unless adverse environmental effects are likely.

Calculation of risks and hazards due to exposure to COPCs are presented in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q) in Tables E.1-7.1 through E.1-7.10, E.2-7.1 through E.2-7.10, and Tables E.3-7.1 through E.3-7.10, respectively. A refinement of the HIs based on target organs is conducted. As shown in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q) in Tables E.1-9.1 through E.1-9.10, E.2-9.1 through E.2-9.10, and E.3-9.1 through E.3-9.10, the refinement consists of calculating HIs on a target organ-specific basis. In addition in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q), Tables E.1-10.1 through E.1-10.3, E.2-10.1 through E.2-10.2, and E.3-10.1 through E.3-10.3 summarize risks and hazards for risk/HI drivers (i.e., those COPCs contributing to a total risk greater than 1.E-04 or a total target organ hazard greater than 1).

Risks and hazards presented in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q) in Tables E.1-9.1 through E.1-9.10, E.2-9.1 through E.2-9.10, and Tables E.3-9.1 through E.3-9.10 are summarized in the tables below.

SWMU 35 – Summary of Risks and Hazards

Timeframe/Receptor	Risk	HI	Risk Drivers	Target Organ Segregation HI>1
Current/Future Maintenance Worker (Surface Soil)	1.E-06	0.1	None	None
Current/Future Maintenance Worker (Total Soil)	7.E-07	0.09	None	None
Hypothetical Future Commercial Worker	2.E-06	0.3	None	None
Hypothetical Future Construction Worker	8.E-06	**8**	None	CNS (HI=7) – Soil (Al – Inh (2.4), Mn – Ing/Derm/Inh (4.1))
Hypothetical Future Adult Resident (Surface Soil and Groundwater)	See Lifetime Resident	0.9	NA	None
Hypothetical Future Adult Resident (Total Soil and Groundwater)	See Lifetime Resident	0.8	NA	None
Hypothetical Future Child Resident (Surface Soil and Groundwater)	See Lifetime Resident	**7**	NA	GI Tract (HI=2) – Soil (Cr – Ing/Derm (1), Fe – Ing (0.5)) Liver (HI=2) – Soil (Cr – Ing/Derm (1), Fe – Ing (0.5)) Vascular (HI=2) – Soil (As - Ing (0.3), Nitroglycerin – Ing/Derm (1.4))
Hypothetical Future Child Resident (Total Soil and Groundwater)	See Lifetime Resident	**6**	NA	Vascular (HI=2) – Soil (As - Ing (0.2), Nitroglycerin – Ing/Derm (1.4))
Hypothetical Lifetime Resident (Surface Soil and Groundwater)	2.E-05	NA	None	NA
Hypothetical Lifetime Resident (Total Soil and Groundwater)	2.E-05	NA	None	NA

Note: NA = Not Applicable, HI = Hazard Index, CNS = Central Nervous System, GI = Gastrointestinal
Bold = Above USEPA Risk or Hazard Range
Al = Aluminum, Cr = Chromium, Fe = Iron, Mn = Manganese, V = Vanadium
Ing = Ingestion, Inh = Inhalation, Derm = Dermal

SWMU 37 – Summary of Risks and Hazards

Timeframe/Receptor	Risk	HI	Risk Drivers	Target Organ Segregation HI>1
Current/Future Maintenance Worker (Surface Soil)	1.E-06	0.07	None	None
Current/Future Maintenance Worker (Total Soil)	8.E-07	0.06	None	None
Hypothetical Future Commercial Worker	5.E-06	0.4	None	None
Hypothetical Future Construction Worker	1.E-05	**8**	None	CNS (HI=6) – Soil (Al – Inh (2.7), Mn – Ing/Derm/Inh (3.7))
Hypothetical Future Adult Resident (Surface Soil and Groundwater)	See Lifetime Resident	1	NA	None
Hypothetical Future Adult Resident (Total Soil and Groundwater)	See Lifetime Resident	1	NA	None
Hypothetical Future Child Resident (Surface Soil and Groundwater)	See Lifetime Resident	**6**	NA	CNS (HI=2) – Groundwater (Mn Ing/Derm (1)), Soil (Al – Ing (0.3), Mn – Ing/Derm (0.4)) GI Tract (HI=2) – Soil (Cr – Ing/Derm (1), Fe – Ing (0.5)) Liver (HI=3) – Soil (Cr – Ing/Derm (1), Fe – Ing (0.5)), Groundwater (Heptachlor Epoxide – Ing/Derm (0.9))
Hypothetical Future Child Resident (Total Soil and Groundwater)	See Lifetime Resident	**6**	NA	CNS (HI=2) – Groundwater (Mn – Ing/Derm (1)), Soil (Al –Ing/Derm (0.3), Mn – Ing/Derm (0.4)) GI Tract (HI=2) – Soil (Cr – Ing/Derm (1), Fe – Ing/Derm (0.5)) Liver (HI=2) – Soil (Cr – Ing/Derm (1), Fe – Ing/Derm (0.5)), Groundwater (Heptachlor Epoxide – Ing/Derm (0.9)
Hypothetical Lifetime Resident (Surface Soil and Groundwater)	5.E-05	NA	None	NA
Hypothetical Lifetime Resident (Total Soil and Groundwater)	5.E-05	NA	None	NA

Note: NA = Not Applicable, HI = Hazard Index, CNS = Central Nervous System, GI = Gastrointestinal
Bold = Above USEPA Risk or Hazard Range
Al = Aluminum, As = Arsenic, Cr = Chromium, Fe = Iron, Mn = Manganese
Ing = Ingestion, Inh = Inhalation, Derm = Dermal

SWMU 38/AOC Q – Summary of Risks and Hazards

Timeframe/Receptor	Risk	HI	Risk Drivers	Target Organ Segregation HI>1
Current/Future Maintenance Worker (Surface Soil)	5.E-07	0.05	None	None
Current/Future Maintenance Worker (Total Soil)	3.E-07	0.05	None	None
Hypothetical Future Commercial Worker	1.E-06	0.7	None	None
Hypothetical Future Construction Worker	3.E-06	**7**	None	CNS (HI=6) – Soil (Al – Inh (2), Mn – Inh (4))
Hypothetical Future Adult Resident (Surface Soil and Groundwater)	See Lifetime Resident	**2**	NA	CNS (HI=2) – Groundwater (Mn – Ing/Derm (2))
Hypothetical Future Adult Resident (Total Soil and Groundwater)	See Lifetime Resident	**2**	NA	CNS (HI=2) – Groundwater (Mn – Ing/Derm (2))
Hypothetical Future Child Resident (Surface Soil and Groundwater)	See Lifetime Resident	**7**	NA	CNS (HI=5) – Groundwater (Mn – Ing/Derm (4)), Soil (Al –Ing (0.3), Mn – Ing/Derm (0.5))
Hypothetical Future Child Resident (Total Soil and Groundwater)	See Lifetime Resident	**7**	NA	CNS (HI=5) – Groundwater (Mn – Ing/Derm (4)), Soil (Al –Ing (0.2), Mn – Ing/Derm (0.5))
Hypothetical Lifetime Resident (Surface Soil and Groundwater)	2.E-05	NA	None	NA
Hypothetical Lifetime Resident (Total Soil and Groundwater)	2.E-05	NA	None	NA

Note: NA = Not Applicable, HI = Hazard Index, CNS = Central Nervous System
Bold = Above USEPA Risk or Hazard Range
Al = Aluminum, Mn = Manganese
Ing = Ingestion, Inh = Inhalation, Derm = Dermal

6.4.1 Lead Exposure Model

The mean concentrations for lead in surface soil and total soil for SWMU 35 (233.6 mg/kg - surface soil and 137.1 mg/kg - total soil), SWMU 37 (121 mg/kg - surface soil and 64.05 mg/kg - total soil), and SWMU 38/AOC Q (26.61 mg/kg - surface soil and 17.63 mg/kg - total soil) were below the residential lead screening level of 400 mg/kg; therefore, additional lead modeling was not conducted for the sites.

6.4.2 Iron Margin of Exposure Evaluation

Because iron concentrations in soil resulted in an HQ of 0.5 or higher for the hypothetical future child resident at the sites, a "margin of exposure evaluation" was conducted for the sites. This evaluation consists of a comparison of estimated intake of iron to the RDA and concentrations known to cause adverse health effects in children (USEPA 2001a).

For the margin of exposure evaluation, the estimated iron intakes at the sites for a hypothetical future resident child scenario for surface soil and total soil are calculated using the assumptions and equations provided in Appendices E.1, E.2, and E.3 for SWMU 35, SWMU 37, and SWMU 38/AOC Q, respectively. These estimated iron intake levels are then compared to the RDA for children (6 months to 10 years old) of 10 mg/day (NCEA 1996). In addition, using an average child weight of 15 kilograms (USEPA 1989), the child intakes for surface soil and total soil are calculated and compared to the calculated provisional (risk reference dose) RfD of 0.7 mg/kg-day. The results of the margin of exposure evaluation are summarized in the table below.

Results of Iron Margin of Exposure Evaluation

		RDA Evaluation			Provisional Risk Reference Dose (RfD) Evaluation		
	Iron EPC (mg/kg)	Child Daily Intake Estimate (mg/day)	RDA (mg/day)	Result	Child Daily Intake (mg/kg-day)	Calculated Provisional RfD (mg/kg-day)	Result
SWMU 35	25,518	4.9	10	<RDA	0.33	0.7	<RfD
SWMU 37	25,458	4.9	10	<RDA	0.33	0.7	<RfD
SWMU 38/ AOC Q	26,000	5.0	10	<RDA	0.33	0.7	<RfD

The iron exposure assessment results for the hypothetical future child resident were below the applicable iron margin of exposure screening criteria for SWMU 35, SWMU 37, and SWMU 38/AOC Q.

6.4.3 Background

Statistical evaluations were conducted to compare metals concentrations in soil at the sites to background concentrations presented in the RFAAP Facility-Wide Background Study Report (IT 2001). These evaluations followed the procedures outlined in the USEPA *Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites* (USEPA 2002a) and included distribution testing and comparisons of site data to background using ProUCL 4.0 (USEPA 2007b). At the sites, if the distribution testing showed that either site data sets and background data sets in each case were not normal, consistent with Section 4.1 of the above referenced USEPA guidance, comparisons of site to background were conducted using non-parametric testing to evaluate whether site concentrations were consistently higher or lower than the background data set. If the distribution of the site and background data sets were both distributed normally, a paired t-test was conducted to evaluate whether site concentrations were consistently higher or lower than the background data set unless non-detects are present in either data set then the default comparison using ProUCL 4.0 is nonparametric. Appendix D presents results of the statistical evaluations and a summary of the results is presented in the following table.

Summary of Statistical Background Evaluations for Metals

Exposure Medium	Test Result Above Background?	SWMU 35	SWMU 37*	SWMU 38/AOC Q
Surface Soil	**Yes**	Al and Cr	Al and Cr	Al
	No	As, Co, Fe, Mn, and V	As, Co, Fe, Mn, and V	As, Cr, Co, Fe, Mn, and V
Total Soil	**Yes**	Al and Cr	Al and Cr	Al and Mn
	No	As, Co, Fe, Mn, and V	As, Co, Fe, Mn, and V	As, Cr, Co, Fe, and V

Notes: * Background evaluation was not conducted for mercury (SWMU 37 surface soil) due to the number of detection in the background data set. Al = aluminum, As = arsenic, Co = cobalt, Cr = chromium, Fe = iron, Mn = manganese, and V = vanadium.

As indicated by the results, aluminum concentrations are above background for both surface soil and total soil at all three sites. Chromium concentrations are above background for both surface soil and total soil at SWMUs 35 and 37. Manganese concentrations are above background for total soil at SWMU 38/AOC Q.

6.5 HHRA SUMMARY

This HHRA was performed to evaluate the potential human health effects associated with previous activities at the three sites. Receptors evaluated for both areas included: current/future maintenance worker, hypothetical future construction worker, hypothetical future commercial worker, hypothetical future adult resident, hypothetical future child resident, and hypothetical future lifetime resident.

6.5.1 SWMU 35 Summary

As presented in Section 6.4, the total risk for each receptor is below or within USEPA's target risk range for Superfund sites (1E-06 to 1E-04, USEPA 1989). The total HIs after target organ segregation for all receptors except the hypothetical future construction worker (CNS) and hypothetical future child resident (GI tract, liver, and vascular) are equal to or below the USEPA reference HI of 1. The iron exposure assessment results for the hypothetical future child resident were below the applicable iron margin of exposure screening criteria for SWMU 35. Lead modeling was not conducted for the site due to mean concentrations of lead in surface and total soil below the residential screening level.

Hypothetical Future Construction Worker

The site-related CNS HI for the hypothetical construction worker, when excluding the metal hazard driver in total soil detected below background (manganese), is 2 due to inhalation of aluminum in total soil. Since the HI greater than 1 is due to aluminum at the site, an additional background comparison of site concentrations to its background point estimate (UTL) was conducted for the site to assess whether site soil concentrations for aluminum were significantly above background. UTLs have been used at RFAAP to evaluate whether there is statistically significant evidence of concentrations consistently higher than background at a site. In cases where calculated target risks or hazards for a metal are above the USEPA recommended ranges, the UTLs also have been used at RFAAP as a remedial goal when UTLs are above risk-based calculated remedial goals. Detected site concentrations for aluminum are below its UTL; and therefore, aluminum concentrations at the site are not considered above the range of facility background. Thus, when considering background the site-related CNS HI for the construction worker would be less than 1.

Hypothetical Future Child Resident (Surface Soil and Groundwater)

The site-related GI tract and liver HIs for the hypothetical future child resident, when excluding the metal hazard driver detected below background (iron) in surface soil, are 1 due to chromium in surface soil.

The site-related vascular HI for the hypothetical future child resident, when excluding the metal hazard driver detected below background (arsenic) in surface soil, rounds to 1 due to nitroglycerin in surface soil. In addition, note that nitroglycerin was detected in 1 of 22 soil samples.

Hypothetical Future Child Resident (Total Soil and Groundwater)

The site-related vascular HI for the hypothetical future child resident, when excluding the metal hazard driver detected below background (arsenic) in total soil, rounds to 1 due to nitroglycerin in total soil. In addition, note that nitroglycerin was detected in 1 of 22 soil samples.

6.5.2 SWMU 37 Summary

As presented in Section 6.4, the total risk for each receptor is below or within USEPA's target risk range for Superfund sites (1E-06 to 1E-04, USEPA 1989). The total HIs after target organ segregation for all receptors except the hypothetical future construction worker (CNS) and hypothetical future child resident (CNS, GI tract, and liver) are equal to or below the USEPA reference HI of 1. The iron exposure assessment results for the hypothetical future child resident were below the applicable iron margin of exposure screening criteria for SWMU 37. Lead modeling was not conducted for the site due to mean concentrations of lead in surface and total soil below the residential screening level.

Hypothetical Future Construction Worker

The site-related CNS HI for the hypothetical construction worker, when excluding the metal hazard driver detected below background (manganese) in total soil, is 3 due to inhalation of aluminum in total soil. Since the HI greater than 1 is due to aluminum at the site, an additional background comparison of site concentrations to its background point estimate (UTL) was conducted for the site to assess whether site soil concentrations for aluminum were significantly above background. UTLs have been used at RFAAP to evaluate whether there is statistically significant evidence of concentrations consistently higher than background at a site. In cases where calculated target risks or hazards for a metal are above the USEPA recommended ranges, the UTLs also have been used at RFAAP as a remedial goal when UTLs are above risk-based calculated remedial goals. Detected site concentrations for aluminum are below its UTL; and therefore, aluminum concentrations at the site are not considered above the range of facility background. Thus, when considering background the site-related CNS HI for the construction worker would be less than 1.

Hypothetical Future Child Resident (Surface Soil and Groundwater)

The site-related CNS HI for the hypothetical future child resident, when excluding the metal hazard driver detected below background (manganese) in surface soil, rounds to 1 due to aluminum in surface soil and manganese in groundwater.

The site-related GI tract HI for the hypothetical future child resident, when excluding the metal hazard driver detected below background (iron) in surface soil, is 1 due to chromium in surface soil.

The liver HI for the hypothetical future child resident, when excluding the metal hazard driver detected below background (iron) in surface soil, is 2 due to chromium in surface soil and heptachlor epoxide in groundwater. The heptachlor epoxide detection was below its MCL. Data suggests the site is not the source of pesticides in groundwater since the pesticides detected in groundwater were not detected in soil at the site and pesticides were also detected in background well 37MW1. Therefore, the site related liver HI for the hypothetical future child resident is 1 due to chromium in surface soil.

Hypothetical Future Child Resident (Total Soil and Groundwater)

The site-related CNS HI for the hypothetical future child resident, when excluding the metal hazard driver detected below background (manganese) in total soil, rounds to 1 due to aluminum in total soil and manganese in groundwater.

The site-related GI tract HI for the hypothetical future child resident, when excluding the metal hazard driver detected below background (iron) in total soil, is 1 due to chromium in surface soil.

The liver HI for the hypothetical future child resident, when excluding the metal hazard driver detected below background (iron) in total soil, is 2 due to chromium in total soil and heptachlor epoxide in groundwater. The heptachlor epoxide detection was below its MCL. Data suggests the site is not the source of pesticides in groundwater since the pesticides detected in groundwater were not detected in soil at the site and pesticides were also detected in background well 37MW1. Therefore, the site related liver HI for the hypothetical future child resident is 1 due to chromium in total soil.

6.5.3 SWMU 38/AOC Q Summary

As presented in Section 6.4, the total risk for each receptor is below or within USEPA's target risk range for Superfund sites (1E-06 to 1E-04, USEPA 1989). The total HIs after target organ segregation for all receptors except the hypothetical future construction worker (CNS), hypothetical adult resident (CNS), and hypothetical future child resident (CNS) are equal to or below the USEPA reference HI of 1E+00. The iron exposure assessment results for the hypothetical future child resident were below the applicable iron margin of exposure screening criteria for SWMU 38/AOC Q. Lead modeling was not conducted for the site due to mean concentrations of lead in surface and total soil below than the residential screening level.

Hypothetical Future Construction Worker

The site-related CNS HI for the hypothetical construction worker is 6E+00 primarily due to inhalation of aluminum and manganese in total soil. Site aluminum and manganese concentrations in total soil were above background concentrations based on background comparisons for total soil. Since the HI greater than 1 is due to aluminum and manganese at the site, an additional background comparison of site concentrations to their background point estimates (UTLs) was conducted for the site to assess whether site soil concentrations for aluminum and manganese were significantly above background. UTLs have been used at RFAAP to evaluate whether there is statistically significant evidence of concentrations consistently higher than background at a site. In cases where calculated target risks or hazards for a metal are above the USEPA recommended ranges, the UTLs also have been used at RFAAP as a remedial goal when UTLs are above risk-based calculated remedial goals. Detected site concentrations for aluminum and manganese are below their UTLs; and therefore, aluminum and manganese concentrations at the site are not considered above the range of facility background. Thus, when considering background the site-related CNS HI for the construction worker would be less than 1.

Hypothetical Future Adult Resident

The site-related CNS HI for the hypothetical future adult resident is 2E+00 due to ingestion and dermal contact with manganese in groundwater.

Hypothetical Future Child Resident (Surface Soil and Groundwater)

The CNS HI for the hypothetical future child resident is 5E+00 due primarily to ingestion and dermal contact with manganese in groundwater (HI=4E+00) and ingestion and dermal contact with aluminum (HI=0.3) and manganese (HI=0.5) in surface soil. Manganese concentrations were below background in surface soil. The dissolved manganese detection in groundwater resulting in an HI of 4 is not considered site related given that, as previously discussed in Section 4.7.3, a site-specific source related to disposal activities for the dissolved manganese concentrations detected in well 38MW3 was not identified. In addition, the occurrence of dissolved manganese at concentrations above the T-RBC at one well location

38MW3 may be due natural geologic conditions (i.e., weathering of bedrock containing manganese and alluvial deposition). Therefore, the site-related CNS HI is 0.3 due to aluminum in surface soil.

Hypothetical Future Child Resident (Total Soil and Groundwater)

The CNS HI for the hypothetical future child resident is 5E+00 due primarily to ingestion and dermal contact with manganese in groundwater (HI=4E+00) and ingestion and dermal contact with aluminum (HI=0.2) and manganese (HI=0.5) in total soil. The dissolved manganese detection in groundwater resulting in an HI of 4 is not considered site related given that, as previously discussed in Section 4.7.3, a site-specific source related to disposal activities for the dissolved manganese concentrations detected in well 38MW3 was not identified. In addition, the occurrence of dissolved manganese at concentrations above the T-RBC at one well location 38MW3 may be due natural geologic conditions (i.e., weathering of bedrock containing manganese and alluvial deposition). Therefore, the site-related CNS HI is 0.7 due to aluminum and manganese in total soil.

6.6 UNCERTAINTIES

Risk assessments involve the use of assumptions, judgments, and incomplete data to varying degrees that contribute to the uncertainty of the final estimates of risk. Uncertainties result both from the use of assumptions or models in lieu of actual data and from the error inherent in the estimation of risk related parameters and may cause risk to be overestimated or underestimated. Based on the uncertainties described below, this risk assessment should not be construed as presenting an absolute estimate of risk to persons potentially exposed to COPCs.

Consideration of the uncertainty attached to various aspects of the risk assessment allows better interpretation of the risk assessment results and understanding of the potential adverse effects on human health. In general, the primary sources of uncertainty are associated with environmental sampling and analysis, selection of chemicals for evaluation, toxicological data, and exposure assessment. The effects of these uncertainties on the risk estimates are discussed below.

6.6.1 Environmental Sampling and Analysis

If the samples do not adequately represent media at the sites, hazard/risk estimates could be overestimated or underestimated. The sampling and analysis plan was designed to investigate anticipated areas of contamination and delineate area(s) of concern at the SWMUs. Therefore, there is less chance that the hazard/risk estimates are biased low. Also, if the analytical methods used do not apply to some chemicals that are present at each area, risk could be underestimated. Because the analytical methods at the site were selected to address all chemicals that are known or suspected to be present on the basis of the history of each area, the potential for not identifying a COPC is reduced.

Uncertainty in environmental chemical analysis can stem from several sources including errors inherent in the sampling or analytical procedures. Analytical accuracy errors or sampling errors can result in rejection of data, which decreases the available data for use in the HHRA, or in the qualification of data, which increases the uncertainty in the detected chemical concentrations. There is uncertainty associated with chemicals reported in samples at concentrations below the method reporting limit but still included in data analysis and with those chemicals qualified "J" indicating that the concentrations are estimated. Another issue involves the amount of blank related (i.e., B-qualified) data in the data set. These data were retained in the HHRA without modification. The inclusion of "B" qualified data in the risk assessment may overestimate risk.

6.6.2 Selection of Chemicals for Evaluation

A comparison of maximum detected chemical concentrations to USEPA Region III RBCs was conducted for both surface and total soil. Chemicals whose maximum concentrations were below their respective RBCs were not carried through the assessment. It is unlikely that this risk based screening excluded chemicals that should be included, based on the conservative exposure assumptions and conservatively

derived toxicity criteria that are the basis of the RBCs. Although following this methodology does not provide a quantitative risk estimate for every chemical, it focuses the assessment on the chemicals accounting for the greatest risks (i.e., chemicals whose maximum concentrations exceed their respective RBCs) and the cumulative risk estimates would not be expected to be significantly greater. As presented on the non-detect method detection limit (MDL) screening tables in Appendices E.1 (SWMU 35), Tables E.1-2.3 and E.1-2.5, E.2 (SWMU 37), Tables E.2-2.3 and E.2-2.5, and E.3 (SWMU 38/AOC Q), Tables E.3-2.3 and E.3-2.5, the maximum MDL exceeded the adjusted RBCs for several chemical in soil and groundwater; therefore, the site-related risks and hazards could be underestimated for the risk assessments due to inadequate detection limits.

Background concentrations of metals in soil at RFAAP have been characterized and are used in statistical comparisons to site soil to evaluate whether concentrations of metals detected at the sites are consistently higher or lower than background. Uncertainties associated with the use of these data may lead to a low-to-moderate overestimation or underestimation of surface and total soil risks due to metals.

Screening criteria are derived from RDAs for essential human dietary minerals, trace elements, and electrolytes that are toxic at very high doses (i.e., calcium, magnesium, potassium, and sodium). Omitting these essential human nutrients from further evaluation is expected to have a low effect on risk and hazard estimates.

The use of the October 2007 RBCs rather than the April 2009 Regional Screening Level Table for the SSP human health risk screening could result in the inclusion or exclusion of chemicals based on outdated toxicity data. Therefore to lessen the uncertainty associated with the use of these screening levels, an assessment of the data was conducted with respect to the April 2009 Regional Screening Levels which did not result in the identification of any additional COPCs for the sites.

6.6.3 Exposure Assessment

The primary areas of uncertainty affecting exposure parameter estimation involve the assumptions regarding exposure pathways, the estimation of exposure point concentrations, and the exposure parameters used to estimate chemical doses.

An underlying assumption in the HHRA is that individuals at the site would engage in activities that result in exposures via each selected pathway. For example, it was assumed that maintenance workers engage in regular activities (once a week) under current and future land use conditions resulting in exposure to COPCs. This assumption is conservative, in that it is more likely that the activity patterns occur occasionally.

In establishing EPCs, the concentrations of chemicals in the media evaluated are assumed to remain constant over time. Depending on the properties of the chemical and the media in which it was detected, this assumption could over estimate risks, depending on the degree of chemical transport to other media or the rate and extent a chemical degrades over time.

When calculating EPCs from sample data, one half of the MDL was sometimes used for non-detect samples in the calculation of the 95% UCL of the mean. Approaches which substitutes values for non-detected chemical concentrations are associated with uncertainty, because chemicals that were not detected at the specified sample MDL may be absent from the medium or may be present at a concentration below the sample MDL. The uncertainty of the exposure point concentration will increase as the number of non-detects in a data set increases and the uncertainty could result in either the overestimation or underestimation of EPCs.

The exposure parameters used to describe the extent, frequency, and duration of exposure is associated with uncertainty. Actual risks for individuals within an exposed population may differ from those predicted, depending upon their actual intake rates (e.g., soil ingestion rates), nutritional status, or body weight. Exposure assumptions were selected to produce an upper bound estimate of exposure in

accordance with USEPA guidelines regarding evaluation of potential exposures at Superfund sites (e.g., exposures were assumed to occur for 25 years for workers). In addition, many USEPA (1991) default exposure parameters are highly conservative and are based on risk management interpretations of limited data. For example, although current USEPA guidance recommends default soil ingestion rates of 100 mg/day for individuals over 6 years of age, other studies, such as Calabrese et al. (1990), have shown that the USEPA default soil ingestion rate of 100 mg/day is likely to greatly overestimate adult exposures and risks. In addition, chemicals in soil are assumed 100% bioavailable; this assumes that ingested chemicals present in a soil matrix are absorbed through the gastrointestinal (GI) tract, which is unlikely due to the affinity of contaminants for soil particles. Therefore, based on the conservative exposure assumptions used in the HHRA, exposures and estimated potential risks are likely to be overestimated for the ingestion of soil pathways.

Evaluation of the dermal absorption exposure pathway is affected by uncertainties in dermal exposure parameters. For example, there is uncertainty associated with the exposed skin surface areas used, since the choice of exposed body parts could slightly overestimate or underestimate risks. Uncertainties that are more significant are associated with the selection and use of dermal absorption factors. For this HHRA, the dermal absorption factors and calculations were based on USEPA Region III guidance, USEPA's *Risk Assessment Guidance for Superfund (RAGS): Part E, Supplemental Guidance for Dermal Risk Assessment* (USEPA 2004). Very limited information is available on dermal absorption of chemicals from contacted soil under environmental conditions. In fact, there are not actual human epidemiological data to support the hypothesis that absorption of soil bound compounds under exposure conditions is a complete route of exposure. For example, the Public Health Statements from the Agency for Toxic Substance Disease Registry (ATSDR 1999b) indicates cadmium is not known to result in human health effects by dermal absorption because virtually zero cadmium can enter the body through the skin under normal circumstances (i.e., without exposure to very high concentrations for long periods or exposure to skin that is damaged (ATSDR 1999a). Therefore, using the dermal absorption factors to evaluate dermal absorption exposures to soil may result in an overestimation of risks.

6.6.4 Toxicological Data

The HHRA relies on USEPA derived dose response criteria. These health effects criteria are conservative and are designed to be protective of sensitive subpopulations. The health criteria used to evaluate long-term exposures, such as RfDs or CSFs, are based on concepts and assumptions that bias an evaluation in the direction of overestimation of health risk. As USEPA notes in its *Guidelines for Carcinogenic Risk Assessment* (USEPA 1986), there are major uncertainties in extrapolating both from animals to humans and from high to low doses. There are important species differences in uptake, metabolism, and organ distribution of carcinogens, as well as species and strain differences in target site susceptibility, human populations are variable with respect to genetic constitution, diet, occupational and home environment, activity patterns, and other cultural factors.

These uncertainties are compensated for using upper bound 95% UCLs for CSFs (carcinogens), and safety factors for RfDs (non-carcinogens). The assumptions used here provide a rough but plausible estimate of the upper limit of risk; in other words, it is not likely that the true risk would be much more than the estimated risk, but it could very well be considerably lower. More refined modeling in the area of dose response calculation (e.g., using maximum likelihood dose response values rather than the 95% UCL) would be expected to substantially lower the final risk.

For dermal absorption exposure pathways, the absence of dermal toxicity criteria necessitates the use of oral toxicity data. To calculate risk estimates for the dermal absorption pathway, absorbed dermal absorption doses are combined with oral toxicity values (also discussed above in Section 6.3). Oral toxicity values, which are typically expressed in terms of potential (or administered) doses, should be adjusted when assessing dermal absorption doses, which are expressed as internal (or absorbed) doses. In this assessment, absolute oral absorption factors that reflect the toxicity study conditions were used to

modify the oral toxicity criteria. For those chemicals lacking sufficient information, a default oral absorption factor of 1.0 was used. The risk estimates for the dermal absorption pathways may be overestimated or underestimated, depending on how the values used in the HHRA reflect the difference between the oral and dermal routes.

Inhalation toxicity criteria are unavailable for many of the COPCs. This HHRA does not use oral-based toxicity criteria to estimate risks from inhalation exposure because of the following uncertainties associated with such a substitution:

- Many contaminants show portal-of-entry toxicity – that is, adverse health effects occur primarily at the tissue site at which the chemical is introduced into the body (e.g., GI tract, lung, or skin). For example, orally administered benzo(a)pyrene is associated with benign and malignant tumors in the gut mucosa (Neal and Rigdon 1967), but inhaled benzo(a)pyrene produces an increased incidence of upper respiratory tract tumors (Thyssen et al. 1981). Therefore, quantitative risk estimates based on these two administration routes are dissimilar;
- Physiological and anatomical differences between the GI tract and respiratory systems invalidate a cross-route quantitative risk extrapolation. The small intestine of humans contains a very large surface area that readily absorbs most compounds by passive diffusion (Klaasen et al. 1986). The oral absorption of a few compounds, such as iron, is an energy-dependent (active-transport) process, wherein; the absorption rate is proportional to the body's current need for iron;
- The rate and extent of pulmonary absorption are much more complex and depend on such factors as particle size distribution of the airborne toxicant and blood-gas solubility of the toxicant (Klaasen et al. 1986). Particles with median aerodynamic diameters of approximately 1 micrometer (μm) or less are absorbed by the alveolar region of the human lung. Larger particles deposit in the tracheobronchial or nasopharyngeal regions where they are cleared by mucociliary mechanisms and subsequently swallowed or physically removed and exhaled. Therefore, pulmonary absorption is more highly dependent on the physiochemical properties of the material than oral absorption;
- Because highly soluble gases (e.g., chloroform) are more rapidly absorbed into the blood than poorly soluble gases (e.g., ethylene), they take much longer to reach equilibrium. Thus, the inhalation absorption rate of a gas is more dependent on blood solubility than the oral absorption rate of the same substance administered as a liquid; and
- Human inhalation risk estimates based on oral toxicity data in subhuman species are distorted by both route-to-route extrapolation and interspecies extrapolation. For example, the rodent GI tract, which includes a structurally unique fore stomach, is anatomically and functionally distinct from the human lung, which contains a very large alveolar surface area for extensive absorption. The rate and extent of absorption across these distinct physiological systems are not alike.

In addition, for inhalation exposure to substances present as dusts, vapors, gases, or airborne particulate matter, dose extrapolation is far more complex, and therefore associated with uncertainty. The major confounding factors that prohibit a direct dose extrapolation of an inhaled toxicant are the following:

- Over 40 functionally different cell types in the lung – the distribution, consequent metabolic reactions, and air exchange rates vary widely across species;
- Differential concentration and activity of the detoxifying protein glutathione;
- Interspecies and intraspecies differences in the ability to repair pulmonary cell damage, and to clear toxic contaminants and immune complexes from the respiratory tract. For example, species vary in the ability to activate macrophages – nonspecific immune cells that can both protect the inner lining of the respiratory system and, at high concentrations, damage healthy tissues;

- Anatomical variations in the respiratory pathway, which affect both absorption rates and time to reach steady-state blood levels; and
- Sensitivity to solubility and concentration variables; because of metabolic saturation (i.e., the exhaustion of normal metabolic activity caused by exposure to high concentrations), highly soluble contaminants deviate from first-order kinetics – which makes it difficult to predict the rates and extent of biotransformation and detoxification reactions. Furthermore, intermittent inhalation exposure to highly blood-soluble chemicals results in bioaccumulation in fat tissue because of the insufficient time between exposure sessions for complete clearance of the contaminant. Such slow release from the fat compartment to other body tissues can result in toxicological and metabolic effects that are difficult to assess and vary across species.

For chemicals without IRIS toxicity criteria, provisional toxicity criteria were used where available (Appendices E.1, E.2, and E.3 - Tables E.1-5.1 through E.1-6.2, Tables E.2-5.1 through E.2.6-2, and Tables E.3-5.1 through E.3-6.2). Provisional toxicity criteria present a source of uncertainty, since USEPA has evaluated the compound, but consensus has not been established on the toxicity criteria. Provisional oral toxicity values were used for aluminum, arsenic, chromium, cobalt, iron, vanadium, Aroclor 1254, heptachlor epoxide, chloroform, and nitroglycerin. For this assessment, use of provisional toxicity criteria was preferable to not evaluating the chemical in order to limit data gaps. However, because these toxicity criteria have not been formally accepted by USEPA, there is uncertainty with these values and, therefore, with the risks calculated using these toxicity criteria.

Some detected constituents (cobalt, cyclohexane, methylcyclohexane, di-n-octylphthalate, and dimethylphthalate) do not have USEPA Region III RBCs. Due to the low detection frequency for cyclohexane, methylcyclohexane, di-n-octylphthalate, and dimethylphthalate, these chemicals were not carried forward as COPCs into the HHRA. Provisional/surrogate toxicity values were researched for cobalt and cancer risk/non-cancer hazard calculations were derived for cobalt. It is undetermined if the uncertainty is biased high or low for cobalt because of the provisional nature of the toxicity data used. However, cobalt is addressed quantitatively in the HHRA using available toxicity data to reduce the level of uncertainty associated with the risk assessment results.

6.6.5 Risk Characterization

Minor uncertainty is associated with rounding of the risk and hazard estimates. Thus, the actual risk or hazard may be slightly greater or less than the presented values. A related issue is that rounding causes minor differences between summed risk and hazard values, depending on how the summing is performed. For example, RAGS Table 7s in Appendices E.1 (SWMU 35), E.2 (SWMU 37), and E.3 (SWMU 38/AOC Q) presents risks and hazards that are summed for exposure route, exposure point, exposure medium, and medium total. Only for the first (exposure route) are the individual chemical-specific risks and hazards summed to derive the total. For the subsequent summations (exposure point, exposure medium, and medium total), each is the summation of the preceding sums. For this reason, there can also be minor rounding-related differences between the 'same' values presented in RAGS Table 9s and 10s in Appendix E.

6.7 HHRA CONCLUSIONS

This HHRA was performed to evaluate the potential human health effects associated with previous activities at the SWMUs Receptors evaluated for both areas included: current/future maintenance worker, hypothetical future construction worker, hypothetical future commercial worker, hypothetical future adult resident, hypothetical future child resident, and hypothetical future lifetime resident.

6.7.1 SWMU 35 HHRA Conclusions

In summary for SWMU 35, the results of the risk assessment indicate that the calculated site-related cancer risks and hazards are within USEPA target ranges for each of the receptors evaluated when

considering background, target organs, and frequency of detection, and site-specific conditions, with the exception of the CNS HI for the hypothetical construction worker of 2 primarily due to inhalation of aluminum in total soil. Based on background point estimate comparison, aluminum concentrations at the site were not considered significantly above background at the site. The results of the human health risk assessment did not indicate a requirement for further action for the site.

6.7.2 SWMU 37 HHRA Conclusions

In summary for SWMU 37, the results of the risk assessment indicate that the calculated site-related cancer risks and hazards are within USEPA target ranges for each of the receptors evaluated when considering background, target organs, and frequency of detection, and site-specific conditions, with the exception of the CNS HI for the hypothetical construction worker of 3 primarily due to inhalation of aluminum in total soil. Based on background point estimate comparison, aluminum concentrations at the site were not considered significantly above background at the site. The results of the human health risk assessment did not indicate a requirement for further action for the site.

6.7.3 SWMU 38/AOC Q HHRA Conclusions

In summary for SWMU 38/AOC Q, the results of the risk assessment indicate that the calculated site-related cancer risks and hazards are within USEPA target ranges for each of the receptors evaluated when considering background, target organs, frequency of detection, and site-specific conditions, with the exception of the CNS HI for the hypothetical construction worker of 6 primarily due to inhalation of aluminum and manganese from total soil. Based on background point estimate comparisons, aluminum and manganese concentrations at the site were not considered significantly above background at the site. The results of the human health risk assessment did not indicate a requirement for further action for the site.

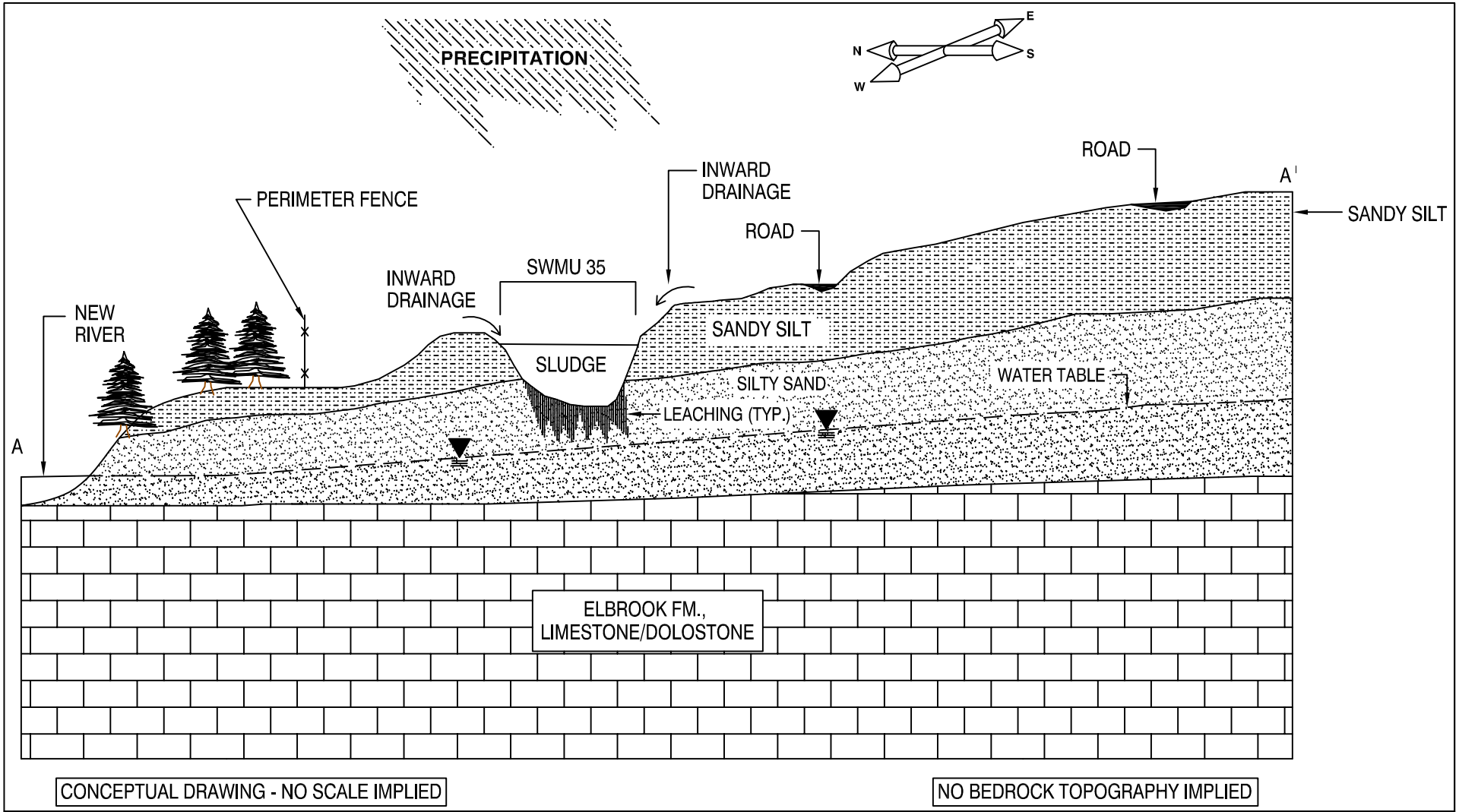


FIGURE 6-1

Conceptual Site Model - SWMU 35

Date: July 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: Not to Scale	File Name: Fig. 6-1 CSM SWMU 35

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230

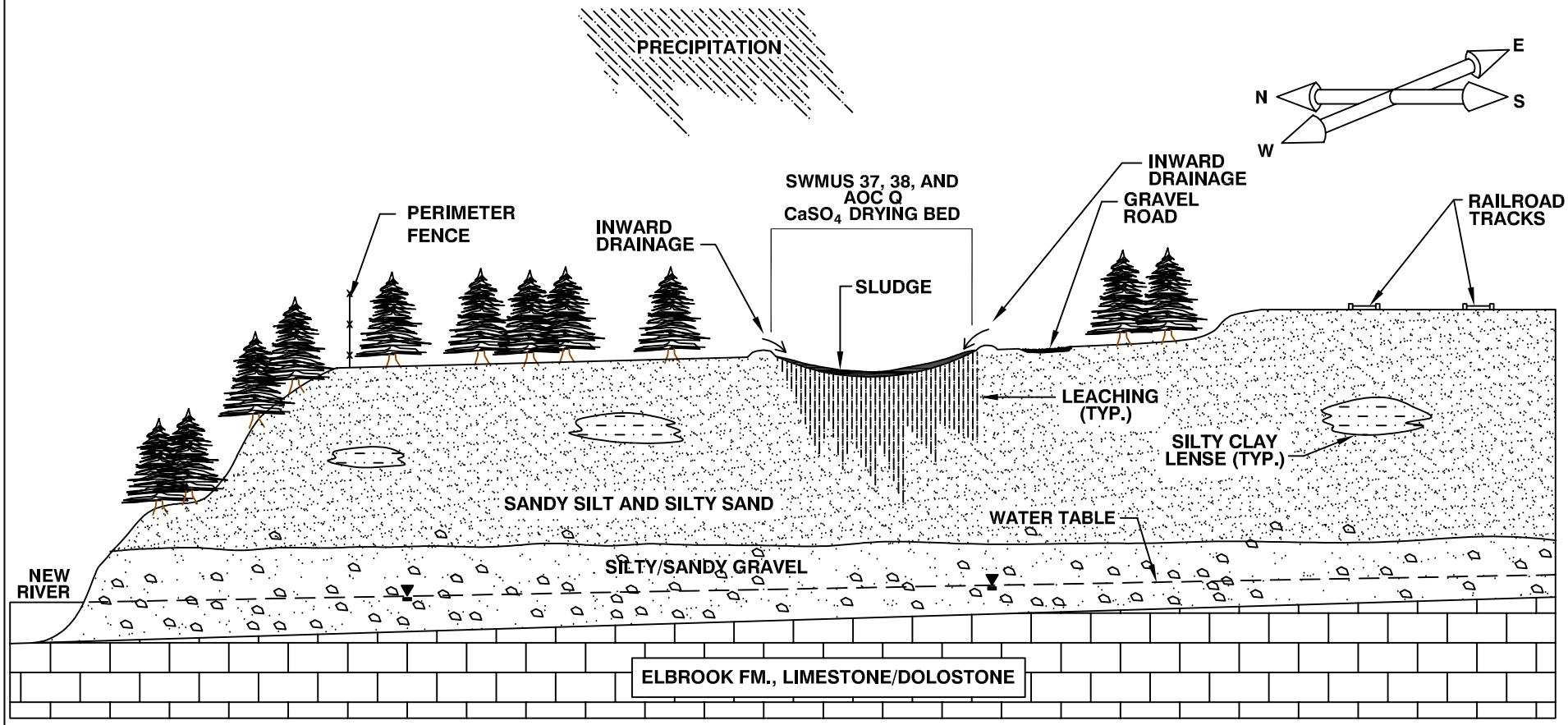


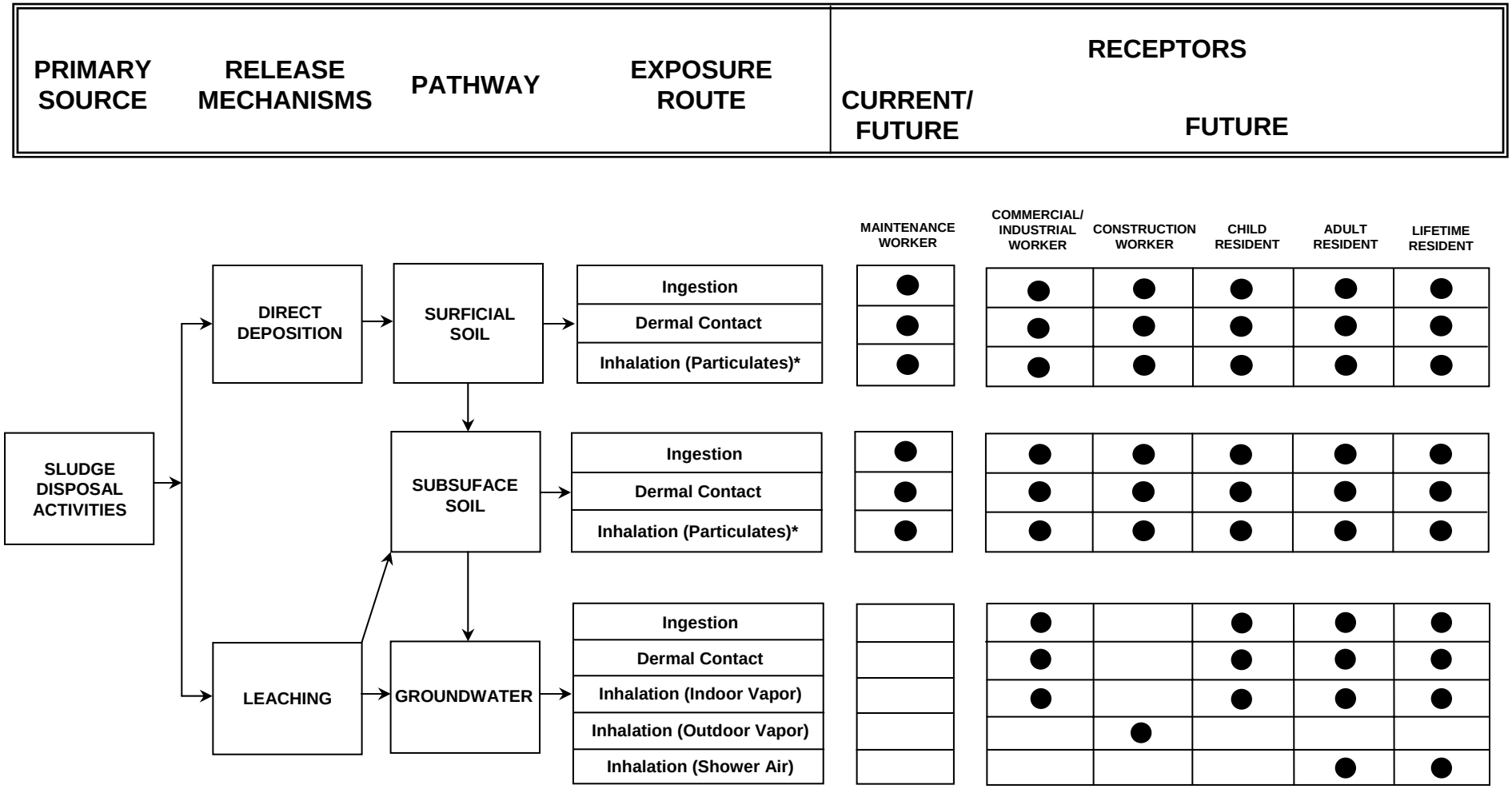
FIGURE 6-2

Conceptual Site Model -
SWMUs 37, 38, and AOC Q

Date: July 2008	URS Project #: 21354887
Prepared by: DBC	Approved by: JOS
Scale: Not to Scale	File Name: Fig. 6-2 CSM 37,38,Q

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

URS Group, Inc.
5540 Falmouth Street
Suite 201
Richmond, Virginia 23230



● POTENTIALLY COMPLETE PATHWAY EVALUATED QUANTITATIVELY

* VOCs were not identified as COPCs in soil; therefore, the outdoor and indoor vapor inhalation pathways are not assessed

FIGURE 6-3
Conceptual Site Diagram

Date: *July 2008*	**URS Project#:** *21354887*
Prepared by: *CLD*	**Approved by:** *JOS*
Scale: *Not to Scale*	**File Name:** *Fig.6-3 CSD*

SWMUs 35, 37, 38, and AOC Q
RFI Report
Radford Army Ammunition Plant
Radford, Virginia

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Suite 201
Richmond, VA 23230

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Table 6-1
Sample Assemblages for Soil and Groundwater COPC Screening
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

SWMU 35			
Surface Soil			
35SB1A	35SB4A	35SB7A	35SB10A
35SB2A	35SB5A	35SB8A	
35SB3A	35SB6A	35SB9A	
Subsurface Soil			
35SB5B	35SB6C	35SB8B	35SB9C
35SB5C	35SB7B	35SB8C	35SB10B
35SB6B	35SB7C	35SB9B	35SB10C
Samples Collected at a Depth >15' Excluded from HHRA			
None			
Groundwater			
35MW1 (D)	35MW2 (D)	D-2 (U)	D-4 (U)
SWMU 37			
Surface Soil			
37SB1A	37SB4A	37SB7A	37SB10A
37SB2A	37SB5A	37SB8A	
37SB3A	37SB6A	37SB9A	
Subsurface Soil			
37SB1B	37SB7B	37SB8C	37SB10B
37SB2B	37SB7C	37SB9B	37SB10C
37SB3B	37SB8B	37SB9C	
Samples Collected at a Depth >15' Excluded from HHRA			
37SB1C	37SB2C	37SB3C	
Groundwater			
37MW1 (U)	37MW2 (D)	37MW3 (D)	37MW4 (D)
SWMU 38/AOCQ			
Surface Soil			
38SB1A	38SB5A	38SB9A	QSB3A
38SB2A	38SB6A	38SB10A	QSB4A
38SB3A	38SB7A	QSB1A	
38SB4A	38SB8A	QSB2A	
Subsurface Soil			
38SB1B	38SB3C	38SB8C	38SB10C
38SB1C	38SB7B	38SB9B	QSB1B
38SB2B	38SB7C	38SB9C	QSB2B
38SB3B	38SB8B	38SB10B	QSB3B
Samples Collected at a Depth >15' Excluded from HHRA			
38SB2C	QSB1C	QSB2C	QSB3C
Groundwater			
38MW1 (C)	38MW2 (D)	38MW3 (D)	

Notes:
HHRA = Human Health Risk Assessment
(D) = Downgradient
(U) = Upgradient
(C) = Crossgradient

Table 6-2
RDA-based Screening Criteria Calculations
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

SOIL AND GROUNDWATER CRITERIA		Parameter Definition		Value	Units
		RDA/AI	= Recommended Daily Allowance/Adequate Intake	nutrient-specific	mg/day
		IR_S	= Soil Ingestion Rate		
			- adult resident	100	mg soil/day
			- child resident	200	mg soil/day
		IR_W	= Tap water ingestion rate		
Soil Screening = Criteria (mg/kg)	$\frac{\text{RDA/AI}}{(IR_S \times EF \times ED \times 10^{-6}\ \text{kg/mg} \times \text{year}/365\ \text{days}) / AT}$		- adult resident	2	L water/day
			- child resident	1	L water/day
		EF	= Exposure frequency		
			- residential	350	days/year
Groundwater Screening = Criteria (µg/L)	$\frac{\text{RDA/AI} \times 1000\ \mu\text{g/mg}}{(IR_W \times EF \times ED \times \text{year}/365\ \text{days}) / AT}$	ED	= Exposure duration		
			- adult resident	24	years
			- child resident	6	years
		AT	= Averaging time		
			- adult resident	24	years
			- child resident	6	years

			RDA/AI[c,d] (mg/day)		Soil Screening Criteria (mg/kg)			Groundwater Screening Criteria (µg/L)		
	Reference	CAS	Adult	Child	Adult Resident	Child Resident	Selected Criteria (Minimum)	Adult Resident	Child Resident	Selected Criteria (Minimum)
Calcium	(a)	7440-70-2	800	210	8.3E+06	1.1E+06	1.1E+06	4.2E+05	2.2E+05	2.2E+05
Magnesium	(a)	7439-95-4	130	30	1.4E+06	1.6E+05	1.6E+05	6.8E+04	3.1E+04	3.1E+04
Potassium	(b)	2023-69-5	1600	500	1.7E+07	2.6E+06	2.6E+06	8.3E+05	5.2E+05	5.2E+05
Sodium	(b)	7440-23-5	400	120	4.2E+06	6.3E+05	6.3E+05	2.1E+05	1.3E+05	1.3E+05

(a) Recommended Dietary Allowances, 10th edition ©1989 by the National Academy of Sciences (National Academy Press, Washington, D.C.)
(b) Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride, ©1997 by the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine (National Academy Press, Washington, D.C.)
(c) RDA/AIs for calcium and magnesium represent the lower end of the RDA/AI for persons 7 years old and over (adults) and 6 years old and under (children).
(d) RDA/AIs for potassium and sodium represent the lower end of the minimum requirement for healthy persons 7 years old and over (adults) and 6 years old and under (children).

7.0 SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

7.1 ECOLOGICAL RISK SCREENING PROCESS

The purpose of the ecological risk screening is to provide conclusions and recommendations regarding potential ecological risk associated with SWMU 35, SWMU 37, and SWMU 38/AOC Q. SLERAs were performed in accordance with the Final Process for Ecological Risk Assessment – Radford AAP (URS 2007b). The SLERA process is summarized below in Sections 7.1.1 through 7.1.7. Refer to Appendix F.1 for a detailed description of the SLERA process utilized for the site evaluations and an example calculation. A summary of the SLERA results are provided in Section 7.2 (SWMU 35), Section 7.3 (SWMU 37), and Section 7.4 (SWMU 38/AOC Q) and the complete tables for the SLERAs are provided in Appendices F.2 (SWMU 35), F.3 (SWMU 37), and F.4 (SWMU 38/AOC Q).

7.1.1 Scope of Work

The SLERA includes Steps 1, 2, and 3a of the Ecological Risk Assessment Guidance for Superfund (ERAGS) (USEPA 1997). Step 1 includes a screening-level problem formulation and ecological effects evaluation. Step 2 includes a preliminary exposure estimate and risk calculation. Step 3a reviews and refines the conservative assumptions used in the risk calculation (Step 2). The addition of Step 3a focuses the outcome of the SLERA, streamlines the review process, and functions as the initial basis for ecological risk management decision making.

The objectives of the ecological risk screening are to:

- Identify potentially complete exposure pathways between COPECs and receptors;
- Assess whether the COPECs are above toxicological screening values that are considered to be protective of ecological receptors;
- Identify uncertainty and/or data gaps in the ecological risk screening; and
- Identify an appropriate SMDP for each site area based on the ecological risk screening results.

7.1.1.1 Ecological Site Characterization

An overview of the site physiography, water resources, geology, and soil for SWMUs 35, 37, 38, and AOC Q is presented in Section 2.0. SWMU 35 consists of a calcium sulfate disposal bed located in the northeastern section of the MMA approximately 120 feet from the New River. SWMUs 37, 38, and AOC Q consist of two calcium sulfate disposal beds (SWMU 37 and 38) and one calcium sulfate treatment and disposal area (AOC Q) located in the northwestern section of the MMA. Each unit is surrounded by an earthen berm and bordered by the New River approximately 300-400 ft to northwest and railway tracks and a gravel road to the east.

The sites are located in densely vegetated areas and dense woods surround SWMU 38 and AOC Q to the north, south, and west where the topography slopes downward towards the New River. Observations made during the site reconnaissance indicate the vegetation community at the sites appears healthy and vigorous (see photographic logs, Appendix A). Indications of chemical vegetative stress were not observed.

In addition to the information contained in Section 2.0, additional site characterization is required for the ecological risk screening, which includes local ecological receptors (threatened and endangered species) and ecological resources. A discussion of potential biota likely to use the site areas, are included in this section. During site visits, wildlife species were observed at the site such as squirrels, deer, and red foxes.

The Virginia Department of Conservation, Division of Natural Heritage and U.S. Fish and Wildlife Service were contacted to gather information regarding the potential for threatened or endangered species to utilize the RFAAP. Results of these inquiries are provided in Appendix F.5.

In addition, the Virginia Department of Game and Inland Fisheries Installation-Wide Biological Survey (1999) recorded various species associated with the grassland communities at RFAAP. Based on their survey of the grassland habitats, the invertebrates (approximately 250 species) and birds (83 species) accounted for the majority of species observations at RFAAP. Potential species utilizing the grassland areas of the site include common passerine birds (e.g., American robin) and small mammals (e.g., short-tailed shrew). Larger mammals (e.g., white-tailed deer and red fox) and raptors (e.g., red-tailed hawk) may potentially utilize the grassland habitat for foraging. Animals such as the mallard duck, belted kingfisher, and raccoon could be expected to forage in the New River.

The Virginia Department of Game and Inland Fisheries survey identified three threatened wildlife species and two rare plant species associated with RFAAP grassland communities (currently not on the 2002 Plant Watch List; http://www.dcr.state.va.us/dnh/plantlist02.pdf). They include:

- Regal Fritillary Butterfly (*Speyeria idalia*);
- Henslow's Sparrow (*Ammodramus henslowii*);
- Loggerhead Shrike (*Lanius ludovicianus*);
- Midland Sedge (*Carex mescochorea*); and
- Shaggy False Gromwell (*Onosmodium hispidissimum*).

Threatened wildlife observations in 1999 at RFAAP included the Regal Fritillary Butterfly (VDGIF 1999). The Regal Fritillary Butterfly was documented in the east-central and eastern edges of the MMA. No threatened wildlife species or rare plant species were identified at the sites.

7.1.2 Identification of Chemicals of Potential Ecological Concern

SWMUs 35 and 37 are evaluated independently in their SLERAs. SWMU 38 and AOC Q are evaluated together in their SLERA for soil given their close proximity and the use of AOC Q as a sludge drying bed when SWMU 38 was full.

7.1.2.1 Approach

Soil samples were collected from 0 to 1 ft bgs below organic layers at the surface. This layer contains the zone of highest biological activity of soil organisms and the soil that is most frequently contacted by terrestrial biota. Although fossorial wildlife may be in contact with soil below 1 ft bgs, the preys of these animals are primarily associated with surficial soil. Furthermore, incidental exposure to the soil below 1 ft bgs is likely to be insignificant relative to surface soil exposure.

Terrestrial grassland surficial soil (0 to 1 ft bgs) represents the potential exposure media to ecological receptors. The following sections describe the process used to evaluate soil, the selection of COPECs evaluated in the SLERA, and the uncertainties associated with COPEC selection.

7.1.2.1 Terrestrial

Potential ecological receptors at SWMUs 35, 37, 38, and AOC Q may be exposed to COPECs in soil through the following exposure routes:

- Direct contact/absorption from soil;
- Direct ingestion of soil;
- Incidental ingestion of soil; and
- Direct ingestion of biota with accumulated COPECs.

Although receptors may be exposed to COPECs through inhalation or drinking surface water, sufficient literature regarding toxicity due to these pathways is lacking to quantitatively evaluate such exposure

routes. Given the potential mobility of COPECs between food web trophic levels, a number of terrestrial categories were selected. Individual receptor species were selected to represent five wildlife receptor categories and these species possess the following characteristics that are essential for assessing COPEC mobility within the food web:

- Highly likely to occur at the site;
- Limited home range;
- Important role in the local food web; and
- Sufficient toxicological information is available in the literature.

Receptor categories and the species selected to represent the wildlife categories include:

- Plant communities;
- Soil invertebrate/microbial communities;
- Omnivorous birds: American Robin (*Turdus migratorius*);
- Carnivorous birds: Red-tailed Hawk (*Buteo jamaicensis*);
- Herbivorous animals: Meadow Vole (*Microtus pennsylvanicus*);
- Omnivorous mammals: Red Fox (*Vulpes vulpes*); and
- Carnivorous mammals: Short-tailed Shrew (*Blarina brevicauda*).

Potential wildlife utilizing the site includes passerine bird and small mammalian species common to RFAAP grasslands (VDGIF 1999).

7.1.3 Identification of Exposure Pathways and Potential Receptors Analysis

7.1.3.1 Data Organization

The following table identifies the soil samples used for the SLERA. These samples were selectively analyzed for TCL VOCs, TCL SVOCs, PAHs, explosives (including nitroglycerin and PETN), TCL pesticides, TCL PCBs, herbicides, TAL metals, and cyanide. Refer to Table 3-1 for a detailed list of samples and analytes.

Soil Samples Evaluated for SLERAs

Soil – SWMU 35		Soil – SWMU 37		Soil – SWMU 38/AOC Q	
35SB1A	35SB6A	37SB1A	37SB6A	38SB1A	38SB8A
35SB2A	35SB7A	37SB2A	37SB7A	38SB2A	38SB9A
35SB3A	35SB8A	37SB3A	37SB8A	38SB3A	38SB10A
35SB4A	35SB9A	37SB4A	37SB9A	38SB4A	QSB1A
35SB5A	35SB10A	37SB5A	37SB10A	38SB5A	QSB2A
				38SB6A	QSB3A
				38SB7A	QSB4A

Detected chemical occurrence and distribution tables for surface soil are presented in Tables F.2-1 for SWMU 35 (Appendix F.2), F.3-1 for SWMU 37 (Appendix F.3), and F.4-1 for SWMU 38/AOC Q (Appendix F.4). Refer to Section 4.0, Tables 4-1 (SWMU 35), 4-5 (SWMU 37), and 4-9 (SWMU 38/AOC Q) for a complete list of results for detected analytes. In addition, to evaluate the adequate sensitivity of the MDL for the necessary screening levels, Tables F.2-2 for SWMU 35 (Appendix F.2), F.3-2 for SWMU 37 (Appendix F.3), and F.4-2 for SWMU 38/AOC Q (Appendix F.4) provide a

screening of the maximum MDL versus available ecological screening values for non-detected chemicals in surface soil.

Chemicals that were not detected in at least one sample were considered as uncertain analytes in the evaluation of risk. Other qualified analytical data were retained in the assessment, with the exception of tentatively identified compounds (TICs) identified by the laboratory qualifier "NJ." TICs were not evaluated quantitatively in the risk assessment.

In cases where chemicals were analyzed using multiple laboratory methods, the analytical results for the method with the lowest MDL were retained for the risk assessment. For example, concentrations of explosives were assessed using Method 8330 rather than the SVOC Method 8270. Eliminating the method having the higher detection limit did not result in exclusion of samples with higher detected concentrations.

7.1.3.2 Ecological Conceptual Site Model (ECSM)

The terrestrial ECSM is presented on Figure 7-1. Surface soil is a potential exposure medium of concern based on historical activities at the site. Based on the site characterization and data, the terrestrial receptor exposure to surface soil pathway exists.

7.1.4 Identification of Assessment and Measurement Endpoints

Assessment endpoints are explicit statements of ecological resources (entities) and attributes of those entities that are important to protect (USEPA 1998). Measurement endpoints represent quantifiable ecological characteristics that can be measured, interpreted, and related to ecological resources chosen as assessment endpoints. Assessment and measurement endpoints for the resources in the terrestrial sites are outlined below.

7.1.4.1 Terrestrial

Assessment and measurement endpoints for terrestrial receptors are as follows:

Assessment Endpoints	Measurement Endpoints
• Survival, growth, and reproduction of terrestrial plants	• MDCs for chemicals detected in surface soil will be compared to concentrations representing no adverse effects thresholds to the survival of plants communities reported in the scientific literature
• Survival, growth, and reproduction of soil invertebrates and microbial communities	• MDCs for chemicals detected in surface soil will be compared to concentrations representing no adverse effects thresholds to the survival of soil invertebrates or microbial communities reported in the scientific literature
• Survival, growth, and reproduction of terrestrial wildlife (birds and mammals) populations and communities	• MDCs for detected bioaccumulative chemicals in soil will be compared to no observable adverse effects levels (NOAELs) and lowest observable adverse effects levels (LOAELs) associated with effects on growth, reproduction, or survival of terrestrial wildlife

7.1.5 Preliminary Exposure Estimate and Ecological Effects Evaluation

The preliminary exposure estimate and ecological effects evaluation considers the most conservative risk scenario. Highly conservative assumptions are used to estimate COPEC exposure to terrestrial receptors for pathways to be quantitatively evaluated. Conservative toxicity reference values (TRVs) are used to evaluate the ecological effects of exposure using the two approaches discussed below.

Risk is assessed by comparing the preliminary exposure estimate (MDC) of each detected chemical to the established TRV (detailed in Appendix F.1, Section 2.1). The preliminary risk is characterized in terms of a HQ, which is expressed as:

HQ = MDC/TRV

where:

HQ = Hazard Quotient for the constituent (unitless)
MDC = Maximum Detected Concentration for constituent (mg/kg)
TRV = Screening Level for constituent (mg/kg)

An HQ of less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects. The potential for risk increases as the HQ increases above one. However, this result should be considered in the context of other characteristic of the exposure area. In addition, it should be noted that the calculation of chemical specific HQs does not account for multiple chemicals acting through the same exposure mechanism. The results of the preliminary exposure assessment are presented in Appendices F.2 (SWMU 35), F.3 (SWMU 37), and F.4 (SWMU 38/AOC Q).

7.1.5.1 Direct Contact Approach

The maximum soil concentrations for detected chemicals are used as the preliminary exposure estimate concentrations to develop a conservative risk scenario for the direct contact pathway to soil invertebrates and terrestrial plants.

7.1.5.2 Dose Rate Modeling Approach

Preliminary risk characterization for wildlife receptors uses the conservative preliminary exposure estimate and ecological effects evaluation to characterize risk to potential terrestrial receptors. Risk is assessed by comparing the preliminary exposure estimate of each detected bioaccumulative chemical, as defined in Table 4-2 in Bioaccumulative Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status, and Needs, EPA-823-R-00-001, to the TRV developed in the ecological effects evaluation. An example calculation for dose rate modeling is provided in Appendix F.1, Section 4.1, utilizing the equation below.

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \ (BAF_{food} \cdot DF) + IR_s \ )AF}$$

where:

C_{TRV} = NOAEL or LOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg COPEC/kg body weight-day)

BW = Minimum Body Weight of the receptor (kg)

IR_{food} = Maximum Ingestion Rate of food (kg food ingested per day, dry weight)

BAF_{food} = BAF of most contaminated dietary component used, specific to prey type and COPEC (ratio of mg of COPEC/kg fauna, wet weight to mg COPEC/ kg substrate, dry weight)

DF = Dietary Fraction (most contaminated dietary component assumed to be 100% of diet)

IR_s = Maximum Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)

AF = 100% Area Use Factor

In the preliminary dose rate modeling approach, the maximum COPEC concentrations for detected bioaccumulative chemicals, along with assumptions of maximum ingestion rate, minimum body weight, 100% area use, and 100% bioavailability are used in the conservative risk scenario as the preliminary exposure estimate for soil and compared to the calculated TRVs. Preliminary receptor-specific exposure parameters are presented on Table F.2-9 for SWMU 35 (Appendix F.2), Table F.3-9 for SWMU 37 (Appendix F.3), and Table F.4-9 for SWMU 38/AOC Q (Appendix F.4).

7.1.6 Refined Exposure Estimate and Risk Characterization

Refined exposure estimates and ecological effects are developed for two major receptor categories having complete exposure pathways to be quantitatively evaluated: 1) direct contact to plants and invertebrates, and 2) wildlife ingestion (i.e., omnivorous birds and mammals, carnivorous birds and mammals, and herbivorous mammals). The refined exposure and risk characterization, Step 3a of ERAGS, reviews and refines the conservative assumptions used in the risk calculation (USEPA 1997). In Step 3a, conservative assumptions used in the preliminary exposure and risk characterization are replaced with more environmentally realistic assumptions to evaluate risk posed by constituents identified in the preliminary risk characterization. The addition of Step 3a focuses the outcome of the SLERA, streamlines the review process, and functions as the initial basis for ecological risk management decision-making.

As noted below for the refined exposure estimate and risk characterization, the 95% UCL is used as the exposure concentration rather than the MDC. Methods used to calculate 95% UCLs are based on guidance provided in the following documents *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites* (USEPA 2002b) and *On the Computation of a 95% Upper Confidence Limit of the Unknown Population Mean Based Upon Data Sets with Below Detection Limit Observations* (USEPA 2006).

In general, the method used to calculate a 95% UCL depends on: 1) the number of samples, 2) the prevalence of non-detects, and 3) the data distribution (e.g., normal or lognormal). Non-detects introduce uncertainty in the data set because the true concentration may be between zero to just below the detection limit. Therefore, distributional assumptions are difficult to make for COPCs with a high rate of non-detects. ProUCL 4.0 (USEPA 2007b) is used to calculate EPCs for the sites. EPCs for soil COPECs are presented in Tables F.2-4 for SWMU 35 (Appendix F.2), F.3-4 for SWMU 37 (Appendix F.3), and F.4-4 for SWMU 38/AOC Q (Appendix F.4).

For the refined evaluation, risk is assessed by comparing the EPC (95% UCL) of each detected chemical to the TRV. The refined risk HQ is expressed as:

$$\mathbf{HQ = EPC/TRV}$$

where:

HQ = Hazard Quotient for the constituent (unitless)
EPC = Calculated Exposure Point Concentration for constituent (mg/kg)
TRV = Screening Level for constituent (mg/kg)

An HQ of less than 1 indicates no or negligible risk. The potential for risk increases as the HQ increases above unity. However, this result should be considered in the context of other characteristics of the exposure area. Results of the refined exposure assessment are presented in Appendices F.2 (SWMU 35), F.3 (SWMU 37), and F.4 (SWMU 38/AOC Q).

7.1.6.1 Direct Contact Approach

The refined exposure estimate for the direct contact pathway to soil invertebrate and microbial communities incorporates the 95% UCL as the exposure concentration for evaluating the COPECs using a conservative yet more realistic exposure assumption than MDCs.

7.1.6.2 Dose Rate Modeling Approach

The conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation were replaced with more environmentally realistic assumptions resulting in a more realistic estimate of potential risk. An example calculation for dose rate modeling is provided in Appendix F.1, Section 4.4, utilizing the equation below.

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + IR_s) AF_{refined}}$$

where:

C_{TRV} = NOAEL or LOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg COPEC/kg body weight-day)

BW = Average Body Weight of the receptor (kg)

IR_{food} = Average Ingestion Rate of food (kg food ingested per day, dry weight)

BAF_{food} = BAF of dietary component used, specific to prey type and COPEC (ratio of mg of COPEC/kg fauna, wet weight to mg COPEC/ kg substrate, dry weight)

DF = Dietary Fraction

IR_s = Average Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)

$AF_{refined}$ = Refined Area Use Factor (detailed below)

The refined exposure estimates and ecological effects are developed for wildlife receptors having complete exposure pathways to be quantitatively evaluated (i.e., omnivorous birds, and carnivorous and herbivorous mammals). In the refined model, an average body weight, average ingestion rate, and a 95% UCL as the EPC are used. Refined receptor-specific exposure parameters are presented on Tables F.2-9 for SWMU 35 (Appendix F.2), F.3-9 for SWMU 38 (Appendix F.3), and F.4-9 for SWMU 38/AOC Q (Appendix F.4). In addition, a realistic area use factor ($AF_{refined}$) was calculated as the ratio of the site area to the average home range of the receptor which is also presented in Tables F.2-9 for SWMU 35 (Appendix F.2), F.3-9 for SWMU 37 (Appendix F.3), F.4-9 for SMWU 38/AOC Q (Appendix F.4). Note that due to the proximity of SWMUs 37, 38, and AOC Q, an area use factor was calculated as the ratio of the sum of the site areas to the average home range of the receptor.

7.1.7 Risk Management – Scientific Management Decision Point

The findings of the ecological risk screen including site characterization and risk calculations are used as input to risk management decision-making for the site. The SMDP reached from the ecological risk screening concludes that one of the following statements is true:

- There is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk;
- The information is not adequate to make a decision at this point and further refinement of data is needed to augment the ecological risk screening; or
- The information collected and presented indicates that a more thorough assessment is warranted.

7.2 SLERA RESULTS – SWMU 35

7.2.1 Preliminary Risk Characterization

The complete preliminary risk characterization tables are provided in Appendix F.2 and summarized below.

7.2.1.1 Terrestrial Plants

Preliminary direct contact HQs calculated for plants are presented in Table F.2-6 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of aluminum, calcium, chromium, copper, lead, manganese, mercury, nickel, vanadium, and zinc resulted in HQ values that were greater than 1.

7.2.1.2 Soil Invertebrates and Microbial Communities

Preliminary direct contact HQs calculated for invertebrates are presented in Table F.2-8 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of chromium, copper, iron, manganese, mercury, vanadium, and zinc resulted in HQ values that were greater than 1.

7.2.1.3 Terrestrial Wildlife

Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The preliminary risks for detected bioaccumulative chemicals are summarized in Table F.2-24 for each terrestrial wildlife receptor and the chemicals with HQs great than 1 are characterized as follows:

Receptor	NOAEL Only HQ>1	NOAEL and LOAEL HQ>1
Meadow Vole	cadmium, chromium, zinc, HMX, nitroglycerin	arsenic, copper, lead, selenium
Short-tailed Shrew	silver, cadmium	arsenic, chromium, copper, lead, zinc, Aroclor 1254, Aroclor 1260
Red Fox	nickel, selenium, silver, benzo(a)anthracene, HMX	arsenic, cadmium, chromium, copper, lead, zinc, Aroclor 1254, Aroclor 1260
American Robin	silver, 4,4'-DDT, Aroclor 1260, 2,4,6-TNT	cadmium, chromium, copper, lead, mercury, zinc, Aroclor 1254, 2,4-DNT
Red-tailed Hawk	chromium, zinc	lead

7.2.2 Refined Risk Characterization

The complete refined risk characterization tables are provided in Appendix F.2 and summarized below.

7.2.2.1 Terrestrial Plants

Refined direct contact HQs calculated for plants are presented in Table F.2-6 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of aluminum, calcium, chromium, copper, lead, manganese, mercury, vanadium, and zinc resulted in refined HQ values that were greater than 1.

7.2.2.2 Soil Invertebrates and Microbial Communities

Refined direct contact HQs calculated for invertebrates are presented in Table F.2-8 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of chromium, copper, iron, manganese, mercury, vanadium, and zinc resulted in refined HQ values that were greater than 1.

7.2.2.3 Terrestrial Wildlife

The refined risk characterization results are presented in Table F.2-24 and summarized below for each of the receptors with chemical HQs greater than 1:

Receptor	NOAEL Only HQ>1	NOAEL and LOAEL HQ>1
Meadow Vole	none	none
Short-tailed Shrew	Aroclor 1254 (2.5), Aroclor 1260 (2.4)	none
Red Fox	none	none
American Robin	chromium (1.3), lead (3.2)	none
Red-tailed Hawk	none	none

*Note: (2.5) = NOAEL-based HQ

7.2.3 Risk Management – Scientific Management Decision Point

Terrestrial plant COPECs with refined HQs greater than 1 included: aluminum, calcium, chromium, copper, lead, manganese, mercury, vanadium, and zinc. Although the refined aluminum HQ is greater than 1, the average pH in the soil is greater than 5.5 (see Appendix C.1). Therefore, since aluminum is biologically inactive in circumneutral to alkaline conditions (pH 5.5-8.0) such as those present at the site, aluminum is not considered a COPEC (USEPA 2003). Manganese and vanadium are consistently below background (see Appendix D, Table D.2-1a); therefore, these chemicals are not considered site-related. A discussion of the methodology of site versus background comparison is provided in Section 6.4.3. Even though the refined HQs for copper (1.5), lead (3.7), and zinc (1.1) are greater than 1 and concentrations at the site are above background concentrations via means comparison, these risks present low to negligible risk to plants at the site. The plant screening levels for calcium, chromium, and mercury are ORNL plant screening levels rather than ECO SSLs introducing uncertainty into the HQ calculations due to the uncertainty associated with these toxicity values. For example, the ORNL screening level is used for chromium, but during the development of ECO SSLs for chromium, it was determined that not enough data was available to derive an ECO SSL for plants; therefore, the data collected for the ORNL study was determined to be insufficient. In addition it is important to note that although metals concentrations in plants were above the screening levels, vegetation at the site is lush and diverse and indications of chemical vegetative stress were not observed with the exception of limited gravel areas as shown in site photographs (Appendix A). Soil invertebrates and microbial processes COPECs with refined HQs greater than 1 included chromium, copper, iron, manganese, mercury, vanadium, and zinc. Iron, manganese, and vanadium are consistently below background; therefore, these chemicals are not considered site-related. Even though the refined HQs for copper (1.3) and zinc (1.5) are slightly greater than 1 and concentrations at the site are above background concentrations via means comparison, these risks present low to negligible risk to soil invertebrates at the site. The invertebrate and microbial processes screening levels for chromium and mercury are ORNL earthworm screening levels rather than ECO SSLs introducing uncertainty into the HQ calculations due to the uncertainty associated with these toxicity values. For example, the ORNL screening level is used for chromium, but during the development of ECO SSLs for chromium, it was determined that not enough data was available to derive an ECO SSL for invertebrates; therefore, the data collected for the ORNL study was determined to be insufficient.

The refined risk characterization for wildlife resulted in the identification of no chemicals with a LOAEL-based HQ greater than 1.

After consideration of the results of the SLERA, background concentrations, uncertainty associated with plant and invertebrate toxicity values, and the nature of the waste historically disposed of at the site, the SMDP is the following:

There is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk.

7.3 SLERA RESULTS – SWMU 37

7.3.1 Preliminary Risk Characterization

The complete preliminary risk characterization tables are provided in Appendix F.3 and summarized below.

7.3.1.1 Terrestrial Plants

Direct contact HQs calculated for plants are presented in Table F.3-6 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of aluminum, calcium, chromium, copper, lead, manganese, mercury, nickel, and vanadium resulted in HQ values greater than 1.

7.3.1.2 Soil Invertebrates and Microbial Communities

Direct contact HQs calculated for invertebrates are presented in Table F.3-8 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of chromium, copper, iron, manganese, mercury, vanadium, and zinc resulted in HQ values that were greater than 1.

7.3.1.3 Terrestrial Wildlife

Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The risk for detected bioaccumulative chemicals is summarized in Table F.3-24 for each terrestrial wildlife receptor and the chemicals with HQs greater than 1 are characterized as follows:

Receptor	NOAEL Only HQ>1	NOAEL and LOAEL HQ>1
Meadow Vole	cadmium, chromium, lead	arsenic, copper, selenium
Short-tailed Shrew	lead, zinc, dieldrin	arsenic, cadmium, chromium, copper, Aroclor 1254
Red Fox	nickel, selenium, dieldrin	arsenic, cadmium, chromium, copper, lead, zinc, Aroclor 1254
American Robin	nickel, selenium, dieldrin	cadmium, chromium, copper, lead, mercury, zinc, Aroclor 1254, 2,4-DNT
Red-tailed Hawk	chromium, lead, zinc	none

7.3.2 Refined Risk Characterization

The complete refined risk characterization tables are provided in Appendix F.3 and summarized below.

7.3.2.1 Terrestrial Plants

Direct contact HQs calculated for plants are presented in Table F.3-6 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of aluminum, calcium, chromium, copper, lead, manganese, mercury, nickel, and vanadium resulted in HQ values greater than 1.

7.3.2.2 Soil Invertebrates and Microbial Communities

Direct contact HQs calculated for invertebrates are presented in Table F.3-8 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of chromium, copper, iron, mercury, and vanadium resulted in HQ values that were greater than 1.

7.3.2.3 Terrestrial Wildlife

The refined risk characterization results are presented in Table F.3-24 and summarized below for each of the receptors with chemical HQs greater than 1:

Receptor	NOAEL Only HQ>1	NOAEL and LOAEL HQ>1
Meadow Vole	none	none
Short-tailed Shrew	arsenic (1.5), Aroclor 1254 (6.3)	none
Red Fox	none	none
American Robin	chromium (4.1), lead (4.7), zinc (2.2)	none
Red-tailed Hawk	none	none

*Note: (31/16) = NOAEL-based HQ/LOAEL-based HQ

7.3.3 Risk Management - Scientific Management Decision Point

Terrestrial plant COPECs with refined HQs greater than 1 included: aluminum, calcium, chromium, copper, lead, manganese, mercury, nickel, and vanadium. Although the refined aluminum HQ is greater than 1, the average pH in the soil is greater than 5.5 (see Appendix C.1). Therefore, since aluminum is biologically inactive in circumneutral to alkaline conditions (pH 5.5-8.0) such as those present at the site, aluminum is not considered a COPEC (USEPA 2003). Lead, manganese, and vanadium are consistently below background (see Appendix D.2, Table D.2-2a); therefore, these chemicals are not considered site-related. A discussion of the methodology of site versus background comparison is provided in Section 6.4.3. Even though the refined HQs for copper (2.1) and nickel (1.3) are greater than 1 and concentrations at the site are above background concentrations via means comparison, this risk presents low to negligible risk to plants at the site. The plant screening levels for calcium, chromium, and mercury are ORNL plant screening levels rather than ECO SSLs introducing uncertainty into the HQ calculations due to the uncertainty associated with these toxicity values. For example, the ORNL screening level is used for chromium, but during the development of ECO SSLs for chromium, it was determined that not enough data was available to derive an ECO SSL for plants; therefore, the data collected for the ORNL study was determined to be insufficient. In addition it is important to note that although metals concentrations in plants were above the screening levels, vegetation at the site is lush and diverse and indications of chemical vegetative stress were not observed as shown in site photographs (Appendix A).

Soil invertebrates and microbial processes COPECs with refined HQs greater than 1 included: chromium, copper, iron, mercury, and vanadium. Iron and vanadium are consistently below background; therefore, these chemicals are not considered site-related. Even though the refined HQ for copper (1.8) is greater than 1 and concentrations at the site are above background concentrations via means comparison, this risk presents low to negligible risk to invertebrates at the site. The invertebrate and microbial processes screening levels for chromium and mercury are ORNL earthworm screening levels rather than ECO SSLs introducing uncertainty into the HQ calculations due to the uncertainty associated with these toxicity values. For example, the ORNL screening level is used for chromium, but during the development of ECO SSLs for chromium, it was determined that not enough data was available to derive an ECO SSL for invertebrates; therefore, the data collected for the ORNL study was determined to be insufficient.

The refined risk characterization for wildlife resulted in the identification of no chemicals with a LOAEL-based HQ greater than 1.

After consideration of the results of the SLERA, background concentrations, uncertainty associated with plant and invertebrate toxicity values, and the nature of the waste historically disposed of at the site, the SMDP is the following:

There is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk.

7.4 SLERA RESULTS – SWMU 38/AOC Q

7.4.1 Preliminary Risk Characterization

The complete preliminary risk characterization tables are provided in Appendix F.4 and summarized below.

7.4.1.1 Terrestrial Plants

Direct contact HQs calculated for plants are presented in Table F.4-6 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of aluminum, calcium, chromium, copper, manganese, selenium, and vanadium resulted in HQ values greater than 1.

7.4.1.2 Soil Invertebrates and Microbial Communities

Direct contact HQs calculated for invertebrates are presented in Table F.4-8 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of chromium, copper, iron, manganese, mercury, and vanadium resulted in HQ values that were greater than 1.

7.4.1.3 Terrestrial Wildlife

Quantitative risk characterization for terrestrial wildlife is limited to direct ingestion of biota and incidental ingestion of soil. The risk for detected bioaccumulative chemicals is summarized in Table F.4-24 for each terrestrial wildlife receptor and the chemicals with HQs great than 1 are characterized as follows:

Receptor	NOAEL Only HQ>1	NOAEL and LOAEL HQ>1
Meadow Vole	cadmium, copper, lead	arsenic, selenium
Short-tailed Shrew	arsenic, cadmium, chromium, copper, lead, selenium, zinc	Aroclor 1254
Red Fox	lead	arsenic, cadmium, chromium, copper, selenium , zinc, Aroclor 1254
American Robin	selenium, Aroclor 1254, 2,4-DNT	cadmium, chromium, lead, mercury, zinc
Red-tailed Hawk	chromium, zinc	none

7.4.2 Refined Risk Characterization

The complete refined risk characterization tables are provided in Appendix F.4 and summarized below.

7.4.2.1 Terrestrial Plants

Direct contact HQs calculated for plants are presented in Table F.4-6 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of aluminum, calcium, chromium, manganese, selenium, and vanadium resulted in HQ values greater than 1.

7.4.2.2 Soil Invertebrates and Microbial Communities

Direct contact HQs calculated for invertebrates are presented in Table F.4-8 for detected chemicals. Of the detected chemicals for which screening values were available, the concentrations of chromium, iron, manganese, mercury, and vanadium resulted in HQ values that were greater than 1.

7.4.2.3 Terrestrial Wildlife

The refined risk characterization results are presented in Table F.4-24 and summarized below for each of the receptors with chemical HQs greater than 1:

Receptor	NOAEL Only HQ>1	NOAEL and LOAEL HQ>1
Meadow Vole	none	none
Short-tailed Shrew	Aroclor 1254 (4.2)	none
Red Fox	none	none
American Robin	chromium (1.8), lead (1.2), zinc (2.0)	none
Red-tailed Hawk	none	none

*Note: (1.4) = NOAEL-based HQ

7.4.3 Risk Management - Scientific Management Decision Point

Terrestrial plant COPECs with refined HQs greater than 1 included: aluminum, calcium, chromium, manganese, selenium, and vanadium. Although the refined aluminum HQ is greater than 1, the average pH in the soil is greater than 5.5 (see Appendix C.1). Therefore, since aluminum is biologically inactive in circumneutral to alkaline conditions (pH 5.5-8.0) such as those present at the site, aluminum is not considered a COPEC (USEPA 2003). Chromium, manganese, and vanadium are consistently below background (see Appendix D.2, Table D.2-3a); therefore, these chemicals are not considered site-related. A discussion of the methodology of site versus background comparison is provided in Section 6.4.3. Even though the refined HQ for selenium (1.2) is slightly greater than 1 and concentrations at the site are above background concentrations via means comparison, this risk presents low to negligible risk to plants at the site.

Soil invertebrates and microbial processes COPECs with refined HQs greater than 1 included: chromium, iron, manganese, mercury, and vanadium. Chromium, iron, manganese, and vanadium are consistently below background; therefore, these chemicals are not considered site-related. Even though the refined HQ for mercury (1.6) is greater than 1 and concentrations at the site are above background concentrations via means comparison, this risk presents low to negligible risk to invertebrates at the site.

The refined risk characterization for wildlife resulted in the identification of no chemicals with a LOAEL-based HQ greater than 1.

After consideration of the results of the SLERA, background concentrations, and the nature of the waste historically disposed of at the site, the SMDP is the following:

There is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk.

7.5 EXPOSURE AND RISK UNCERTAINTY ANALYSIS

Based on this assessment, while factors such as lack of TSV and wildlife profile assumptions may create limited uncertainty, the overall result of the conservative nature of the process has produced a conservative assessment of potential ecological risks associated with the site.

Assumptions and other factors that tend to overestimate, underestimate, or have an unknown effect on the findings of the ecological risk screening are presented below with a discussion of their uncertainty.

7.5.1 Data Quality

Insufficient sampling density or the analyte list may not provide a representative estimate of exposure to COPECs. Misrepresentation of exposure results in uncertainty and may lead to an overestimation or underestimation of risk. Ten or more sampling locations at each of the sites under consideration reduce

this uncertainty. Elevated reporting limits for chemicals, such as PAHs at SWMU 35, could result in an underestimation of risk at the site due to potentially failing to identify a COPEC. Moreover, the extensive list of constituents analyzed reduces the likelihood of failing to identify a COPEC. Therefore, the uncertainty in the ecological risk screening results associated with data quality is likely minimal.

7.5.2 COPEC Bioavailability

Chemical analyses of exposure media measured the total levels of the COPECs rather than the more bioavailable toxic forms. The availability of the total concentrations alone assumes that the entire fraction is bioavailable and toxic. This is likely to be a very conservative assumption that varies from constituent to constituent. It was also assumed that no geochemical factors limited receptor exposure to, or the potential for toxic expression of COPECs. It is likely that COPECs may, to some degree, adsorb to fine-grained particles and/or complex with chemical complexing agents and organic ligands in the exposure media. Such actions may change the chemical speciation of the COPECs to a less toxic form, or reduce the concentrations of bioavailable chemicals and subsequent uptake by receptors. Therefore, risk is likely to be overestimated.

7.5.3 Wildlife Profile Assumptions

Dose rate models require a number of assumptions, which could result in either an overestimation or underestimation of risk to receptors. For example, body weights and ingestion rates are estimated from limited information. In addition, receptors are assumed to feed on specified food sources, although some such as the Red Fox may feed opportunistically on a greater variety of food types.

Area use factors (AFs) were estimated based on the size of the site relative to the home ranges of the receptors. However, the foraging of birds and mammals is not assessed simply by size, but rather a function of habitat suitability, habitat productivity, and species-specific foraging behaviors. Therefore, because habitat quality is not accounted for in estimating AF, the risk to terrestrial receptors in this assessment is likely to be overestimated.

The qualitative nature of the conclusion of lack of risk to the plant community based on the lack of indicator of chemical vegetative stress and lush vegetation present at the site creates uncertainty since it is not known that if the local plant community shows a response in terms of lower species diversity, reduced growth, or other more subtle responses that might be observable when compared to an non-impacted reference location.

7.5.4 Lack of Toxicological Data

The evaluation of ecological effects was limited in the direct contact and wildlife ingestion pathways due to limited toxicological data of the COPECs. The effects of many COPECs evaluated for the direct contact pathway to invertebrates and microbial communities were not quantified due to the lack of invertebrate derived TRVs. In addition, NOAEL and LOAEL TRVs were not available for receptors exposed to multiple COPECs. Therefore, due to the lack of toxicological data, the risk to potential receptors may be underestimated or unknown.

7.5.5 TRVs

NOAEL and LOAEL TRVs identified for wildlife receptors represent the most conservative application of toxicity test results identified from the literature. High uncertainty factors were used to provide TRVs representative of chronic exposure and sub-lethal effects. This approach is likely to overestimate the sensitivity of many ecological receptors and likely overestimates risk to potential receptors.

7.5.6 Hazard Quotients

Uncertainties in characterizing risks are primarily associated with the assumption that an HQ greater than 1 is an adequate indicator of the potential for ecological risks of individual chemicals. Given the use of conservative and realistic exposure and effects assumptions previously discussed, there is minimal

uncertainty that the potential for ecological risks of individual chemicals are not identified in the ecological risk screening of the sites. Conversely, there is a strong possibility for false positive identification of ecological risks for some individual chemicals. An HQ of less than one indicates that the contaminant alone is unlikely to cause adverse ecological effects. The potential for risk increases as the HQ increases above one. However, this result should be considered in the context of other characteristic of the exposure area. In addition, it should be noted that the calculation of chemical specific HQs does not account for multiple chemicals acting through the same exposure mechanism.

7.5.7 Exposure and Risk Uncertainty Conclusions

While factors such as lack of TSV and wildlife profile assumptions may create limited uncertainty, the very small size and negligible habitat quality of the site in combination with these limited uncertainties has produced a conservative assessment of potential ecological risks associated with SWMU 35, SWMU 37, and SWMU 38/AOC Q.

7.6 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the SLERAs and risk management considerations, no need for further action is required at SWMU 35, SWMU 37, and SWMU 38/AOC Q on the basis of ecological risk.

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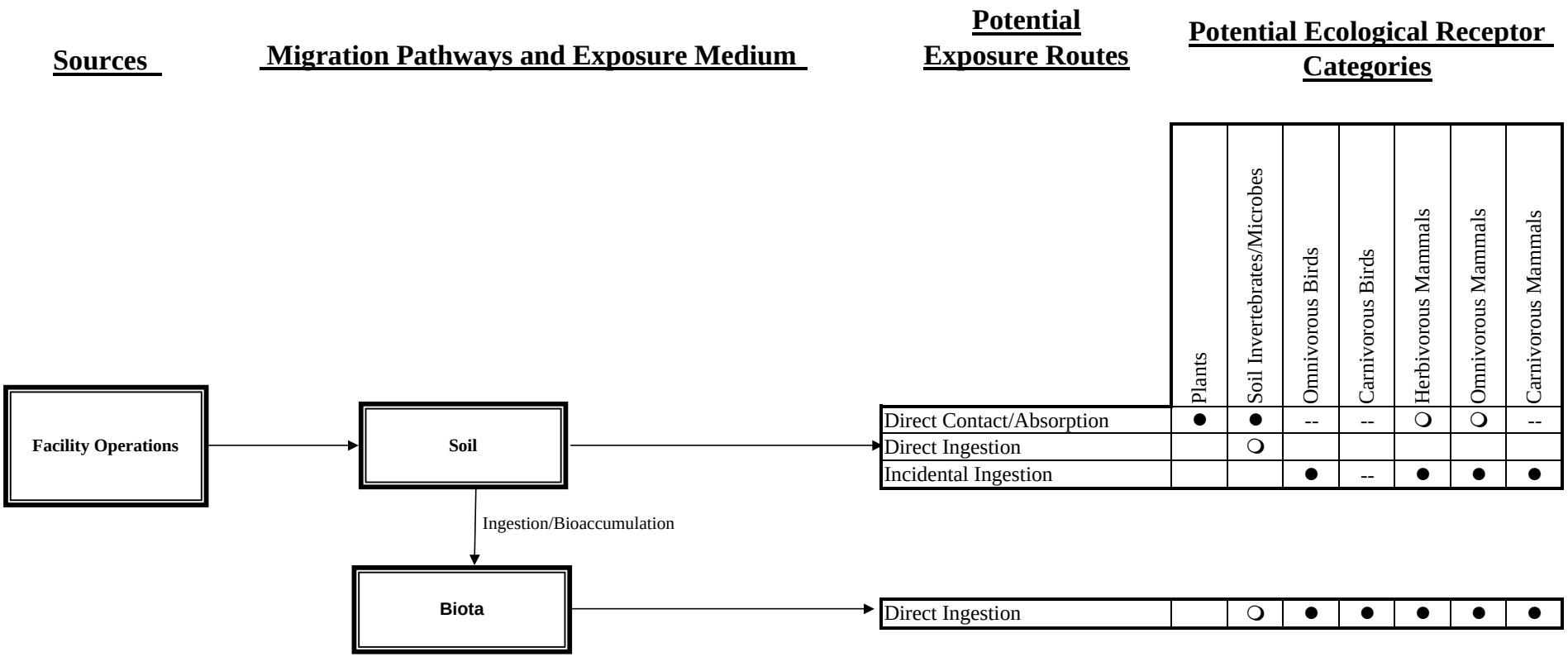
Figure 7-1
Terrestrial Ecological Conceptual Site Model
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia



Notes:

● = POTENTIALLY COMPLETE PATHWAY EVALUATED QUANTITATIVELY

❍ = COMPLETE PATHWAY EVALUATED QUALITATIVELY

-- = PATHWAY IS INSIGNIFICANT

BLANK = INCOMPLETE PATHWAY

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8.0 CONCLUSIONS AND RECOMMEDATIONS

An RFI has been completed for SWMUs 35, 37, 38, and AOC Q, calcium sulfate lagoons, located in the MMA of the RFAAP. The purpose of the RFI was to evaluate potential releases to soil and groundwater at the sites.

Soil sampling with the RFI study areas indicated that metals were the primary COPCs for the sites. Manganese, chloroform, and pesticides (SWMU 37 only) were identified as the primary COPCs for the sites in groundwater.

HHRAs were performed to evaluate the potential human health effects associated with releases to soil and groundwater at the sites. Receptors evaluated included: current/future maintenance worker, hypothetical future construction worker, hypothetical future commercial worker, hypothetical future adult resident, hypothetical future child resident, and hypothetical future lifetime resident. Total carcinogenic risk calculated for each receptor was below or within USEPA's target risk range for Superfund sites (1E-06 to 1E-04, USEPA 1989) for the sites. The mean concentrations for lead in surface soil and total soil for SWMU 35 (233.6 mg/kg - surface soil and 137.1 mg/kg - total soil), SWMU 37 (121 mg/kg - surface soil and 64.05 mg/kg - total soil), and SWMU 38/AOC Q (26.61 mg/kg - surface soil and 17.63 mg/kg - total soil) were below the residential lead screening level of 400 mg/kg; therefore, additional lead modeling was not conducted for the sites. Total non carcinogenic hazards after consideration of target organs, background, and site specific conditions, for all receptors were equal to or below the USEPA reference HI of 1E+00 with the exception of the construction worker at each site due to aluminum (SWMU 35, SWMU 37, SWMU 38/AOCQ) and manganese (SWMU 38/AOC Q) in soil. Additional comparison of site soil concentrations to background point estimates (UTLs), indicated that the sites' soil concentration for these metals were not significantly above background. The results of the human health risk assessments did not indicate a requirement for further action for the sites.

SLERAs were performed to evaluate potential ecological risk associated with soil at the sites. Receptors evaluated included soil invertebrates and microbes, plants, and terrestrial wildlife. The results of the screening level ecological risk assessment indicated there is adequate information to conclude that ecological risks were not significant at the sites, and therefore, there was no need for further action for soil at the sites on the basis of ecological risk.

Based on the results of the RFI, HHRAs, and SLERAs, no further action is recommended for the sites.

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SOLID WASTE MANAGEMENT UNITS 35, 37, 38, AND AREA OF CONCERN Q (RAAP-10) RCRA FACILITY INVESTIGATION REPORT

RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

FINAL
SEPTEMBER 2010

URS

ARCHITECT-ENGINEER SERVICES
CONTRACT NO.
DACA31-00-D-0011
DELIVERY ORDER NO. 0054

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APPENDIX A

PHOTOGRAPHIC LOG

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PHOTO 1: View looking south across SWMU 35

PHOTO 2: View facing east across SWMU 35 toward the New River

PHOTO 3: View of ground surface at SWMU 35

PHOTO 4: View looking southwest across SWMU 37

PHOTO 5: Interior of SWMU 37 facing east

PHOTO 6: Interior of SWMU 37 facing southeast

PHOTO 7: SWMU 38 Down-gradient boring located adjacent to the southwest

PHOTO 8: SWMU 38 facing south from top of berm

PHOTO 9: View looking southwest across SWMU 38

PHOTO 10: Adjacent to Area Q facing south toward SWMU 38

APPENDIX B

STANDARD OPERATING PROCEDURES

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Standard Operating Procedures

SOP SERIES	TITLE
10.0	**DOCUMENTATION**
10.1	Field Logbook
10.2	Surface Water, Groundwater, and Soil/Sediment Field Logbooks
10.3	Boring Logs
10.4	Chain-of-Custody Forms
20.0	**SUBSURFACE INVESTIGATION**
20.1	Monitoring Well Installation
20.2	Monitoring Well Development
20.3	Well and Boring Abandonment
20.11	Drilling Methods and Procedures
30.0	**SAMPLING**
30.1	Soil Sampling
30.2	Groundwater Sampling
30.7	Sampling Strategies
30.9	Collection of Soil Samples By USEPA SW-846 Method 5035 Using Disposable Samplers
40.0	**FIELD EVALUATION**
40.1	Multiparameter Water Quality Monitoring Instrument
40.2	Water Level and Well-Depth Measurements
40.3	Slug Tests
50.0	**SAMPLE MANAGEMENT**
50.1	Sample Labels
50.2	Sample Packaging
70.0	**INVESTIGATION-DERIVED MATERIAL**
70.1	Investigation-Derived Material
80.0	**DECONTAMINATION**
80.1	Decontamination
90.0	**AIR MONITORING EQUIPMENT**
90.1	Photoionization Detector (HNu Model PI-101 and HW-101)

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STANDARD OPERATING PROCEDURE 10.1
FIELD LOGBOOK

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for recording daily site investigation activities.

Records should contain sufficient information so that anyone can reconstruct the sampling activity without relying on the collector's memory.

2.0 MATERIALS

- Field Logbook;
- Indelible ink pen; and
- Clear tape.

3.0 PROCEDURE

Information pertinent to site investigations will be recorded in a bound logbook. Each page/form will be consecutively numbered, dated, and signed. All entries will be made in indelible ink, and all corrections will consist of line out deletions that are initialed and dated. If only part of a page is used, the remainder of the page should have an "X" drawn across it. At a minimum, entries in the logbook will include but not be limited to the following:

- Project name (cover);
- Name and affiliation of personnel on site;
- Weather conditions;
- General description of the field activity;
- Sample location;
- Sample identification number;
- Time and date of sample collection;
- Specific sample attributes (e.g., sample collection depth flow conditions or matrix);
- Sampling methodology (grab or composite sample);
- Sample preservation, as applicable;
- Analytical request/methods;
- Associated quality assurance/quality control (QA/QC) samples;
- Field measurements/observations, as applicable; and
- Signature and date of personnel responsible for documentation.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

USEPA. 1990. *Sampler's Guide to the Contract Laboratory Program*. EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, DC.

USEPA. 1991. *User's Guide to the Contract Laboratory Program*. EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response, January.

USEPA. 1998. *EPA Requirements for Quality Assurance Project Plans.* EPA/600/R-98/018, QA/R5, Final, Office of Research and Development, Washington, D.C.

STANDARD OPERATING PROCEDURE 10.2
SURFACE WATER, GROUNDWATER, AND SOIL/SEDIMENT FIELD LOGBOOKS

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for recording surface water, groundwater, and soil/sediment sampling information, as well as instrument calibration data in field logbooks.

2.0 MATERIAL

- Applicable field logbook (see attached forms); and
- Indelible ink pen.

3.0 PROCEDURE

All information pertinent to surface water, groundwater, or soil/sediment sampling will be recorded in the appropriate logbook. Each page/form of the logbook will be consecutively numbered. All entries will be made with an indelible ink pen. All corrections will consist of line out deletions that are initialed and dated.

3.1 SOIL/SEDIMENT

3.1.1 Field Parameters/Logbook (Form 10.2-a)

1. HIGH CONCENTRATION EXPECTED?: Answer "Yes" or "No.";
2. HIGH HAZARD?: Answer "Yes" or "No.";
3. INSTALLATION/SITE: Record the complete name of the installation or site;
4. AREA: Record the area designation of the sample site;
5. INST. NAME: Record the two-letter installation name for Radford Army Ammunition Plant – "RD";
6. SAMPLE MATRIX CODE: Record the appropriate sample matrix code. Common codes are "SD" for solid - sediment, "SI" for soil - gas, "SL for solid sludge, "SO" for surface other, "SS" for solid – soil, "SW" for surface wipe, "WD" for water – potable, "WG" for water – ground, "WS" water – surface, "WT" – water treated and "WW" water -waste;
7. SITE ID: Record a code up to 20 characters or numbers that is unique to the site;
8. ENV. FIELD SAMPLE IDENTIFIER: Record a code up to 20 characters specific for the sample;
9. DATE: Enter the date the sample was taken;
10. TIME: Enter the time (12-hour or 24-hour clock acceptable as long as internally consistent) the sample was taken;
11. AM PM: Circle "AM" or "PM" to designate morning or afternoon (12-hour clock);
12. SAMPLE PROG: Record "RFI" (RCRA Facility Investigation) or other appropriate sample program;
13. DEPTH (TOP): Record the total depth sampled;
14. DEPTH INTERVAL: Record the intervals at which the plug will be sampled;
15. UNITS: Record the units of depth (feet, meters);

16. SAMPLE MEASUREMENTS: Check the appropriate sampling method;
17. CHK: Check off each container released to a laboratory;
18. ANALYSIS: Record the type of analysis to be performed on each sample container;
19. SAMPLE CONTAINER: Record the sample container type and size;
20. NO.: Record the number of containers;
21. REMARKS: Record any remarks about the sample;
22. TOTAL NUMBER OF CONTAINERS FOR SAMPLE: Record the total number of containers;
23. SITE DESCRIPTION: Describe the location where the sample was collected;
24. SAMPLE FORM: Record the form of the sample (i.e., clay, loam, etc.) using The Unified Soil Classification System (USCS);
25. COLOR: Record the color of the sample as determined from standard Munsell Color Charts;
26. ODOR: Record the odor of the sample or "none";
27. PID: Record the measured PID values or other similar measurement instrument value;
28. UNUSUAL FEATURES: Record anything unusual about the site or sample;
29. WEATHER/TEMPERATURE: Record the weather and temperature; and
30. SAMPLER: Record your name.

3.1.2 Map File Form (refer to form 10.2-c)

1. SITE ID: Record the Site ID from the field parameter form;
2. POINTER: Record the field sample number for the sample being pointed to;
3. DESCRIPTION/MEASUREMENTS: Describe the location where the sample was taken, along with distances to landmarks;
4. SKETCH/DIMENSIONS: Diagram the surroundings and record the distances to landmarks;
5. MAP REFERENCE: Record which U.S.G.S. Quad Map references the site;
6. COORDINATE DEFINITION: Write the compass directions and the X- and Y-coordinates of the map run;
7. COORDINATE SYSTEM: Write "UTM" (Universal Transverse Mercator);
8. SOURCE: Record the 1-digit code representing the Map Reference;
9. ACCURACY: Give units (e.g., write "1-M" for 1 meter);
10. X-COORDINATE: Record the X-coordinate of the sample site location;
11. Y-COORDINATE: Record the Y-coordinate of the sample site location;
12. UNITS: Record the units used to measure the map sections;
13. ELEVATION REFERENCE: Record whether topography was determined from a map or a topographical survey;
14. ELEVATION SOURCE: Record the 1-digit code representing the elevation reference;
15. ACCURACY: Record the accuracy of the map or survey providing the topographical information;

16. ELEVATION: Record the elevation of the sampling site;
17. UNITS: Write the units in which the elevation is recorded; and
18. SAMPLER: Write your name.

3.2 SURFACE WATER

3.2.1 Field Parameter Logbook (Forms 10.2-b and 10.2-c)

1. CAL REF: Record the calibration reference for the pH meter;
2. pH: Record the pH of the sample;
3. TEMP: Record the temperature of the sample in degrees Celsius;
4. COND: Record the conductivity of the water;
5. Description of site and sample conditions (refer to 10.2-b);
6. Map File Form (refer to Section 3.1.2).

3.3 GROUNDWATER (FORMS 10.2- D)

3.3.1 Field Parameter Logbook (Form 10.2.b)

Refer to Section 3.2.1.

3.3.2 Map File and Purging Forms

1. WELL NO. OR ID: Record the abbreviation appropriate for where the sample was taken. Correct abbreviations can be found on pages 18-21 of the IRDMIS User's Guide for chemical data entry;
2. SAMPLE NO.: Record the reference number of the sample;
3. WELL/SITE DESCRIPTION: Describe the location where the sample was taken, along with distances to landmarks;
4. X-COORD AND Y-COORD: Record the survey coordinates for the sampling site;
5. ELEV: Record the elevation where the sample was taken;
6. UNITS: Record the units the elevation was recorded in;
7. DATE: Record the date in the form MM/DD/YY;
8. TIME: Record the time, including a designation of AM or PM;
9. AIR TEMP.: Record the air temperature, including a designation of C or F (Celsius or Fahrenheit);
10. WELL DEPTH: Record the depth of the well in feet and inches;
11. CASING HEIGHT: Record the height of the casing in feet and inches;
12. WATER DEPTH: Record the depth (underground) of the water in feet and inches;
13. WELL DIAMETER: Record the diameter of the well in inches;
14. WATER COLUMN HEIGHT: Record the height of the water column in feet and inches;
15. SANDPACK DIAM.: Record the diameter of the sandpack. Generally, this will be the same as the bore diameter;

16. EQUIVALENT VOLUME OF STANDING WATER: Use one of the following equations to determine one equivalent volume (EV);

    1 EV = volume in casing + volume in saturated sandpack. Or:

    $1\ EV = [\pi R_w^2 h_w + 0.30p(R_s^2 - R_w^2)h_s] * (0.0043)$

Where:

R_s = radius of sandpack in inches
R_w = radius of well casing in inches
h_s = height of sandpack in inches
h_w = water depth in inches

$0.0043 = gal/in^3$
and filter pack porosity is assumed as 30%, or

Volume in casing =
$(0.0043\ gal/in^3)(p)(12\ in/ft)(R_c^2)(W_h)$

Where:

R_c = radius of casing in inches, and
W_h = water column height in feet

Vol. in sandpack =
(0.0043 gal/in3)(p)(12 in/ft)(Rb2 - Rc2)(Wh)(0.30)

(if Wh is less than the length of the sandpack), or

Vol. in sandpack =
(0.0043 gal/in3)(p)(12 in/ft)(Rb2 - Rc2)(Sh)(0.30)

(if Wh is greater than the length of the sandpack).

where:

Rb = radius of the borehole, and
Sh = length of the sandpack.

Show this calculation in the comments section.

1. PUMP RATE: Record pump rate;
2. TOTAL PUMP TIME: Record total purge time and volume;
3. WELL WENT DRY? Write “YES” or “NO”;
4. PUMP TIME: Record pump time that made the well go dry;
5. VOLUME REMOVED: Record the volume of water (gal) removed before the well went dry;
6. RECOVERY TIME: Record the time required for the well to refill;

7. PURGE AGAIN?: Answer “YES” or “NO”;
8. TOTAL VOL. REMOVED: Record the total volume of water (in gallons) removed from the well;
9. CAL REF.: Record the calibration reference for the pH meter;
10. TIME: Record time started (INITIAL T(0)), 2 times DURING the sampling and the time sampling ended (FINAL);
11. pH: Record the pH at start of sampling (INITIAL), twice DURING the sampling, and at the end of sampling (FINAL);
12. TEMP: Record the water temperature (Celsius) at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
13. COND: Record the conductivity of the water at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
14. D.O.: Record the dissolved oxygen level in the water at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
15. TURBIDITY: Record the readings from the turbidity meter (nephelometer) and units at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
16. ORD: Record the oxidation/reduction (RedOx) potential of the water sample at the start of sampling, twice DURING the sampling, and at the end of sampling (FINAL);
17. HEAD SPACE: Record any positive readings from organic vapor meter reading taken in well headspace before sampling;
18. NAPL: Record the presence and thickness of any non-aqueous phase liquids (LNAPL and DNAPL)
19. COMMENTS: Record any pertinent information not already covered in the form; and
20. SIGNATURE: Sign the form.

3.4 FIELD CALIBRATION FORMS (REFER TO FORM 10.2-E)

1. Record time and date of calibration;
2. Record calibration standard reference number;
3. Record meter ID number;
4. Record initial instrument reading, recalibration reading (if necessary), and final calibration reading on appropriate line;
5. Record value of reference standard (as required);
6. COMMENTS: Record any pertinent information not already covered on form; and
7. SIGNATURE: Sign form.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCE

USEPA. 1991. *User's Guide to the Contract Laboratory Program*. EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response, January.

FIELD PARAMETER/LOGBOOK FORM 10.2-a
SOIL AND SEDIMENT SAMPLES

HIGH CONCENTRATION EXPECTED? _____ HIGH HAZARD?

INSTALLATION/SITE _____ AREA _____

INST NAME _____ FILE NAME _____

SAMPLE MATRIX CODE _____ SITE ID _____
ENV. FIELD SAMPLE IDENTIFIER _____

DATE (MM/DD/YY) __/__/__ TIME _____ AM PM SAMPLE PROGRAM

DEPTH (TOP) _____ DEPTH INTERVAL _____ UNIT _____

SAMPLING METHOD:

SPLIT SPOON __ AUGER __ SHELBY TUBE __ SCOOP __ OTHER

CHK	ANALYSIS	SAMPLE CONTAINER	NO.	REMARKS

TOTAL NUMBER OF CONTAINERS FOR SAMPLE_____

DESCRIPTION OF SITE AND SAMPLE CONDITIONS

SITE DESCRIPTION:_____

SAMPLE FORM _____ COLOR _____ ODOR _____

PID (HNu)_____ UNUSUAL FEATURES_____

WEATHER/TEMPERATURE

SAMPLER _____

FIELD PARAMETER/LOGBOOK FORM 10.2-b
GROUNDWATER AND SURFACE WATER SAMPLES

HIGH CONCENTRATION EXPECTED? _____ HIGH HAZARD?

INSTALLATION/SITE _____ AREA

INST CODE _____ FILE NAME _____ SITE TYPE

SITE ID _____ FIELD SAMPLE NUMBER

DATE (MM/DD/YY) __/__/__ TIME _____ AM PM SAMPLE PROG.

DEPTH (TOP) _____ DEPTH INTERVAL _____ UNITS

SAMPLING MEASUREMENTS

CAL REF. _____ pH _____ TEMPERATURE °C _____ CONDUCTIVITY _____ REDOX _____

DISSOLVED OXYGEN ____ TURBIDITY _____ OTHER

CHK	ANALYSIS	SAMPLE CONTAINER	NO.	REMARKS

TOTAL NUMBER OF CONTAINERS FOR SAMPLE_____

DESCRIPTION OF SITE AND SAMPLE CONDITIONS

SITE DESCRIPTION_____

SAMPLING METHOD_____

SAMPLE FORM _____ COLOR _____ ODOR _____

PID (HNu)_____

UNUSUAL FEATURES_____

WEATHER/TEMPERATURE_____ SAMPLER _____

EXAMPLE MAP FILE LOGBOOK FORM 10.2-c
SURFACE WATER, SOIL, AND SEDIMENT SAMPLES

SITE ID_____ POINTER_____

DESCRIPTION/MEASUREMENTS_____

SKETCH/DIMENSIONS :

MAP REFERENCE_____

COORDINATE DEFINITION (X is _____ Y is _____)

COORDINATE SYSTEM _____ SOURCE _____ ACCURACY_____

X-COORDINATE _____ Y-COORDINATE _____ UNITS_____

ELEVATION REFERENCE_____

ELEVATION SOURCE _____ ACCURACY _____ELEVATION_____

UNITS_____

SAMPLER_____

EXAMPLE MAP FILE AND PURGING LOGBOOK FORM 10.2-d
GROUNDWATER SAMPLES

WELL COORD. OR ID _____ SAMPLE NO._____

WELL/SITE DESCRIPTION_____

_____

X-COORD. _____ Y-COORD. _____ ELEV. _____ UNITS

DATE ____/____/____ TIME _____ AIR TEMP.

WELL DEPTH _____ FT. _____ IN. CASING HT. _____ FT. _____ IN.

WATER DEPTH _____ FT. _____ IN. WELL DIAMETER _____ IN.

WATER COLUMN HEIGHT _____ FT. _____ IN. SANDPACK DIAM. _____ IN.

EQUIVALENT VOLUME OF STANDING WATER _____ (GAL) (L)

VOLUME OF BAILER _____ (GAL) (L) or PUMP RATE _____ (GPM) (LPM)

TOTAL NO. OF BAILERS (5 EV) _____ or PUMP TIME _____ MIN.

WELL WENT DRY? [Yes] [No] NUM. OF BAILERS _____ or PUMP TIME

VOL. REMOVED _____ (GAL) (L) RECOVERY TIME

PURGE AGAIN? [Yes] [No] TOTAL VOL. REMOVED _____ (GAL) (L)

DATE & TIME	QUANTITY REMOVED	TIME REQ'D	pH	Cond	Temp	ORD	Turb	DO	Character of water (color / clarity / odor / partic.)
(before)									
(during)									
(during)									
(during									
(after)									

COMMENTS_____

SIGNATURE_____

EXAMPLE FIELD CALIBRATION FORM 10.2-e
FOR pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY,
ORD, AND DISSOLVED OXYGEN METERS

INITIAL CALIBRATION	FINAL CALIBRATION
DATE:	**DATE:**
TIME:	**TIME:**

pH METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

pH STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
7.0			
10.0			
4.0			

CONDUCTIVITY METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

COND. STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

TEMPERATURE METER CALIBRATION

METER ID_____

TEMP. STANDARD	INITIAL READING	RECALIB. READING	FINAL READING
ICE WATER			
BOILING WATER			
OTHER _____			

EXAMPLE FIELD CALIBRATION FORM 10.2-e
FOR pH, CONDUCTIVITY, TEMPERATURE, TURBIDITY,
ORD, AND DISSOLVED OXYGEN METERS

TURBIDITY METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

ORD METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

DISSOLVED OXYGEN METER CALIBRATION

CALIBRATION STANDARD REFERENCE NO:_____

METER ID_____

STANDARD	INITIAL READING	RECALIB. READING	FINAL READING

COMMENTS_____

SIGNATURE_____

STANDARD OPERATING PROCEDURE 10.3
BORING LOGS

1.0 INTRODUCTION

The purpose of this standard operating procedure (SOP) is to describe the methods to be followed for classifying soil and rock, as well as preparing borehole logs and other types of soil reports.

2.0 MATERIALS

The following equipment is required for borehole logging:

- HTRW ENG Form 5056-R and 5056A-R boring log forms;
- Daily inspection report forms;
- Chain-of-custody forms;
- Request for analysis forms;
- ASTM D 2488 classification flow chart;
- Soil and/or Rock color chart (i.e., Munsell®);
- Grain size and roundness chart;
- Graph paper;
- Engineer's scale;
- Previous reports and boring logs;
- Pocketknife or putty knife;
- Hand lens;
- Dilute hydrochloric acid (10% volume);
- Gloves;
- Personal protective clothing and equipment, as described in work plan addenda health and safety plan;
- Photoionization detector or other appropriate monitoring equipment per site-specific health and safety plan; and
- Decontamination supplies (SOP 80.1).

3.0 PROCEDURE

Each boring log should fully describe the subsurface environment and the procedures used to obtain this description.

Boring logs should be prepared in the field on USACE Engineer Form 5056-R and 5056-R. Logs should be recorded in the field directly on the boring log form and not transcribed from a field book.

A "site geologist" should conduct borehole logging and soil/rock identification and description or other professional trained in the identification and description of soil/rock.

3.1 BORING LOG INFORMATION

As appropriate, the following information should be recorded on the boring log during the course of drilling and sampling activities:

- Project information including name, location, and project number;
- Each boring and well should be uniquely numbered and located on a sketch map as part of the log;
- Type of exploration;
- Weather conditions including events that could affect subsurface conditions;
- Dates and times for the start and completion of borings, with notations by depth for crew shifts and individual days;
- Depths/heights in feet and in decimal fractions of feet;
- Descriptions of the drilling equipment including rod size, bit type, pump type, rig manufacturer and model, and drilling personnel;
- Drilling sequence and descriptions of casing and method of installation;
- Description and identification of soils in accordance with ASTM Standard D 2488;
- Descriptions of each intact soil sample for the parameters identified in Section 3.2;
- Descriptions and classification of each non-intact sample (e.g., wash samples, cuttings, auger flight samples) to the extent practicable;
- Description and identification of rock;
- Description of rock (core(s)) for the parameters identified in Section 3.7;
- Scaled graphic sketch of the rock core (included or attached to log) according to the requirements identified in Section 3.7;
- Lithologic boundaries, with notations for estimated boundaries;
- Depth of water first encountered in drilling, with the method of first determination (any distinct water level(s) below the first zone will also be noted);
- Interval by depth for each sample taken, classified, and/or retained, with length of sample recovery and sample type and size (diameter and length);
- Blow counts, hammer weight, and length of fall for driven samplers;
- Rate of rock coring and associated rock quality designation (RQD) for intervals cored;
- Drilling fluid pressures, with driller's comments;
- Total depth of drilling and sampling;
- Drilling fluid losses and gains should be recorded;
- Significant color changes in the drilling fluid returned;
- Soil gas or vapor readings with the interval sampled, with information on instrument used and calibration;

- Depth and description of any in-situ test performed; and
- Description of other field tests conducted on soil and rock samples.

3.2 SOIL PARAMETERS FOR LOGGING

In general, the following soil parameters should be included on the boring log when appropriate:

- Identification per ASTM D 2488 with group symbol;
- Secondary components with estimated percentages per ASTM D 2488;
- Color;
- Plasticity per ASTM D 2488;
- Density of non-cohesive soil or consistency of cohesive soil;
- Moisture condition per ASTM D 2488 (dry, moist, or wet);
- Presence of organic material;
- Cementation and HCL reaction testing per ASTM D 2488;
- Coarse-grained particle description per ASTM D 2488 including angularity, shapes, and color;
- Structure per ASTM D 2488 and orientation;
- Odor; and
- Depositional environment and formation, if known.

ASTM D 2488 categorizes soils into 13 basic groups with distinct geologic and engineering properties based on visual-manual identification procedures. The following steps are required to classify a soil sample:

1. Observe basic properties and characteristics of the soil. These include grain size grading and distribution, and influence of moisture on fine-grained soil.
2. Assign the soil an ASTM D 2488 classification and denote it by the standard group name and symbol.
3. Provide a written description to differentiate between soils in the same group if necessary.

Many soils have characteristics that are not clearly associated with a specific soil group. These soils might be near the borderline between groups, based on particle distribution or plasticity characteristics. In such a case, assigning dual group names and symbols (e.g., GW/GC or ML/CL) might be an appropriate method of describing the soil. The two general types of soils, for which classification is performed, coarse- and fine-grained soils, are discussed in the following sections.

3.3 COURSE-GRAINED SOIL IDENTIFICATION

For soils in the coarse-grained soils group, more than half of the material in the soil matrix will be retained by a No. 200 sieve (75-μm).

1. Coarse-grained soils are identified on the basis of the following:
    a) Grain size and distribution;
    b) Quantity of fine-grained material (i.e., silt and clay as a percentage); and
    c) Character of fine-grained material.

2. The following symbols are used for classification:

Basic Symbols			Modifying Symbols
G	=	gravel	W = well graded
S	=	sand	P = poorly graded
			M = with silty fines
			C = with clayey fines

3. The following basic facts apply to coarse-grained soil classification.

- The basic symbol G is used if the estimated percentage of gravel is greater than that for sand. In contrast, the symbol S is used when the estimated percentage of sand is greater than the percentage of gravel.
- Gravel ranges in size from 3-inch to 1/4-inch (No. 4 sieve) diameter. Sand ranges in size from the No. 4 sieve to No. 200 sieve. The Grain Size Scale used by Engineers (ASTM Standard D 422-63) is the appropriate method to further classify grain size as specified by ASTM D 2488.
- Modifying symbol W indicates good representation of all particle sizes.
- Modifying symbol P indicates that there is an excess or absence of particular sizes.
- The symbol W or P is used only when there are less than 15% fines in a sample.
- Modifying symbol M is used if fines have little or no plasticity (silty).
- Modifying symbol C is used if fines have low to high plasticity (clayey).

Figure 10.03a is a flowchart for identifying coarse-grained soils by ASTM D 2488.

3.4 FINED-GRAINED SOIL IDENTIFICATON

If one-half or more of the material will pass a No. 200 sieve (75 μm), the soil is identified as fine-grained.

1. Fine-grained soils are classified based on dry strength, dilatancy, toughness, and plasticity.
2. Classification of fine-grained soils uses the following symbols:

Basic Symbols			Modifying Symbols		
M	=	silt (non plastic)	L	=	low liquid limit (lean)
C	=	clay (plastic)	H	=	high liquid limit (fat)
O	=	organic			
Pt	=	peat			

3. The following basic facts apply to fine-grained soil classification:
    - The basic symbol M is used if the soil is mostly silt, while the symbol C applies if it consists mostly of clay.
4. Use of symbol O (group name OL/OH) indicates that organic matter is present in an amount sufficient to influence soil properties. The symbol Pt indicates soil that consists mostly of organic material.

- Modifying symbols (L and H) are based on the following hand tests conducted on a soil sample:
    — Dry strength (crushing resistance).
    — Dilatancy (reaction to shaking).

— Toughness (consistency near plastic limit).

- Soil designated ML has little or no plasticity and can be recognized by slight dry strength, quick dilatency, and slight toughness.
- CL indicates soil with slight to medium plasticity, which can be recognized by medium to high dry strength, very slow dilatancy, and medium toughness.

Criteria for describing dry strength per ASTM D 2488 are as follows:

Description	Criteria
None	Dry sample crumbles into powder with pressure of handling
Low	Dry specimen crumbles into powder with some finger pressure
Medium	Dry specimen breaks into pieces or crumbles with considerable finger pressure
High	Dry specimen cannot be broken with finger pressure but will break into pieces between thumb and a hard surface
Very high	Dry specimen cannot be broken between the thumb and a hard surface stiffness

Criteria for describing dilatancy per ASTM D 2488 are as follows:

None	No visible change in the sample
Slow	Water appears slow on the surface of the sample during shaking and does not disappear or disappears slowly upon squeezing
Rapid	Water appears quickly on the surface of the sample during shaking and disappears quickly upon squeezing

Criteria for describing toughness per ASTM D 2488 are as follows:

Description	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit and the thread and lump are weak and soft
Medium	Medium pressure is required to roll the thread to near the plastic limit and the thread and lump have medium stiffness
High	Considerable pressure is required to roll the thread to near the plastic limit and the thread and lump have very high stiffness

Figure 10.03b is a flowchart for identifying fine-grained soils by ASTM D 2488.

3.5 DENSITY AND CONSISTENCY

Relative density for coarse-grained soils and consistency for fine-grained soils can be estimated using standard penetration test blow count data (ASTM D 1586). The number of blows required for each 6 inches of penetration or fraction thereof is recorded. If the sampler is driven less than 18 inches, the number of blows per each complete 6-inch interval and per partial interval is recorded.

For partial increments, the depth of penetration should be recorded to the nearest 1 inch. If the sampler advances below the bottom of the boring under the weight of rods (static) and/or hammer, then this information should be recorded on the log.

The following are some "rule-of-thumb" guidelines for describing the relative density of coarse-grained soils:

Blow Count	Relative Density for Sand
0–4	Very loose
4–10	Loose
10–30	Medium dense
30–50	Dense
>50	Very Dense

The following are some "rule-of-thumb" guidelines for describing the consistency of fine-grained soils:

Blow Count	Consistency for Clays	Description
0–2	Very Soft	Sample sags or slumps under its own weight
2–4	Soft	Sample can be pinched in two between the thumb and forefinger
4–8	Medium Stiff	Sample can be easily imprinted with fingers
8–16	Stiff	Sample can be imprinted only with considerable pressure of fingers
16–32	Very Stiff	Sample can be imprinted very slightly with fingers
>32	Hard	Sample cannot be imprinted with fingers; can be pierced with pencil

3.6 OTHER DESCRIPTIVE INFORMATION

The approximate percentage of gravel, sand, and fines (use a percentage estimation chart) should be recorded per ASTM D 2488 as follows:

Modifiers	Descriptions
Trace	Less than 5%
Few	5%–10%
Little	15%–25%
Some	30%–45%
Mostly	50%–100%

Color/discoloration should be recorded and described using a soil color chart, such as the Munsell® Soil Color Charts. A narrative and numerical description should be given from the color chart, such as Brown 10 YR, 5/3 (Munsell®). Odor should be described if organic or unusual.

Plasticity should be described as follows:

Description	Criteria
Non-plastic	A 1/8-inch thread cannot be rolled at any water content
Low	Thread can barely be rolled and lump cannot be formed when drier than plastic limit.
Medium	Thread is easy to roll; plastic limit can be reached with little effort and lump crumbles when drier than plastic limit.
High	Considerable time is required to reach the plastic limit and lump can be formed without crumbling when drier than plastic limit

Moisture condition should be recorded as dry (absence of moisture), moist (damp but no visible water) or wet (visible free water).

Cementation should be recorded (carbonates or silicates) along with the results of HCL reaction testing. The reaction with HCL should be described as none (no visible reaction), weak (some reaction with slowly forming bubbles) or strong (violent reaction with bubbles forming immediately).

Particle description information for coarse-grained soil should be recorded where appropriate per ASTM D 2488 including maximum particle size, angularity (angular, subangular, subrounded, or rounded), shape (flat, elongated or flat and elongated), and color.

Structure (along with orientation) should be reported using the following ASTM D 2488 descriptions:

Description	Criteria
Stratified	Alternating layers of varying material or color with layers greater than 6 millimeters thick
Laminated	Alternating layers of varying material or color with layers less than 6 millimeters thick
Fissured	Breaks along definite planes of fracture with little resistance
Slickensided	Fracture planes that appear polished or glossy, can be striated
Blocky	Inclusion of small pockets of different soils
Homogeneous	Same color and appearance throughout

3.7 ROCK CORE PARAMETERS FOR LOGGING

In general, the following parameters should be included on the boring log when rock coring is conducted:

- Rock type;
- Formation;
- Modifier denoting variety;
- Bedding/banding characteristics;
- Color;
- Hardness;
- Degree of cementation;
- Texture;
- Structure and orientation;
- Degree of weathering;
- Solution or void conditions;
- Primary and secondary permeability including estimates and rationale; and
- Lost core interval and reason for loss.

A scaled graphic sketch of the core should provided on or attached to the log, denoting by depth, location, orientation, and nature (natural, coring-induced, or for fitting into core box) of all core breaks. Where fractures are too numerous to be shown individually, their location may be drawn as a zone.

The RQD values for each core interval (run) should be calculated and included on the boring log. The method of calculating the RQD is as follows per ASTM D 6032:

RQD = [Σ length of intact core pieces > 100 mm (4-inches)] x 100%/total core length.

3.8 PROCEDURES FOR ROCK CLASSIFICATION

For rock classification record mineralogy, texture, and structural features (e.g., biotite and quartz fine grains, foliated parallel to relict bedding oriented 15 to 20 degrees to core axis, joints coated with iron oxide). Describe the physical characteristics of the rock that are important for engineering considerations such as fracturing (including minimum, maximum, and most common and degree of spacing), hardness, and weathering.

1. The following is to be used as a guide for assessing fracturing:

AEG Fracturing	Spacing
Crushed	up to 0.1 foot
Intense	0.1–0.5 foot
Moderate	0.5 foot–10 feet
Slight	1.0 foot–3.0 feet
Massive	>3.0 feet

2. Record hardness using the following guidelines:

Hardness	Criteria
Soft	Reserved for plastic material
Friable	Easily crumbled by finger pressure
Low	Deeply gouged or carved with pocketknife
Moderate	Readily scratched with knife; scratch leaves heavy trace of dust
Hard	Difficult to scratch with knife; scratch produces little powder and is often faintly visible
Very Hard	Cannot be scratched with knife

3. Describe weathering using the following guidelines:

Weathering	Decomposition	Discoloration	Fracture Condition
Deep	Moderate to complete alteration of minerals feldspars altered to clay, etc.	Deep and thorough	All fractures extensively coated with oxides, carbonates, or clay
Moderate	Slight alteration of minerals, cleavage surface lusterless and stained	Moderate or localized and intense	Thin coatings or stains
Weak	No megascopic alteration of minerals	Slight and intermittent and localized	Few strains on fracture surfaces
Fresh	Unaltered, cleavage, surface glistening		

3.9 PROCEDURE FOR LOGGING REFUSE

The following procedure applies to the logging of subsurface samples composed of various materials in addition to soil as may be collected from a landfill or other waste disposal site.

1. Observe refuse as it is brought up by the hollow stem auger, bucket auger, or backhoe.

2. If necessary, place the refuse in a plastic bag to examine the sample.

3. Record observations according to the following criteria:

   - Composition (by relative volume), e.g., paper, wood, plastic, cloth, cement, or construction debris. Use such terms as "mostly" or "at least half." Do not use percentages;
   - Moisture condition: dry, moist, or wet;
   - State of decomposition: highly decomposed, moderately decomposed, slightly decomposed, etc.;
   - Color: obvious mottling and/or degree of mottling;
   - Texture: spongy, plastic (cohesive), friable;
   - Odor;
   - Combustible gas readings (measure down hole and at surface); and
   - Miscellaneous: dates of periodicals and newspapers, ability to read printed materials, degree of drilling effort (easy, difficult, and very difficult).

3.10 SUBMITTAL REQUIREMENTS

Each original boring log should be submitted to the Contracting Officer Representative (CRO) after completion of the boring. When a monitoring well will be installed in a boring, the boring log and well installation diagram should be submitted together.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Not applicable.

6.0 REFERENCES

ASTM Standard D 422-63 (2002)e1. 2002. *Standard Test Method for Particle-Size Analysis of Soils.*

ASTM Standard D 1586–99 (1999). 1999. *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.*

ASTM Standard D 2488-06. 2006. *Standard Practice for Description and Identification of Soils Visual-Manual Procedure).*

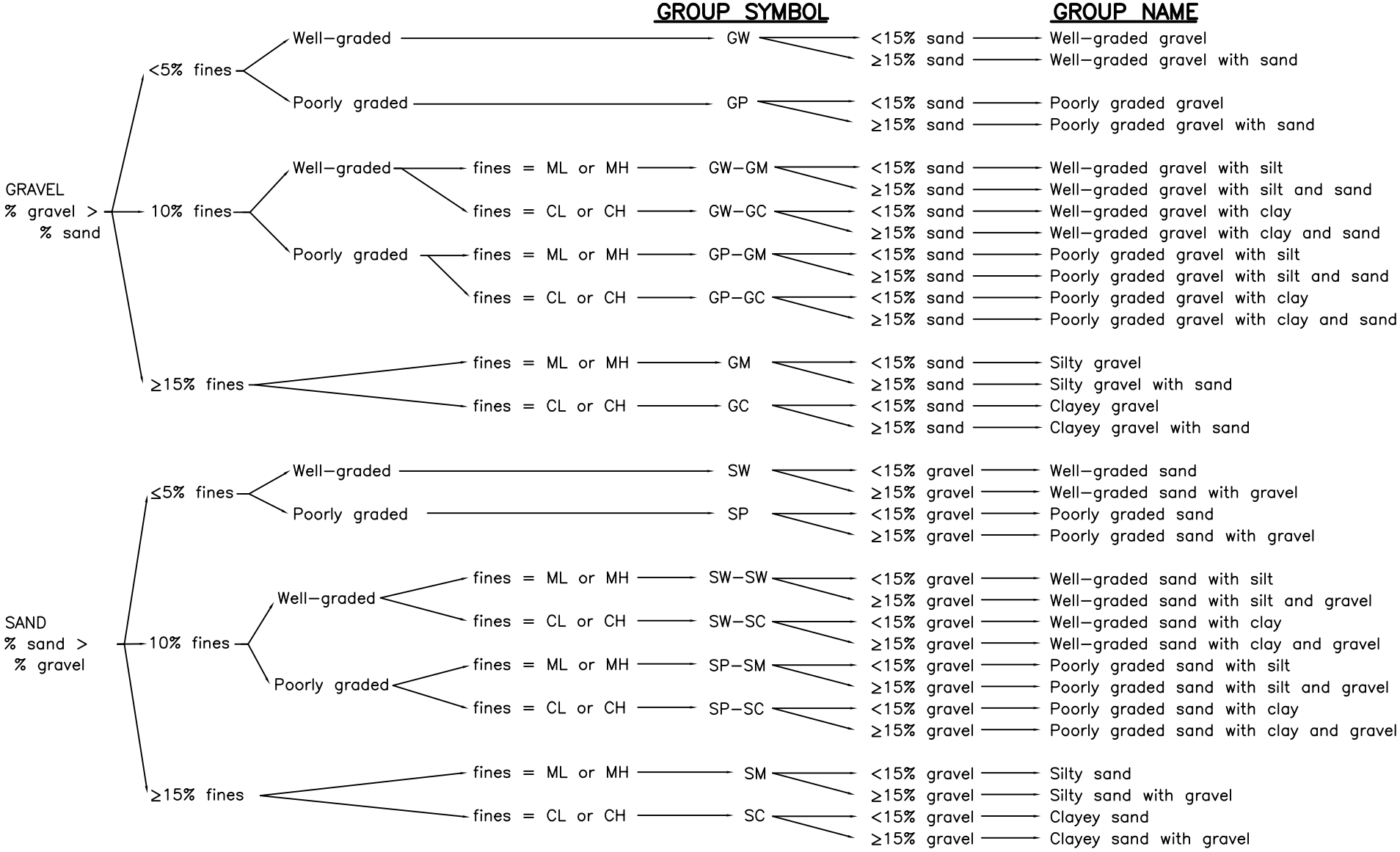
ASTM Standard D 5434-03. 2003. *Guide for Field Logging of Subsurface Explorations of Soil and Rock.*

ASTM Standard D 6032-02 (2006). 2006. *Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Core.*

Compton, R. R. 1962. *Manual of Field Geology.* John Wiley & Sons, Inc., New York.

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000, 1, November.

U.S. Department of the Interior. 1989. *Earth Manual.* Water and Power Resources Service, Washington, DC.



NOTE: PERCENTAGES ARE BASED ON ESTIMATING AMOUNTS OF FINES, SAND, AND GRAVEL TO THE NEAREST 5%.

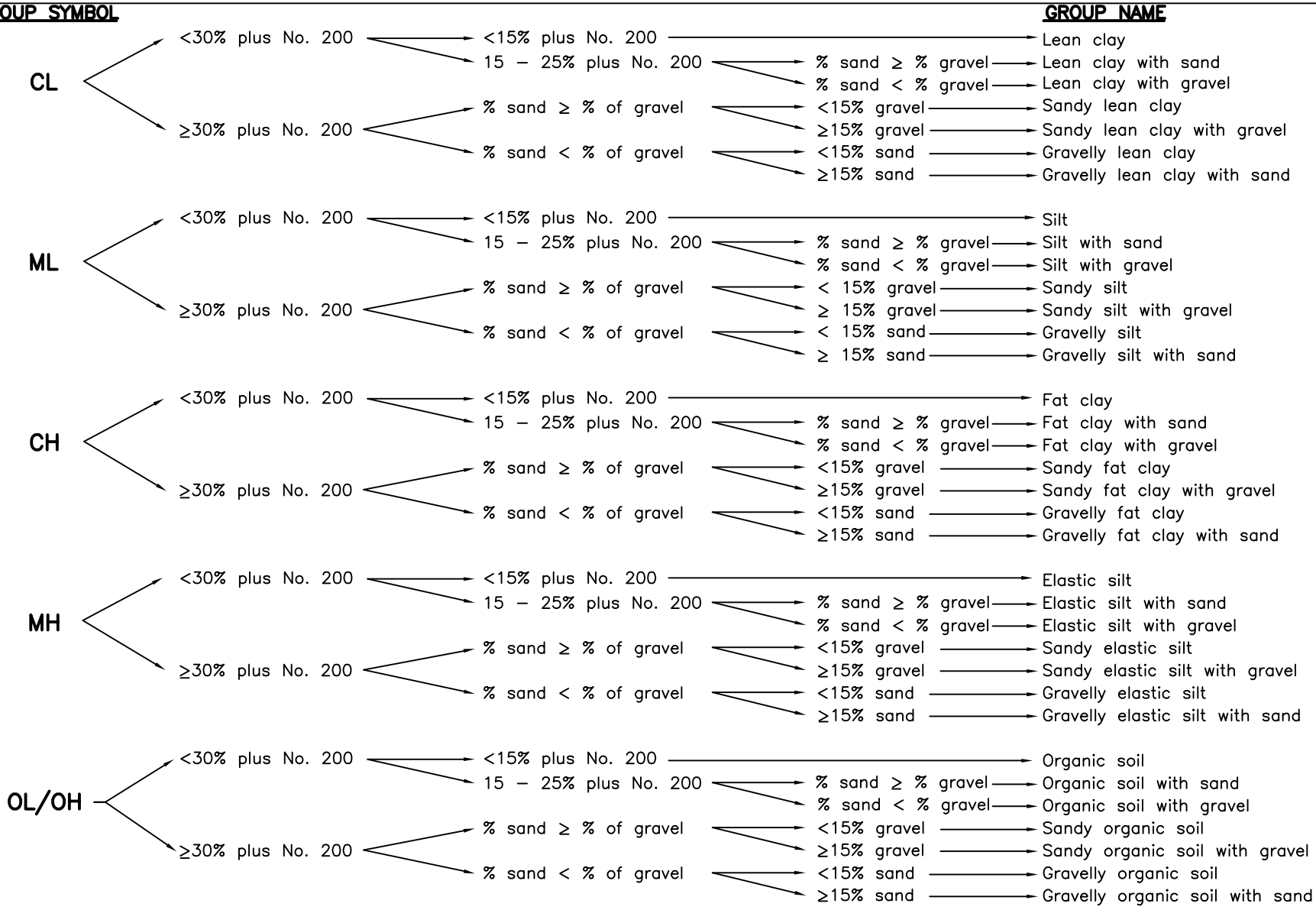
SOURCE: ASTM D 2488

Radford Army Ammuntion Plant

FIGURE 10.03a

FLOW CHART FOR IDENTIFYING COARSE-GRAINED SOILS

Date: *October 2007*	**Prepared By:** *DBC/TLD*
Scale: *N.T.S.*	**File Name:** *SOP Figure 10.03a_Coarse*



NOTE: PERCENTAGES ARE BASED ON ESTIMATING AMOUNTS OF FINES, SAND, AND GRAVEL TO THE NEAREST 5%.

SOURCE: ASTM D 2488

Radford Army Ammuntion Plant	
Date: *October 2007*	**Prepared By:** *DBC/TLD*
Scale: *N.T.S.*	**File Name:** *SOP Figure 10.03b_Fine*

FIGURE 10.03b

FLOW CHART FOR IDENTIFYING FINE-GRAINED SOILS

STANDARD OPERATING PROCEDURE 10.4
CHAIN-OF-CUSTODY FORM

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for use of the chain-of-custody form. An example is provided as part of this SOP. Other formats with similar levels of detail are acceptable.

2.0 MATERIALS

- Chain-of-custody form; and
- Indelible ink pen.

3.0 PROCEDURE

1. Record the project name and number.
2. Record the project contact's name and phone number.
3. Print sampler's names in "Samplers" block.
4. Enter the Field Sample No.
5. Record the sampling dates for all samples.
6. List the sampling times (military format) for all samples.
7. Indicate, "grab" or "composite" sample with an "X."
8. Record matrix (e.g., aqueous, soil).
9. List the analyses/container volume across top.
10. Enter the total number of containers per Field Sample No. in the "Subtotal" column.
11. Enter total number of containers submitted per analysis requested.
12. State the carrier service and airbill number, analytical laboratory, and custody seal numbers.
13. List any comments or special requests in the "Remarks" section.
14. Sign, date, and time the "Relinquished By" section when the cooler is relinquished to the next party.
15. Upon completion of the form, retain the shipper copy and place the forms and the other copies in a zip seal bag to protect from moisture. Affix the zip seal bag to the inside lid of the sample cooler to be sent to the designated laboratory.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

USEPA. 1990. *Sampler's Guide to the Contract Laboratory Program.* EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, DC, December 1990.

USEPA. 1991. *User's Guide to the Contract Laboratory Program.* EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response, January 1991.

USEPA. 1998. *EPA Requirements for Quality Assurance Project Plans.* EPA/600/R-98/018, QA/R5, Final, Office of Research and Development, Washington, D.C.

FIGURE 10.4-a
EXAMPLE CHAIN-OF-CUSTODY FORM

Project Number	Project Name				Matrix	A N A L Y S E S									LAB :
Project Contact (Name and Phone Number)															AIRBILL No:
Samplers:															Courier:
Field Sample No.	Date (MM-DD-YY)	Time	Comp	Grab										Subtotal	REMARKS
TOTAL															

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Relinquished by:	Date/time	Received by: (for lab)	Date/Time	Remarks	

STANDARD OPERATING PROCEDURE 20.1
MONITORING WELL INSTALLATION

1.0 SCOPE AND APPLICATION

The installation of monitoring wells is contingent upon the existing conditions at the project site. The purpose of this standard operating procedure (SOP) is to delineate the quality control measures required to ensure the accurate installation of monitoring wells. For a particular site investigation, the associated work plan addenda should be consulted for specific installation instructions. The term "monitoring wells", as used herein is defined to denote any environmental sampling well.

2.0 MATERIALS

2.1 DRILLING EQUIPMENT

- Appropriately sized drill rig adequately equipped with augers, bits, drill stem, etc;
- Steam cleaner and approved source water for decontamination of drilling equipment, etc.;
- Source of approved water;
- Photoionization detector or other appropriate monitoring instrument per the site-specific Health and Safety plan;
- Water level indicator (electrical);
- Weighted steel tape measure;
- Steel drums and other appropriate containers for investigation-derived materials (drill cuttings, contaminated PPE, decontamination solutions, etc.);
- Absorbent pads and/or logs;
- Personal protective equipment and clothing (PPE) per site-specific health and safety plan; and
- Decontamination supplies, pad with heavy plastic sheeting (SOP 80.1).

2.2 WELL INSTALLATION MATERIALS

Technical information on all installed materials (screens, riser pipe, filter pack, bentonite, cement, etc.) and representative samples of the proposed filter pack will be supplied to the Contracting Officer's Representative (COR) before initiating well installation.

Well screen slot size and filter pack gradation will be determined based on existing site geology before initiating site-specific investigations.

- Well screen :

  Polyvinyl Chloride (PVC): JOHNSON (or equivalent); PVC commercially slotted continuous slot, wire wrapped screen; 4-in. diameter.; SCH 40; SCH 80; flush-threaded (leak-proof) joints; PVC should conform to National Sanitation Foundation (NSF) Standard 14 for potable water usage or ASTM Standard Specification F 480 and bear the appropriate rating logo. PVC should be free of ink markings, cleaned, and prepackaged by manufacturer;

Stainless Steel: JOHNSON (or equivalent); stainless steel Vee-Wire continuous slot, wire wrapped screen; 304 stainless steel (unless the sum concentration of Cl^-, F^-, and Br^- is <1000 ppm, case type 316 should be used); ASTM F 480 flush threads; cleaned, wrapped, and heat-sealed by manufacturer;

- Riser pipe:
  - PVC: JOHNSON (or equivalent); STD. PVC; 4-in. diameter.; SCH 40; SCH 80; flush-threaded (leak-proof) joints; PVC should conform to NSF Standard 14 or F 480; free of ink markings; cleaned and prepackaged by manufacturer;
  - Stainless Steel: JOHNSON (or equivalent); SCH 5; 304 stainless steel; ASTM type A312 material; 4-in. diameter.; cleaned, wrapped and heat-sealed by manufacturer;
- Plugs/Caps: JOHNSON (or equivalent); standard PVC or stainless steel;
- Filter pack: MORIE, clean sorted gravel (or equivalent);
- Bentonite seal: BAROID, bentonite pellets (3/8-in. diameter.);
- Cement: Type II Portland Cement; if sulfate concentrations are higher than 1500 ppm, Type IV Portland Cement will be used;
- Bentonite powder: BAROID, Aquagel Gold Seal;
- Steel Protective Casing: BRAINARD-KILMAN (or equivalent) zinc-plated steel, lockable, painted;
- Containers for purged water, as required;
- Submersible pump or bailer of appropriate capacity, and surge block sized to fit well;
- Hach DREL 2000 portable laboratory (or equivalent);
- Multiprobe Electronic Water Quality Recorder (Hydrolab);
- Electric well sounder and measuring tape;
- Portland Type II cement (see footnote); and
- Steel Posts (pickets), painted (see footnote).

2.3 DOCUMENTATION

- Copy of work plans and health and safety plan;
- Copy of USACE EM 110-1-4000 Monitoring Well Requirements;
- Copies of permits (area entry, hot work, well, and utility clearance);
- Boring log forms;
- Well completion diagram form; and
- Field logbook.

2.4 GEOLOGIST'S PERSONAL EQUIPMENT

- Boring log materials per SOP 10.3; and
- Personal protective equipment and clothing (PPE) as required by the site-specific health and safety plan.

3.0 PROCEDURE

3.1 MATERIALS APPROVAL

3.1.1 Source Water

Water sources for drilling, grouting, sealing, filter pack placement, well installation, and equipment decontamination must be approved by the COR before arrival of the drilling equipment. Information required for the water source includes:

- Water source;
- Manufacturer/owner and their address and telephone number;
- Type of treatment and filtration prior to tap;
- Time of access;
- Cost per gallon (if applicable); and
- Dates and results associated with all available chemical analyses over the past 2 years, and the name and address of the analytical laboratory (if applicable).

3.1.2 Bentonite

Pure sodium bentonite with no additives (bentonite) will be the only drilling fluid additive allowed, and its use must be approved by the COR before the arrival of the drilling equipment. The information required for evaluation includes brand name, manufacturer, manufacturer's address and telephone number, product description, and intended use for the product, and potential effects on chemical analysis of water samples.

3.1.3 Granular Filter Pack

Granular filter pack material must be approved by the COR before drilling. A one-pint representative sample must be supplied to the COR. Information required includes lithology, grain size distribution, brand name, source, processing method, and size of intended screen.

3.1.4 Cement

Portland Type II cement will be used for grout (or Type IV, as noted in Section 2.2).

3.2 DRILLING

The objective of the selected drilling technique used at given site is to ensure that the drilling method provides representative data while minimizing subsurface contamination, cross contamination, and drilling costs.

Drilling methods that are appropriate for boring or monitoring well installation will depend on the subsurface geology most likely to be encountered in the boring. The geology for each site should be determined by reviewing previous investigation data (boring data, geophysics, etc.) from the site or nearby areas. Specific drilling methods that will be used to support site activities will be incorporated into work plan addenda.

Section 5.2.2 of the Master Work Plan discusses the different drilling methods that may be appropriate for installation of monitoring wells at the Radford Army Ammunition Plant (RFAAP) based on the different types of conditions encountered. The different drilling methods discussed in this section of the Master Work Plan including:

- Hollow Stem Auger (for soil);
- Air Rotary (soil and rock);

- Water Rotary and wire-line casing advancement (soil and rock);
- Drill-Through-Casing Driver (soil and rock); and
- Sonic (soil and rock).

3.2.1 Responsibilities of the Site Geologist

A Site Geologist will be present during all well drilling and installation activities and will fully characterize all tasks performed in support of these activities in the monitoring well logbook. The Site Geologist will be responsible for the logging samples, monitoring drilling operations, recording water losses/gains and groundwater data, preparing the boring logs and well diagrams, and recording the well installation procedures for one operating rig. The Site Geologist will have sufficient equipment in operable condition on-site to perform efficiently his/her duties.

3.2.2 Additives

No lubricants will be used on down hole drilling equipment. Additives containing either lead or copper will not be allowed. In addition, polychlorinated biphenyls will not be permitted in hydraulic fluids or other fluids used in the drilling rig, pumps, or other field equipment and vehicles.

Surface runoff or other fluids will not be allowed to enter any boring or well during or after drilling/construction.

Antifreeze used to keep equipment from freezing will not contain rust inhibitors and sealants. Antifreeze is prohibited in any areas in contact with drilling fluid. Absorbent pillows will be placed to catch any obvious leaks from the drill rig.

3.2.3 Boring Logs and Field Notes

Borings for monitoring wells will be logged by a geologist as described in SOP 10.3. Logs will be recorded on USACE HTRW ENG Form 5056-R and 5056A-R boring log forms.

Daily investigation activities at the site related to drilling should be recorded in field logbooks as described in SOPs 10.1 and 10.2.

3.3 WELL CONSTRUCTION AND INSTALLATION

Specifications for monitoring well construction and installation for a given site being investigated are to be included in work plan addenda. In case the previously defined criteria have not been met before the depth range for a given hole is reached, the geologist will stop the drilling and confer with the supervisor. The current boring conditions (depth, nature of the stratigraphic unit, and water-table depth) will be compared to those of other wells nearby to decide whether to continue drilling or to terminate and complete the well.

3.3.1 Overburden Wells

Overburden wells at the RFAAP are typically designed as a 4-inch diameter, single cased well (see Figure 20-1a) installed into a surficial aquifer, which is present above bedrock. For this type of well, the well boring would be terminated before penetrating any underlying confining unit and/or bedrock.

Section 5.2.2 of the Master Work Plan discusses the different drilling methods that may be appropriate for installation of overburden wells.

If dense, non-aqueous liquid (DNAPL) is encountered during drilling, the well boring will be terminated and completed at the base of the overburden aquifer being monitored.

3.3.2 Bedrock Wells

Multi-cased wells or wells with an outer casing installed into competent bedrock should be specified for wells that are designed to monitor groundwater within bedrock (see Figure 20-1c). The installation of a multi-cased well or outer casing will isolate the zone(s) monitored from overburden and will minimize the potential for cross-contamination during and after drilling.

The general procedure to be followed for installation of a multi-cased well is as follows. This procedure assumes the installation of a 4-inch diameter monitoring well. Specific procedures, drilling techniques and design of monitoring wells will be presented in work plan addenda for site-specific investigations.

1. If soil sampling is required within overburden, use appropriate drilling techniques to advance the boring and collect the soil samples.

2. A minimum 10-inch drill bit should be advanced from the surface into competent bedrock a distance not less than 2 feet. A drilling technique appropriate for penetrating overburden and bedrock should be used such as air rotary.

3. After the borehole has been advanced to the target depth within competent bedrock, a 6-inch diameter steel or Schedule 80 PVC outer casing should be lowered to the bottom of the boring.

4. Once the outer casing has been lowered to the bottom of the boring, the casing should be grouted in-place using a decontaminated tremie pipe equipped with a side discharge. The annulus between the outer casing and borehole wall will be injected with grout until undiluted grout reaches the surface.

5. The grouting mixture, specification, and placement should be consistent with the requirements identified in Section 3.3.8.

6. The grout should be allowed to cure a minimum of 24 hours before further drilling.

7. After adequate curing time for outer casing, drilling with a 5-5/8-inch bit until the desired total depth is reached should complete the well boring.

8. Once the well boring is completed, an appropriate bedrock well will be constructed based on site-specific conditions. The types of wells that may be installed may include a constructed well with screen, casing, filter pack, seal, and grout; an open-bedrock well; or a lined open bedrock well (see Section 3.3.3).

3.3.3 Well Screen Usage

Well screen usage for a given site should be specified in work plan addenda based on expected site conditions.

In general, wells installed within overburden will be installed with a screen as per Figure 20.01-a or 20.01-b. Bedrock wells may be installed with or without a screen depending on site specific conditions such as the depth of water bearing zones, stability of bedrock, occurrence of karst zones, and construction of existing wells at the site being investigated.

In general, bedrock wells installed within karst zones will be completed as open-hole construction (see Figure 20.01c). If evidence of potential or severe borehole collapse (unstable bedrock) is indicated during drilling, casing and screen will be installed in the borehole as a removable lining. If desired, multiple flow zones may be monitored in an open bedrock well by installing a multiport well, which has monitoring/sampling intervals sealed off from the rest of the boring and from each other by packers.

3.3.4 Beginning Well Installation

Schedule

Monitoring well installation should begin within 12 hours of boring completion for holes that are uncased or partially cased with temporary drill casing. In the case where a partially cased hole into bedrock is to be partially developed prior to well insertion, the well installation should begin within 12 hours of this initial development. For holes that are fully cased, installation should begin within 48 hours. Once begun, well installation should not be interrupted.

Placement of Materials

Temporary casing and hollow stem augers may be removed from the boring prior to well installation if the potential for cross contamination is low and if the borehole will remain stable during the time required for installation.

Where borehole conditions are unstable, some or all of the well materials may need to be installed prior to removal of the temporary casing or hollow stem augers. The casing or hollow stem augers should have an inside diameter sufficient to allow the installation of the screen and casing plus annular space for a pipe through which to place filter pack and grout.

Any materials blocking the bottom of the drill casing or hollow stem auger should be dislodged and removed from the casing prior to well insertion.

3.3.5 Screens, Casing, and Fittings

Borehole Specifications

The borehole for each well should be of sufficient diameter to provide for at least 2 inches of annular space between the borehole wall and all sides of the casing.

Well Screens

Material specifications for well screens, casings, and fittings are discussed in Section 2.2.

Screen bottoms should be securely fitted with a threaded cap or plug of the same composition as the screen. The cap/plug should be within 0.5 feet of the open portion of the screen. A sediment trap/sump will not be used.

Screen slot size will be appropriately sized to retain 90%–100% of the filter pack material, the size of which will be determined by sieve analysis of formation material.

Well screen lengths should be specified in work plan addenda and will be based on various site-specific factors such as environmental setting, subsurface conditions, analytes of concern, regulatory considerations, etc.

Assembly and Placement of Well Screen and Casing

Personnel should take precautions to assure that grease, oil, or other contaminants do not contact any portion of the well screen and casing assembly. Clean latex or nitrile gloves should be worn when handling the screen and casing assembly. Flush, threaded joints usually can be tightened by hand. If necessary, steam cleaned wrenches may be used to tighten joints.

In general, each section of the well assembly is lowered into the borehole, one section at a time, screwing each section securely into the section below it. No grease, lubricant, polytetrafluoroethylene (PTFE) tape, or glue may be used in joining the sections of screen and casing.

The assembly should be lowered to its predetermined level and held in position for placement of the filter pack. It is essential that the assembly be installed straight (with centralizers as appropriate) to allow for

appropriate sampling. Buoyant forces associated with fluids in the borehole may require that the assembly be installed with the aid of hydraulic rams of the drill rig. When the well assembly is placed to predetermined level, a temporary cap should be place on the well to prevent foreign material from entering the well.

The bottoms of well screens should be placed no more than 3 feet above the bottom of the drilled borehole. If significant overdrilling is required, a pilot boring should be used. Sufficient filter pack should be placed at the bottom of the borehole

The well casing should be pre-cut (square) to extend 2 to 2.5 feet above the ground surface. Before placement of the last piece of well casing, a notch or other permanent reference point will be cut, filed, or scribed into the top edge of the casing.

The tops of all well casing will be capped with covers composed of materials compatible with the products used in the well installation. Caps will be loose fitting, constructed to preclude binding to the well casing caused by tightness of fit, unclean surfaces, or weather conditions. In either case, it should be secure enough to preclude the introduction of foreign material into the well, yet allow pressure equalization between the well and the atmosphere.

The top of each well casing should be level so that the maximum difference in elevation between the highest and lowest points of the casing is less than or equal to 0.02 ft.

3.3.6 Filter Pack

The volume of filter pack that is required to fill the annular between the well screen/casing and borehole should be computed, measured, and recorded.

Granular filter packs will be chemically and texturally clean, inert, and siliceous. The gradation of filter packs will be selected based on the screen size used and will be specified in the work plan addenda for the site being investigated.

Primary Filter Pack

Filter pack material should be placed in the borehole using a decontaminated tremie pipe. An appropriate amount of primary filter pack should be placed in the borehole prior to final positioning of the well screen to provide an appropriate barrier between the bottom of the borehole and the bottom of the screen. Once the initial filter pack has been placed and the well assembly is appropriately positioned and centered in the borehole, the remaining primary filter pack should be placed in increments (and tamped) as the tremie pipe is gradually raised.

As the primary filter pack is placed, approved source water may need to be added to help move the filter pack. A weighted tape should be used to measure the top of the filter pack as it is being placed. If bridging of the filter pack occurs, then this bridging should be broken mechanically prior to adding additional filter pack.

When temporary casing or hollow stem augers are used, the casing or augers should be removed in increments such that lifting of the well assembly is minimal. After removal of each increment, it should be confirmed by direct measurement that the primary filter pack has not been displaced during the removal.

The primary filter pack should extend from the bottom of the borehole to 3 to 5 ft above the top of the screen.

Secondary Filter Pack

The primary filter pack may be capped with 1 to 2 feet of feet of secondary filter pack to prevent the intrusion of the bentonite seal into the primary filter pack. The need for this filter pack (and specifications) should be addressed in work plan addenda for the site being investigated. Such factors as the gradation of the primary filter pack, the potential for grout extrusion, and site hydrogeology should be considered when evaluating the need for this filter pack.

3.3.7 Bentonite Seal

A bentonite seal, consisting of hydrated 3/8-inch diameter. bentonite pellets, will be installed immediately above the filter pack. The seal may be installed with a tremie pipe, which is lowered to the top of the filter pack and slowly raised as the pellets fill the annular space. In deep wells, the pellets may bridge and block the tremie pipe; in this case, pellets may be placed by free fall into the borehole. A weighted tape should be used to measure the top of seal as it is installed.

When cement grout is to be used above the bentonite seal, a minimum of 3 to 4 hours should be allowed for hydration of the pellets.

When installing a seal above the water table, water should be added to the bentonite for proper hydration. In this case, the seal should be placed in lifts of 0.5 to 1 foot with each lift hydrated for a period of 30 minutes.
If the bentonite seal is to be installed far below the water table, a bentonite slurry seal will be installed. Cement-bentonite grout will not be used below the water table. The slurry will be mechanically blended aboveground to ensure a lump-free mixture. The slurry will consist of bentonite powder and approved water mixed to a minimum of 20 percent solids by weight of pumpable slurry with a density of 9.4 pounds per gallon or greater. The slurry will be pumped into place through a tremie pipe and measured as installed.
Bentonite seals should be 3 to 5 ft thick as measured immediately after placement. The final depth to the top of the bentonite seal will be measured and recorded before grouting.

3.3.8 Grout

Cement grout used in construction will be composed of the following:

- Type II Portland Cement (or Type IV as noted in Section 2.2);
- Bentonite (2 to 5% dry bentonite per 94-lb sack of dry cement); and
- A maximum of 6 to 7-gallons of approved water per 94-lb sack of cement

Neither additives nor borehole cuttings will be mixed with the grout. Bentonite will be added after the required amount of cement is mixed with the water.

All grout material will be combined in an aboveground container and mechanically blended to produce a thick, lump-free mixture. The mixed grout will be recirculated through the grout pump before placement.
Grout placement should be performed as follows:

1. Grout should be placed from a rigid tremie pipe located just over the top of the bentonite seal. The tremie pipe should be decontaminated prior to use.
2. The tremie pipe should be kept full of grout from start to finish with the discharge end of the pipe completely submerged as it is slowly and continuously lifted.
3. The annulus between the drill casing and well casing should be filled with sufficient grout to allow for the planned drill casing removal. Grout should not penetrate the well screen or filter pack.
    - For incremental removal of drill casing, grout should be pumped to maintain at least 10 ft of grout in the drill casing remaining in the borehole after removing the selected length of casing. After each section of casing is removed, the tremie pipe may be reinserted to the base of the casing not yet removed.
    - In the case where drill casing will be removed all at once, grout should be pumped from the tremie pipe until undiluted grout flows from the annulus at the ground surface.

4. If the un-grouted portion of a borehole is less than 15 feet and without fluids after drill casing removal, then the un-grouted portion may be filled by pouring grout from the surface.
5. If drill casing was not used for well installation, grouting should proceed to the surface in one continuous operation.
6. For grout placement in a dry and open hole less than 15 ft deep, grout may be manually mixed and poured in from the surface providing that integrity of the bentonite seal is maintained.
7. Protective casing should be installed immediately after completion of grouting.
8. Grout settlement should be checked within 24 hours of the initial grout placement. Additional grout should be added grout should be added to fill any observed depressions.

The following will be noted in the boring logs: (1) exact amounts of cement, bentonite, and water used in mixing grout and (2) actual volume of grout placed in the hole.

3.3.9 Well Protection

The major elements of well protection will include:

- A protective casing;
- Protective concrete pad around the well; and
- Protective steel posts set around the well outside of the concrete pad.

Well Protective Casing

Well protective casings will be installed around all monitoring wells immediately after grouting. The protective casing should consist of a minimum 5-ft long, steel pipe (protective casing) installed over the well casing and into the grout. The protective casing should be installed to a depth of approximately 2.5-feet below ground surface (extending approximately 2.5 feet above ground surface). The internal well casing (riser) and protective casing will not be separated by more than 0.2 feet of height.

An internal mortar collar will be placed within the protective steel casing and outside the well casing to a height of 0.5 above ground surface.

After placement and curing of the mortar collar, an internal drainage hole will be drilled through the protective casing, which is centered no more than 1/8 inch above the grout filled annulus between the well riser and the protective casing.

Any annulus formed between the outside of the protective casing and the borehole will be filled to ground surface with cement.

Concrete Pad

After the grout has thoroughly set and the well protective casing has been installed, a protective concrete pad will be installed around the well. This pad will be at least 4 inches thick and 4 feet square and sloped away from the well to provide for adequate drainage.

Protective Posts

Additional protection will be provided at each well location by the installation of four steel posts outside of each corner of the concrete pad. The installation of protective posts should occur before the well is sampled.

The posts should have a minimum diameter of 3 inches, be placed 2 to 3 feet below ground surface, and extend at least 3 feet above ground surface. Posts should be painted orange using a brush.

Posts should be set in post holes, which are backfilled with concrete. For additional protection, the posts can be filled with concrete.

3.3.10 Well Construction Diagram and Field Notes

The construction of each well will be depicted as built in a well construction diagram (see Figure 20.1a). The diagram will be attached to the boring log and the following will be graphically denoted:

- Bottom of boring;
- Screen location, length, and size;
- Coupling locations;
- Granular filter pack;
- Seal;
- Grout;
- Cave-in;
- Centralizers;
- Height of riser;
- Protective casing detail;
- Water level 24 hours after completion with date and time of measurement;
- Quantity and composition of materials used; and
- Material between bottom of boring and bottom of screen.

Daily activities at the site related to monitoring well installation should be recorded in the field logbooks as described in SOPs 10.1 and 10.2.

3.4 GENERAL SEQUENCE OF MONITORING WELL COMPLETION

The following is a general sequence of monitoring well completion with reference to the specific details included in Section 3.3.

1. Completion of borehole;
2. Assembly and placement of well assembly as described in Section 3.3.5;
3. Placement of the appropriate filter pack(s) as discussed in Section 3.3.6;
4. Installation of an appropriate bentonite seal as discussed in Section 3.3.7;
5. Grouting the remaining annular space of the borehole as discussed in Section 3.3.8;
6. Set the protective casing for the well as discussed in Section 3.3.9;
7. Complete the protective concrete pad as discussed in Section 3.3.9; and
8. Install the protective posts as discussed in Section 3.3.9.

3.5 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addenda for the site being investigated and SOP 70.1.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

6.0 REFERENCES

ASTM Standard D 5092-04e1. 2004. *Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers.*

ASTM Standard F 480-06b. 2006. *Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80.*

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000, 1, November.

EXAMPLE WELL DEVELOPMENT FORM

WELL DESIGNATION:_____ DATE(S) OF INSTALLATION:_____/_____/_____

SITE GEOLOGIST:_____ DEVELOPMENT DATE(S):_____/_____/_____

STATIC WATER LEVELS BEFORE AND AFTER DEVELOPMENT * :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO SEDIMENT BEFORE AND AFTER DEVELOPMENT * :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO WELL BOTTOM *: _____ SCREEN LENGTH _____

HEIGHT OF WELL CASING ABOVE GROUND SURFACE: _____

QUANTITY OF MUD/WATER:

LOST DURING DRILLING	(+)_____gallons
REMOVED PRIOR TO WELL INSERTION	(-)_____gallons
LOST DURING THICK FLUID DISPLACEMENT	(+)_____gallons
ADDED DURING FILTER PACK PLACEMENT	(+)_____gallons
TOTAL LOSSES	_____gallons

(a) Water column ht. (ft.) _____ (b) Well radius (in.)_____

(c) Screen length (ft.) _____ (d) Borehole radius (in.)_____

(e) QUANTITY OF FLUID STANDING IN WELL

Install Equation Editor and double-click here to view equation.

1 _____ gallons
(Show Calculation)

(f) QUANTITY OF FLUID IN ANNULUS Install Equation Editor and double-click here to view equation. 1_____gallons
(Show Calculation)

DEVELOPMENT VOLUME = (5 * TOTAL LOSSES) + [5 * (e + f)] = _____ gallons
(Show Calculation)

* **ALL DEPTHS MEASURED FROM TOP OF WELL CASING**

EXAMPLE WELL DEVELOPMENT RECORD

WELL DESIGNATION _____ DATE(S) OF DEVELOPMENT: _____/_____/_____

TYPE AND SIZE OF PUMP:_____

TYPE AND SIZE OF BAILER:_____

DESCRIPTION OF SURGE TECHNIQUE:_____

RECORD OF DEVELOPMENT

DATE & TIME	QUANTITY REMOVED	TIME REQ'D	pH	Cond	Temp	ORD	Turb	DO	Character of water (color/clarity/ odor/partic.)
(before)									
(during)									
(during)									
(during									
(after)									

TYPICAL PUMPING RATE_____ GAL./HR. EST. RECHARGE RATE_____

TOTAL QUANTITY OF WATER REMOVED_____ TIME REQUIRED_____

REMARKS_____

SIGNATURE OF SITE GEOLOGIST_____

Facility/Project Name

Facility License, Permit or Monitoring Number

Type of Protective Cover: Above-Ground ☐ Flush-To-Ground ☐

Well Distance From Waste/Source Boundary

Maximum Depth of Frost Penetration (estimated)

Local Grid Location of Well ☐N. ____ m. ☐S. ☐E. ____ m. ☐W.

Grid Origin Location
Lat. ____ ____ ____ Long ____ ____ ____ or
St. Plane ____ m. N. ____ m. E.

Section Location of Waste/Source
____1/4 of ____1/4 of Sec. ____ T. ____ N.R. ____ ☐E. ☐W.

Location of Well Relative to Waste/Source
u ☐ Upgradient s ☐ Sidegradient
d ☐ Downgradient n ☐ Not Known

Well Number

Date Well Installed (Start)

Date Well Installed (Completed)

Well Installed By: (Person's Name & Firm)

Note: Use top of casing (TOC) for all depth measurments.

A. Protective casing, top elevation ____ m. MSL

B. Well casing, Top elevation ____ m. MSL

C. Land surface elevation ____ m. MSL

D. Surface seal, bottom ____ m. TOC or ____ m. MSL

16. USCS classification of sell near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

17. Sieve analysis attached? ☐ Yes ☐ No

18. Drilling method used: Rotary ☐ Hollow Stem Auger ☐ ____ Other ☐

19. Drilling fluid used Water ☐ Air ☐ Drilling mud ☐ None ☐

20. Drilling additives used? ☐ Yes ☐ No
Describe ____

21. Source of water (attach analysis): ____

E. Secondary filter, top ____ m. TOC or ____ m. MSL

F. Bentonite seal, top ____ m. TOC or ____ m. MSL

G. Secondary filter, top ____ m. TOC or ____ m. MSL

H. Primary filter, top ____ m. TOC or ____ m. MSL

I. Screen joint ____ m. TOC or ____ m. MSL

J. Well bottom ____ m. TOC or ____ m. MSL

K. Filter pack, bottom ____ m. TOC ____ m. MSL

L. Borehole, bottom ____ m. TOC or ____ m. MSL

M. Borehole, diameter ____ mm.

N. O.D. well casing ____ mm.

O. I.D. well casing ____ mm.

P. 24-hr water level after completion ____ m. TOC or ____ m. MSL

1. Cap and Lock? ☐ Yes ☐ No

2. Protective posts? ☐ Yes ☐ No

3. Protective casing:
a. Inside diameter: ____ mm.
b. Length: ____ m.

4. Drainage port(s) ☐ Yes ☐ No

5. Surface seal:
a. Cap Gravel blanket ☐ Bentonite ☐ Concrete ☐ ____ Other ☐

b. Annular space seal: Bentonite ☐ Cement ☐ ____ Other ☐

6. Material between well casing and protective casing: Bentonite ☐ Cement ☐ ____ Other ☐

7. Annular space seal: A. Granular Bentonite ☐
b. ____ Lbs/gal mud weight.....Bentonite-sand slurry ☐
c. ____ Lbs/gal mud weight.....Bentonite slurry ☐
d. ____ x Bentonite.....Bentonite-cement grout ☐
e. ____ m^3 volume added for any of the above
f. How installed: Tremie ☐ Tremie pumped ☐ Gravity ☐

8. Centralizers ☐ Yes ☐ No

9. Secondary Filter ☐ Yes ☐ No
a. Volume added ____ m^3 ____ Bags/Size

10. Bentonite seal: a. Bontonite granules ☐
b. 1/4in. 3/6in. 1/2in. Bentonite pellets ☐
c. ____ Other ☐

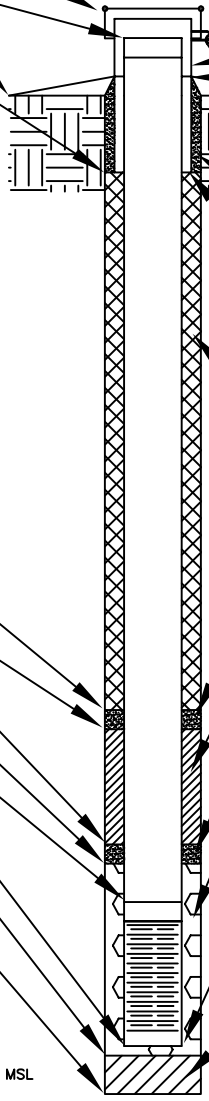
11 Secondary Filter ☐ Yes ☐ No
a. Volume added ____ m^3 ____ Bags/Size

12. Filter pack material: Manufacturer, product name & mesh size
a.
b. Volume added ____ m^3 ____ Bags/Size

13. Well casing: Flush threated PVC schedule 40 ☐ Flush threated PVC schedule 80 ☐ ____ Other ☐

14. Screen material:
a. Screen type: Factory cut ☐ Continous slot ☐ ____ Other ☐
b. Manufacturer
c. Slot size: 0.____ In.
d. Slotted length: ____ In.

15. Backfill material (below filter pack): None ☐
____ Other ☐

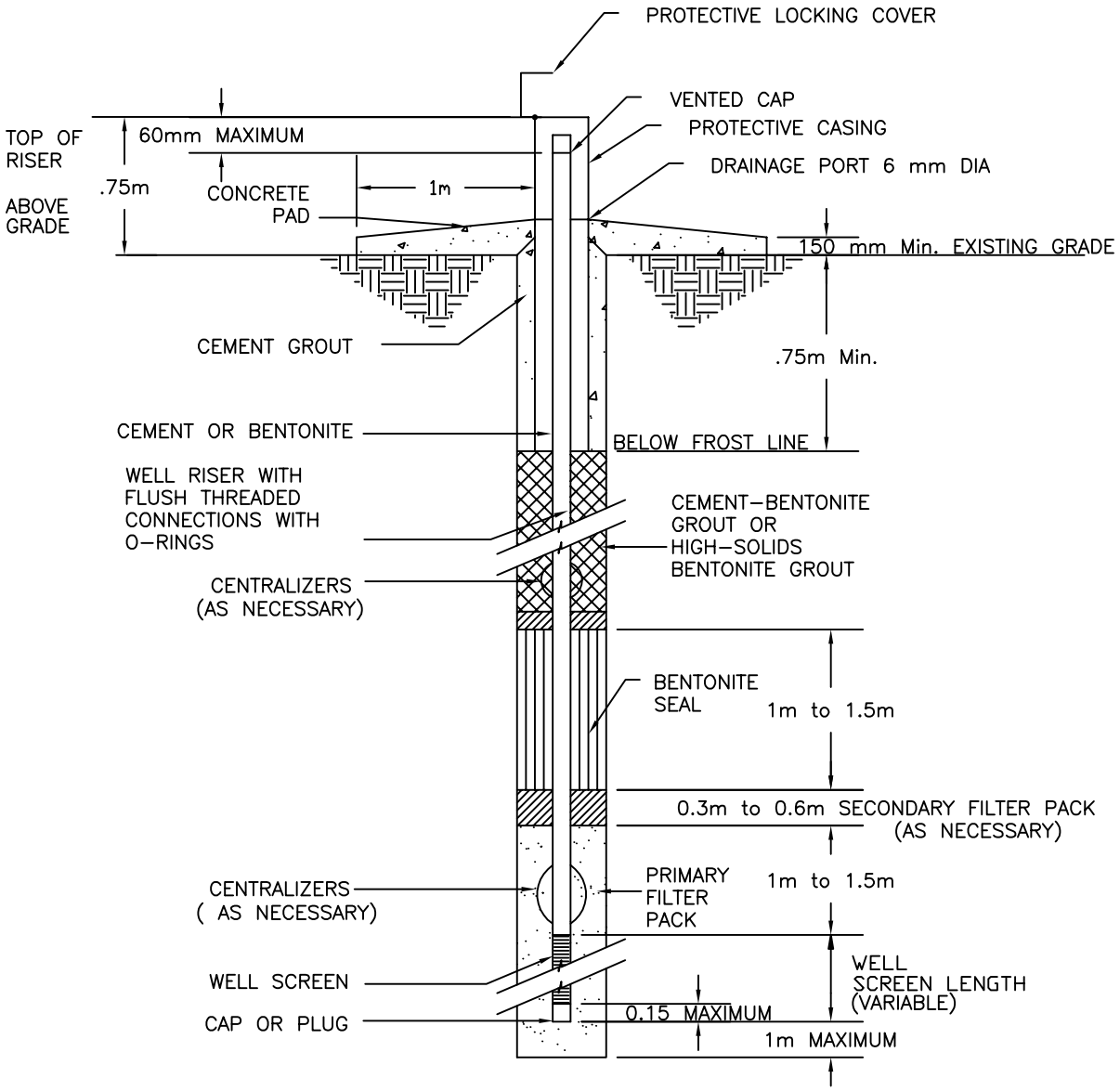


Radford Army Ammuntion Plant

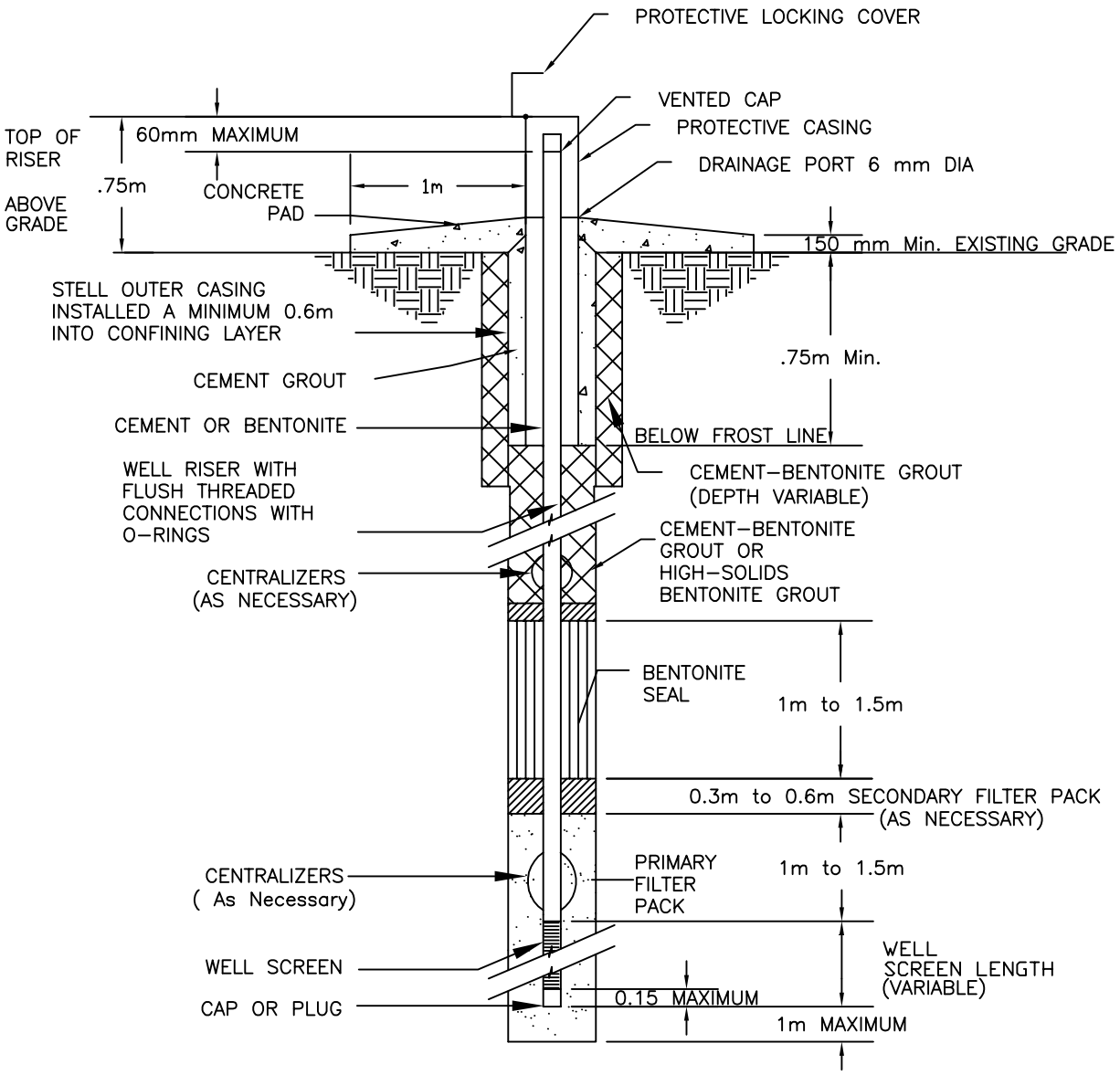
FIGURE 20-1a

SCHEMATIC CONSTRUCTION DIAGRAM OF MONITORING WELL

Date:	Prepared By:
October 2007	*URS Corp./DBC*
Scale:	**File Name:**
NO SCALE	*SOP Figure 20-1a*



Radford Army Ammuntion Plant		FIGURE 20-1b
Date: *October 2007*	**Prepared By:** *URS Corp./DBC*	**SCHEMATIC CONSTRUCTION OF SINGLE-CASED WELL WITH STICKUP COMPLETION**
Scale: *NO SCALE*	**File Name:** *SOP Figure 20-1b*	



Radford Army Ammuntion Plant		FIGURE 20-1c
Date: *October 2007*	**Prepared By:** *URS Corp./DBC*	**SCHEMATIC CONSTRUCTION OF MULTI-CASED WELL WITH CONCRETE PAD**
Scale: *NO SCALE*	**File Name:** *SOP Figure 20-1c*	

STANDARD OPERATING PROCEDURE 20.2
MONITORING WELL DEVELOPMENT

1.0 SCOPE AND APPLICATION

Well development is the process by which drilling fluids, solids, and other mobile particulates within the vicinity of the newly installed monitoring well are removed, while ensuring proper hydraulic connection to the aquifer. Development stabilizes the formation and filter pack sands around the well screen to ensure aquifer water moves freely to the well.

Well development will be initiated not less than 48 consecutive hours but no longer than 7 calendar days following grouting and/or placement of surface protection.

2.0 MATERIALS

- Work Plans;
- Well Development Form;
- Field Logbook;
- Boring Log and Well Completion Diagram for the well;
- Submersible pump, control box, associated equipment, etc;
- Photoionization detector or other appropriate monitoring instrument as specified in site-specific health and safety plan;
- Personal protective equipment and clothing (PPE) as specified in site-specific health and safety plan;
- Flow-through-cell and probes measuring specific conductance, pH, temperature, oxidation/reduction potential, dissolved oxygen, and turbidity;
- Decontamination supplies (SOP 80.1);
- Electric well level indicator and measuring tape;
- Appropriate containers for purged water and other investigation-derived material, as required; and
- Drilling tools for reverse-air circulation development, as appropriate.

3.0 PROCEDURE

3.1 SELECTING METHOD OF DEVELOPMENT

The type of subsurface conditions encountered should determine the method of well development used at a particular site at the Radford Army Ammunition Plant (RFAAP).

When monitoring wells are installed within overburden material, fractured bedrock or karst aquifers producing little sediment, a combination of mechanical surging and pumping (over pumping) or bailing is generally appropriate for well development. In general, over-pumping is the method of pumping the well at a rate higher than recharge occurs. Moving a tight-fitting surge block along the inside of the well screen to create a vacuum completes surging.

When monitoring wells are installed with solution features containing excessive amounts of sediment, reverse-circulation airlifting should be used as the initial step of development. Because reverse-circulation tools airlift methods avoid forcibly exposing the annular space to air, reverse-circulation tools can be run throughout the entire water column in the wells being developed.

After the excessive sediment has been removed by reverse-circulation airlifting, conventional pumping techniques may be used as appropriate to complete the well development.

3.2 DEVELOPMENT AND SAMPLING TIMING

Final development of monitoring wells should not be initiated any sooner than 48 hours after or more than 7 days beyond the final grouting of the well. Pre-development or preliminary development may be initiated before this 48-hour minimum period. Preliminary development may be conducted for open wells or for screened wells after installation of the well screen, casing, and filter pack but before installation of the annular seal. Pre-development is recommended when the natural formation will be used as a filter pack.
Well development should be completed at least 14 days prior to sampling.

3.3 SUMMARY OF PROCEDURES

In general, the following procedure should be followed when developing a well using the pump and surge technique:

1. Prepare the work area outside the well by placing plastic sheeting on the ground to avoid cross-contamination.
2. Calibrate water quality meters (refer to SOP 40.1).
3. Determine the depth to water and total depth of well (refer to SOP 40.2).
4. Calculate the equivalent volume (EV) of water in well to be developed (refer to SOP 30.2).
5. Pump or bail the well to ensure that water flows into it and to remove some of the fine materials from the well. Removal of a minimum of one EV is recommended at this point. The rate of removal should be high enough to stress the well by lowering the water level to approximately one-half its original level.
6. Remove pump or bailer, slowly lower a close-fitting surge block into the well until it rests below the static water level but above the screened interval. (NOTE: The latter is not required in the case of an LNAPL well.)
7. Begin a gentle surging motion along top on-third length of the screen, which will allow any material blocking the screen to break up, go into suspension, and move into the well. Note that development should always begin above or at the top of the screen and move progressively downward to prevent the surge block from becoming sand locked in the well casing. Continue surging for 5-10 minutes, remove surge block, and pump or bail the well, rapidly removing at least one EV.
8. Repeat previous step at successively lower levels within the well screen, until the bottom of the well is reached. As development progresses, successive surging can be more vigorous and of longer duration as long as the amount of sediment in the screen is kept to a minimum.
9. Development should continue until the well development criteria listed in Section 3.1.3 have been achieved.
10. All water removed must be managed as directed by the site investigation plan.

3.3.1 Well Development Criteria

In general, well development should proceed until the following criteria are met:

1. At a minimum, removal of three EV of water from the well.
2. Removal of three times of the amount of fluid (mud and/or water) lost during drilling.
3. Removal of three times the fluid used for well installation.
4. The following indicator parameters should be stabilized as indicated by three successive readings within:
    - ± 0.2 for pH;
    - ±3% for specific conductance;
    - ±10 mV for oxidation/reduction potential;
    - ± 1 degree Celsius for temperature; and
    - ±10% for turbidity and dissolved oxygen (except for wells installed in karst aquifers).
5. Well water is clear to the unaided eye (except for wells installed in karst aquifers).
6. The sediment thickness remaining within the well is less than one percent of the screen length or less than 0.1 ft for screens equal to or less than 10 feet.
7. Site specific factors should be evaluated to determine appropriate well development criteria have been if:
    - Well recharge is so slow that the required volume of water cannot be removed during 48 consecutive hours of development;
    - Water discoloration persists after the required volumetric development; and
    - Excessive sediment remains after the required volumetric development.

3.4 WELL DEVELOPMENT RECORD

Record all data as required on a Well Development Record Form (see example), which becomes a part of the complete Well Record. These data include the following:

- Project name, location;
- Well designation, location;
- Date(s) and time(s) of well installation;
- Static water level from top of well casing before and 24 hours after development;
- Depths and dimensions of the well, the casing, and the screen, obtained from the Well Diagram;
- Water losses and uses during drilling, obtained from the boring log for the well;
- Water contained in the well, obtained from calculations using the depth of the water column and the well radius, plus the radius and height of the filter pack and an assumed 30% porosity;
- Measurements of the following indicator parameters: pH, conductivity, oxidation/reduction potential, temperature, and turbidity before and after development and once during each EV;
- Notes on characteristics of the development water;
- Data on the equipment and technique used for development; and
- Estimated recharge rate and rate/quantity of water removal during development.

Well development records shall be submitted to the COR after the development has been completed.

3.5 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addendum for the site being investigated and SOP 70.1.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

6.0 REFERENCES

Aller, Linda, et al. 1989. *Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells.* National Water Well Association.

ASTM Standard D 5092-04e1. 2004. *Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers*.

EPA Groundwater Handbook. 1989.

Nielsen, David M. 1993. *Correct Well Design Improves Monitoring,* in "Environmental Protection," Vol. 4, No.7, July, 1993.

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000, 1 November.

EXAMPLE WELL DEVELOPMENT FORM

WELL DESIGNATION:_____ DATE(S) OF INSTALLATION:_____/_____/_____

SITE GEOLOGIST:_____ DEVELOPMENT DATE(S):_____/_____/_____

STATIC WATER LEVELS BEFORE AND AFTER DEVELOPMENT :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO SEDIMENT BEFORE AND AFTER DEVELOPMENT * :

BEFORE _____ DATE _____ 24 HR. AFTER _____ DATE_____

DEPTH TO WELL BOTTOM *: _____ SCREEN LENGTH _____

HEIGHT OF WELL CASING ABOVE GROUND SURFACE: _____

QUANTITY OF MUD/WATER:

LOST DURING DRILLING	(+)_____	gallons
REMOVED PRIOR TO WELL INSERTION	(-)_____	gallons
LOST DURING THICK FLUID DISPLACEMENT	(+)_____	gallons
ADDED DURING FILTER PACK PLACEMENT	(+)_____	gallons
TOTAL LOSSES	_____	gallons

(a) Water column ht. (ft.) _____ (b) Well radius (in.)_____

(c) Screen length (ft.) _____ (d) Borehole radius (in.)_____

(e) QUANTITY OF FLUID STANDING IN WELL

Install Equation Editor and double-click here to view equation. 1 _____ gallons
(Show Calculation)

(f) QUANTITY OF FLUID IN ANNULUS Install Equation Editor and double-click here to view equation. 1_____gallons
(Show Calculation)

DEVELOPMENT VOLUME = (3 * TOTAL LOSSES) + [5 * (e + f)] = _____ gallons
(Show Calculation)

* **ALL DEPTHS MEASURED FROM TOP OF WELL CASING**

EXAMPLE WELL DEVELOPMENT RECORD

WELL DESIGNATION _____ DATE(S) OF DEVELOPMENT: _____/_____/_____

TYPE AND SIZE OF PUMP:_____

TYPE AND SIZE OF BAILER:_____

DESCRIPTION OF SURGE TECHNIQUE:_____

RECORD OF DEVELOPMENT

DATE & TIME	QUANTITY REMOVED	TIME REQ'D	pH	Cond	Temp	ORD	Turb	DO	Character of water (color/clarity/ odor/partic.)
(before)									
(during)									
(during)									
(during									
(after)									

TYPICAL PUMPING RATE_____ GAL./HR. EST. RECHARGE RATE_____

TOTAL QUANTITY OF WATER REMOVED_____ TIME REQUIRED_____

REMARKS_____

SIGNATURE OF SITE GEOLOGIST_____

STANDARD OPERATING PROCEDURE 20.3
WELL AND BORING ABANDONMENT

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to establish the protocols by which all borings and wells will be abandoned. The primary objective of boring or well abandonment activities is to permanently abandon the boring or well so that the natural migration of groundwater or soil vapor is not significantly influenced.

2.0 MATERIALS

- Well abandonment equipment including appropriate grout mixing/placement equipment, and heavy equipment as appropriate (drill rig, crane, backhoe, etc.);
- Pure sodium bentonite powder with no additives (bentonite);
- Bentonite pellets (seal);
- Cement (Portland Type II); and
- Approved source water.

3.0 PROCEDURE

The volume of grout required for borehole or well abandonment should be calculated prior to proceeding with abandonment. These calculations should consider loss of material to the formation, changes in borehole diameter, potential zones of washout, and shrinkage of material. Calculations should be recorded on an abandonment record (see Section 3.1.4).

In general, cement grout should be used for boring and well abandonment per the specifications in Section 3.1 and procedures identified in the following sections. Specialized narrow diameter soil borings (3-inches or less) associated with direct push methods or hand augers may be abandoned using bentonite pellets or chips (see Section 3.5).

Any replacement borings or wells associated with the abandonment should be offset at least 20 feet from any abandoned site in a presumed up- or cross-gradient direction.

3.1 GROUT

Grout used in construction will be composed by weight of the following:

- Type II Portland cement (Type IV Portland Cement if sulfate concentrations are greater than 1,500 ppm);
- Bentonite (2 to 5% dry bentonite per 94-lb sack of dry cement); and
- A maximum of 6 to 7 gallons of approved water per 94-lb sack of cement.

Neither additives nor borehole cuttings will be mixed with the grout. Bentonite will be added after the required amount of cement is mixed with the water.

All grout material will be combined in an aboveground container and mechanically blended to produce a thick, lump-free mixture. The mixed grout will be recirculated through the grout pump before placement.

Grout placement will be performed using a commercially available grout pump and a rigid tremie pipe. Removal and grouting will be accomplished in stages, aquifer by aquifer, sealing the boring from the bottom to ground surface. This will be accomplished by placing a grout pipe to the bottom and pumping grout through the pipe until undiluted grout reaches the bottom of the next higher section of casing or, for the top-most section, until grout flows from the boring at ground surface.

After 24 hours, the abandoned drilling site will be checked for grout settlement. Any settlement will be filled with grout and rechecked 24 hours later. This process will be repeated until firm grout remains at the ground surface.

3.2 BORINGS

The term "borings" as used in this SOP applies to any drilled hole made that is not completed as a well. This includes soil test borings, soil sampling borings, and deep stratigraphic borings. Whether completed to the planned depth or aborted for any reason before reaching that depth, borings will be grouted and will be normally closed within 12 hours.

To achieve an effective seal, the borehole to be abandoned should be free of debris and foreign matter that may restrict the adhesion of the grout to the borehole wall. Borehole flushing with a tremie pipe may be required to remove such materials prior to grouting.

Each boring to be abandoned should be sealed by grouting from the bottom of the boring to the ground surface. This will be accomplished by placing a tremie pipe to the bottom of the borehole and pumping grout through the pipe at a steady rate. The grouting should be completed slowly and continuously to prevent channeling of material. The tremie pipe should be raised when pumping pressure increases significantly or when undiluted grout reaches the surface.

After 24 hours of completing the abandonment, the abandoned boring or well should be checked for any grout settlement. The settlement depression should be filled with grout and rechecked 24 hours later. Grout should be placed with a tremie pipe if the open hole is 15 feet or deeper or if the hole is not dry. Otherwise, the grout may be poured from the surface.

3.3 NARROW BORINGS

Narrow borings, those with diameter less than 3 inches, advanced by hand auger or direct push methods, may be sealed using bentonite pellets or chips rather than a grout mixture. Often times a grout pump is not available to mix the grout when these methods have been used. Bentonite pellets or chips will be poured into the boring from the ground surface. Then bentonite will hydrate by absorbing moisture from the ground; unapproved water should not be added to the boring. After 24 hours, the abandoned boring will be checked, and any grout settlement will be topped off with more bentonite. The process will be repeated until bentonite remains at ground surface unless site condition indicates otherwise.

3.4 WELLS

The following procedure applies to wells aborted before completion and existing wells determined to be ineffective or otherwise in need of closure.

General Considerations

A number of techniques are available for abandoning monitoring wells and other monitoring devices including:

- Abandonment in place by grouting the well screen and casing in place;
- Removal of the well by pulling; and
- Overdrilling.

The particular method used for abandonment should be specified in the work plan addenda developed for a site-specific investigation. Several factors must be considered when selecting the appropriate abandonment technique including well construction, well condition, and subsurface conditions.
In general the preferred method for abandonment of wells is to remove all existing well materials to:

- Reduce the potential for the formation of a vertical conduit to occur at the contact between the casing and annular seal;
- Reduce the potential for well materials interfering with the abandonment procedures; and
- Decrease the potential for reaction between the well materials and grout used for abandonment.

In general, all well materials will be removed during abandonment (including screen and casing) by either pulling out the casing, screen, and associated materials or by overdrilling using a rotary or hollow stem auger drilling procedure.

Abandonment with Well Materials In Place

In the event that it is not possible to remove the casing and screen, the casing and screen will be perforated using a suitable tool. A minimum of four rows of perforations several inches long and a minimum of five perforations per linear foot of casing or screen is recommended.

After the screen and casing have been appropriately perforated, the well should be abandoned by grouting from the bottom of the well to the ground surface using a tremie pipe as described in Section 3.2. The tremie pipe should be raised when pumping pressure increases significantly or when undiluted grout reaches the surface.

After 24 hours of completing the abandonment, the abandoned well should be checked for any grout settlement. The settlement depression should be filled with grout and rechecked 24 hours later. Grout should be placed with a tremie pipe if the open hole is 15 feet or deeper or if the hole is not dry. Otherwise, the grout may be poured from the surface.

Abandonment by Removal

Site conditions permitting, relatively shallow monitoring wells may be successfully abandoned by removal providing that the well is generally good condition and sections of casing (including screen) can be successfully removed with materials intact.

This method of abandonment is generally accomplished by removing (pulling) sections of casing and screen out of the subsurface using a drill rig, backhoe, crane, etc. of sufficient capacity. Materials with lower tensile strength such as polyvinyl chloride (PVC) generally cannot be removed by pulling if they have been appropriately cemented in place.

Once the well materials have been removed from the borehole, the borehole should be abandoned by grouting in the same manner discussed for borings in Section 3.2. If the borehole collapses after removal of well materials, then the borehole should be over drilled to remove all material and then grouted to the surface.

Overdrilling

With this method of abandonment, the well materials are removed by overdrilling (overreaming) the well location. Overdrilling using rotary techniques may be accomplished using an overreaming tool. This tool consists of a pilot bit that is approximately the same size as the inner diameter of well casing and a reaming bit that is slightly larger than the diameter of the borehole. As drilling proceeds, all well materials are destroyed

and returned to the surface. After completion of the overdrilling, the borehole should be immediately grouted with a tremie pipe as described in Section 3.2.

In the case of overburden wells, a hollow stem auger may be used for overdrilling providing that this method of drilling appropriate for the subsurface conditions. The hollow stem auger should be equipped with outward facing carbide-cutting teeth with a diameter 2 to 4 inches larger than the well casing. With this method, the casing guides the cutting head and remains inside the auger. When the auger reaches the bottom of the well boring and the well materials have been removed, the borehole may be grouted with a tremie pipe (Section 3.2) through the augers as the augers are gradually withdrawn.

Considerations for Fractured Bedrock and Karst Wells

Multi-cased wells completed into bedrock as screened wells, open wells, or open-lined wells may be abandoned with the outer casing left in place providing that the integrity of this casing and associated annular seal is good. A cement bond log (acoustic amplitude boring geophysical log) may be used to evaluate the integrity of the casing and annular seal, if the outer casing is to be left in place.

Borings or wells completed in karst zones may be difficult to abandon because of the potential presence of large conduits, which may make it difficult to grout. Where large conduits exist or difficulties are encountered when abandoning a boring or well, fill the portion of the borehole penetrating the solution cavity with inert gravel (quartz, claystone, etc.). Packers can be used to isolate critical intervals for filling with grout above and below these zones.

3.5 RESTORATION

All work areas around the borings or wells abandoned should be restored to a condition essentially equivalent to that before the borings and wells were installed.

3.6 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material should be managed in accordance with the requirements of SOP 70.1 and the work plan addenda associated with the site investigation

3.7 DOCUMENTATION

For each abandoned boring or well, a record should be prepared to include the following as appropriate:

- Project and boring/well designation;
- Location with respect to replacement boring well (if any);
- Open depth of well/annulus/boring prior to grouting;
- Casing or items left in hole by depth, description, composition, and size;
- Copy of the boring log;
- Copy of construction diagram for abandoned well;
- Reason for abandonment;
- Description and total quantity of grout used initially;
- Description and daily quantities of grout used to compensate for settlement;
- Disposition of investigation-derived material;
- Water or mud level prior to grouting and date measured; and
- Remaining casing above ground surface, height above ground surface, size, and disposition of each.

Daily investigation activities at the site related to boring and well abandonment should be recorded in field logbooks as described in SOPs 10.1 and 10.2.

4.0 PRECAUTIONS

Refer to the health and safety plan associated with the Work Plan Addenda and the Master Health and Safety Plan.

5.0 REFERENCES

ASTM Standard D 5299-99 (2005). 2005. *Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities.*

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000, 1 November.

STANDARD OPERATING PROCEDURE 20.11
DRILLING METHODS AND PROCEDURES

1.0 SCOPE AND APPLICATION

The use of an appropriate drilling procedure is contingent upon the existing conditions at the project site. The purpose of this standard operating procedure (SOP) is to outline procedures for the various methods of soil and rock drilling identified in the Master Work Plan. In addition it provides procedures for using sampling devices commonly used during soil and rock drilling such as split-barrel sampling, thin walled tube sampling, direct push samplers, and rock coring. For a particular site investigation, the associated work plan addendum will identify the appropriate drilling method and method of sampling, along with proposed sampling depths and intervals and any special procedures or methods.

2.0 MATERIALS

The following types of materials are generally appropriate for drilling:

2.1 SPLIT-BARREL SAMPLING

- Split barrel sampler;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.2 THIN WALLED TUBE SAMPLING

- Thin walled tubes;
- Sealing materials for sample such as sealing wax, metal disks, wood disks, tape, cheesecloth, caps, etc;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.3 DIRECT PUSH SAMPLING

- Direct push unit with hydraulic ram, hammer, etc;
- Sample collection devices, associated equipment and expendable supplies such as sample liners, sample retainers, appropriate lubricants, etc;
- Hollow extension rods;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;

- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.4 HOLLOW-STEM AUGER DRILLING

- Drill rig and associated equipment;
- Hollow stem auger assemblies for drilling to appropriate depth including auger heads, drive assembly, pilot assembly, and hollow-stem auger sections;
- Auxiliary devices such as wrenches, auger forks, hoisting hooks, swivels, and adaptors;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.5 DIRECT AIR ROTARY DRILLING

- Drill rig with rotary table and Kelly or top-head drive unit;
- Drill rods, bits, and core barrels (as appropriate);
- Casing;
- Sampling devices and equipment, as appropriate;
- Air compressor and filters, pressure lines, discharge hose, swivel, dust collector, and air-cleaning device (cyclone separator);
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.6 DRILL-THROUGH CASING DRIVER

- Drill rig equipped with a mast-mounted, percussion driver;
- Casing, drill rods, and drill bits or hammers;
- Air compressor and filters, pressure lines, discharge hose, swivel, dust collector, and air-cleaning device (cyclone separator);
- Sampling devices and equipment, as appropriate;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Welding equipment and materials for installation of casing;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and

- Decontamination supplies and equipment per SOP 80.1.

2.7 DIRECT WATER-BASED ROTARY DRILLING

- Drill rig with derrick, rotary table and Kelly or top-head drive unit;
- Drill rods, bits, and core barrels (as appropriate);
- Casing;
- Water based drilling fluid, with approved additives as appropriate;
- Mud tub, suction hose, cyclone de-sander(s), drilling fluid circulation pump, pressure hose, and swivel;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1.
- Decontamination supplies and equipment per SOP 80.1.

2.8 DIRECT ROTARY WIRELINE-CASING ADVANCEMENT DRILLING

- Drill rig with either hollow spindle or top-head drive;
- Drill rods, coring or casing bits, overshot assembly, pilot bit, and core barrel;
- Water based drilling fluid, with approved additives as appropriate;
- Mud tub, suction hose, drilling fluid circulation pump, pressure hose, and swivel;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

2.9 DIAMOND CORE DRILLING

- Direct rotary drill rig and associated equipment (see Sections 2.4, 2.5 or 2.6);
- Core barrels and core bits;
- Core lifters;
- Core boxes, engineers scale, permanent marking pen, and camera for photographing cores;
- Auxiliary tools for handling, assembling, and disassembling tools and samplers;
- Borehole logging materials per SOP 10.3 and sampling equipment and materials, as appropriate per SOP 30.1;
- Containers to manage investigation-derived material per SOP 70.1; and
- Decontamination supplies and equipment per SOP 80.1.

3.0 PROCEDURES

3.1 PENETRATION TEST AND SPLIT-BARREL SAMPLING OF SOILS

The following general procedure may be followed as outlined in ASTM Standard Test Method D 1586.

1. Advance the boring to the desired sampling depth using an appropriate drilling method (see sections below) and remove excessive cuttings from the borehole.
2. Attach the split-barrel sampler to the sampling rods and lower into the borehole. Do not allow the sampler to drop onto the soil to be sampled.
3. Position the hammer above and attach the anvil to the top of the drilling rods.
4. Rest the dead weight of the sampler, rods, anvil, and drive weight on the bottom of the boring and apply a seating blow. If excessive cuttings are encountered at the bottom of the borehole, remove the sampler and rods from borehole and remove the cuttings.
5. Mark the drill rods in three successive 6-inch increments so that the advance of the sampler can be observed.
6. Drive the sampler with blow from the 140 pound hammer and count the number of blows applied in each 6-inch increment until:
   a. Fifty (50) blows have been applied during one of the three 6-inch increments.
   b. A total of 100 blows have been applied.
   c. There is no observed advance of the sampler during the application of 10 successive blows of the hammer.
7. The sampler is advanced the complete 18-inches without the limiting blow counts occurring as described above.
8. Record the number of blows that is required to achieve each 6-inch increment of penetration or fraction of this increment on the boring.
   a. The first 6 inches is considered the seating driver.
   b. The sum of the second and third 6-inch penetration intervals is termed the “standard penetration resistance” or “N-value.”
   c. If the sampler is driven less than 18 inches as discussed in No. 6, then the number of blow for each partial increment will be recorded.
   d. For partial increments, the depth of penetration should be recorded to the nearest 1-inch on the boring log.
   e. If the sampler advances below the bottom of the boring under the weight of rods (static) and/or hammer, then this information will be recorded on the boring log.
9. The raising and dropping of the 140 pound hammer may be accomplished by:
   a. Using a trip, automatic, or semi-automatic hammer drop system that lifts the hammer and allows it to drop 30± 1 inches.
   b. Using a cathead shall be essentially free of rust, oil, or grease and have a diameter in the range of 6 to 10 inches. The cathead should be operated at a minimum speed of rotation of 100 revolutions per minute. No more than 2-1/4 rope turns on the cathead may be used when conducting the penetration test.

10. For each hammer blow, a 30-inch lift and drop shall be used.
11. After completing the penetration test, retrieve the sampler and open. Record the percent recovery or the length of sample recovered. Following the procedures outlined in SOP 30.1 when collecting environmental soil samples.
12. Borehole logging should be completed per SOP 10.3.
13. Split-barrel samples must be decontaminated before and after each use per the requirements of SOP 80.1.

3.2 THIN WALLED TUBE SAMPLING

The following general procedure may be followed for collection of relatively undisturbed, thin walled tube samples (e.g., Shelby tube) as outlined in ASTM Standard Practice D 1587.

1. Clean out the borehole to targeted sampling depth using most appropriate method, which avoids disturbing the material to be sampled. If groundwater is encountered, maintain the liquid level in the borehole at or above the groundwater level during sampling.
2. Place the sample tub so that its bottom rests on the bottom of the borehole.
3. Advance the sampler without rotation by a continuous relatively rapid motion.
4. Determine the length of the advance by the resistance and condition of the formation, the length of the advance should never exceed 5 to 10 diameters of the tube in sands and 10 to 15 diameters of the tube in clay.
5. When the formation is too hard for push type of sampling, the tube may be driven or the practice used for ring-lined barrel sampling may be used per ASTM Standard D 3550. When a sample is driven, the weight and fall of the hammer must be recorded along with the penetration achieved.
6. The maximum length of sample advance will be no longer than the sample-tube length minus an allowance for the sample head and a minimum of 3-inches for sludge-end cuttings.
7. Upon removal of the tube, measure the length of the sample in the tube. Remove the disturbed material in the upper end of the tube and re-measure the sample length.
8. Remove at least one-inch of material from the lower end of the tube for soil description and identification per SOP 10.3. Measure the overall sample length. Seal the lower end of the tube. If directed, the material from the end of the tube will not be removed for soil identification and description; in this case the tube will be sealed promptly.
9. Prepare sample labels and affix (or markings) on the tube.

3.3 DIRECT PUSH SOIL BORING

The following general procedures outlined in this section may be followed as described in ASTM Standard Test Method D 6282.

General considerations for this method include the following:

- A variety of direct push drive systems may be used to advance soil borings based on the intended sampling depths and subsurface conditions and include the following:

Shallower Depths and Less Difficult Conditions

- Percussive driving systems – use hydraulically operated hammers and mechanically operated hammers.
- Static push drive systems – use hydraulic rams to apply pressure and exert static pull (e.g., cone penetrometer systems).
- Vibratory/sonic systems – use a vibratory device, which is attached to the top of the sampler extension rods.

Greater Depths and More Difficult Conditions

- Sonic or resonance drilling systems – use a high power vibratory system to advance larger diameter single or dual tube systems.
- Rotary drilling equipment – use hydraulic system of drill rig for direct push.

- The equipment used for direct push must be capable of apply sufficient static force, or dynamic force, or both, to advance the sampler to the required depth of collection. Additionally, this equipment must have adequate retraction force to remove the sampler and extension/drive rods once the sample has been collected.
- Avoid using excessive down pressure when advancing the drilling tools/sampler. Excessive pressure may cause the direct push unit to offset from the boring location and may damage drilling tools and samplers.
- Sample liners should be compatible with the material being sampled and the type of analysis to be conducted on the sample. Sealing of liners for submittal to the laboratory for physical testing should be accomplished according to ASTM Standard D 4220 (Standard Practice for Preserving and Transporting Soil Samples).
- The general procedure for completing direct push soil borings is the following:

1. Stabilize direct push unit and raise mast at desired location.
2. Attach the hammer assembly to the drill head if not permanently attached. Attach the anvil assembly in the prescribed manner, slide the direct push unit the position over the borehole, and ready the tools for insertion.
3. Inspect the direct push tools before and after use. Decontaminate all down hole tools before and after use per SOP 80.1.
4. Inspect drive shoes for damaged cutting edges, dents or thread failures and these conditions could cause loss of sample recovery and slow the rate of advancement.
5. Assemble samplers and install where required, install sample retainers where needed, and install and secure sampler pistons to ensure proper operation where needed (see Steps 14 through 20 for the various sampler assembly procedures, etc.).
6. After sampler has been appropriately installed (see Steps 14 through 20 for installation procedures, etc.) advance the boring to the target sampling depth using an appropriate direct push technique, as identified above under general considerations.
7. Collect the soil sample from the target sampling depth using one of the methods identified in Steps 14 through 20.
8. Retrieve the sampler and appropriately process the soil sample as identified in Steps 14 through 20 below and in SOP 30.1.
9. Log the borehole per the requirements of SOP 10.3.
10. If collecting another soil sample, decontaminate the sampler for reuse per the requirements of SOP 80.1 or use another decontaminated sampler.

11. Appropriately manage investigation-derived material (discarded samples, decontamination fluids, etc.) per SOP 70.1.
12. Upon completion of the boring and collection of the desired soil samples, abandon the boring per the requirements of SOP 20.2.
13. The following single tube sampling systems (generally piston rod) may be used to collect soil samples (see Steps 14 through 16 below):
    a. Open Solid Barrel Sampler;
    b. Closed Solid Barrel Sampler (e.g. Geoprobe Macro-Core® Piston Rod Sampler); and
    c. Standard Split Barrel Sampler (see Section 3.1).
14. The following two tube sampling systems may be used to collect soil samples (see Steps 17 through 20 below):
    a. Split Barrel Sampler;
    b. Thin Wall Tubes;
    c. Thin Wall Tube Piston Sampler; and
    d. Open Solid Barrel Samplers.
15. Sampling with the single tube, open solid barrel sampler:
    a. Attach the required liner to the cutting shoe by insertion into the machined receptacle are or by sliding over the machined tube.
    b. Insert the liner and shoe into the solid barrel and attach the shoe.
    c. Attach the sampler head to the sampler barrel.
    d. Attach the sampler assembly to the drive rod and the drive head to the drive rod.
    e. Position the sampler assembly under the hammer anvil and advance the sampler assembly into the soil at a steady rate slow enough to allow the soil to be cut by the shoe and move up into the sample barrel.
    f. At the completion of the sampling interval, removal the sampler from the borehole. Remove the filled sampler liner from the barrel by unscrewing the shoe. Cap the liner for laboratory testing or split open for field processing (see SOP 30.1).
    g. Log the borehole per the requirements of SOP 10.3.
16. Sampling with the closed, solid barrel sampler (e.g., Macro-Core® sampler).
    a. Insert or attach the sample liner to the shoe and insert the assembly into the solid barrel sampler. Install the sample, retaining basket, if desired.
    b. Attach the latch coupling or sampler head to the sampler barrel, and attach the piston assembly with point and "O" rings if free water is present, to the latching mechanism.
    c. Insert the piston or packer into the liner to its proper position so that the point leads the sampler shoe. Set latch, charge packer, or install locking pin, and attach assembled sampler to drive rod.
    d. Add drive head and position under the hammer anvil. Apply down pressure, and hammer if needed, to penetrate the soil strata above the targeted sampling interval.
    e. When the sampling interval is reached, insert the piston latch release and recovery tool, removing the piston, or insert the locking pin removal/extension rods through the drive rods, turn counter clockwise, and remove the piston locking pin so the piston can float on top of the sample, or release any other piston holding device.
    f. Direct push or activate the hammer to advance the sampler the desired interval.

g. Retrieve the sampler from the borehole by removing the extension/drive rods. Remove the shoe, and withdraw the sample line with sample for processing (see SOP 30.1).

h. Clean and decontaminate the sampler, reload as described above and repeat the same procedure for collection of addition samples.

i. Log the borehole per the requirements of SOP 10.3.

17. Sampling with standard split barrel (split spoon) sampler generally consists of the following:

a. Attach the split barrel sampler to an extension rod or drill rod.

b. Using a mechanical or hydraulic hammer drive the ampler into the soil the desired interval. The maximum interval that should be driven is equal to the sample chamber length of the split barrel sampler, which is either 18-inches or 24-inches.

c. Retrieve the sampler from the borehole by removing the extension/drive rods.

d. Split the sampler open for field processing (see SOP 30.1).

e. Clean and decontaminate the sampler (SOP 80.1), re-attach and repeat the same procedure for collection of additional samples.

f. Log the borehole per the requirements of SOP 10.3.

18. Sampling with a two tube, split barrel sampler generally consists of the following:

a. Assemble the outer casing with the drive shoe on the bottom, attach the drive head to the top of the outer casing, and attach the sampler to the extension rods.

b. Connect the drive head to the top of the sampler extension rods, and insert the sampler assembly into the outer casing.

c. The cutting shoe of the sampler should contact the soil ahead of the outer casing to minimize sample disturbance.

d. The sample barrel should extend a minimum of 0.25 inches ahead of the outer casing.

e. Mark the outer casing to identify the required drive length, position the outer casing and sampler assembly under the drill head.

f. Move the drill head downward to apply pressure on the tool string. Advance the casing assembly into the soil at a steady rate, which is slow enough to allow the soil to be cut by the shoe and move up inside the sample barrel.

g. Occasional hammer action during the push may assist recovery.

h. If smooth push advancement is not possible because of subsurface conditions, use the hammer to advance the sampler.

i. Stop the application of pressure or hammering when target interval has been sampled. Move the drill head off the drive head. Attach a pulling device to the extension rods or position the hammer bail and retrieve the sampler from the borehole.

j. At the surface, remove the sampler from the extension rods and process the sample per Section 3.01 and SOP 30.1.

k. Log the borehole per the requirements of SOP 10.3.

19. Sampling with a two tube, thin wall tube sampler generally consists of the following:

a. Attach the tube to the tube head using removable screws.

b. Attach the tube assembly to the extension rods and position at the base of the outer casing shoe protruding a minimum of 0.25 inches to contact the soil ahead of the outer casing.

c. Advance the tube with or without the outer casing at a steady rate.

d. After completing the sampling interval, let the tube remain stationary for one minute. Rotate the tube slowly two revolutions to shear off the sample.

e. Remove the tube from the borehole and measure the recovery, and log the borehole per the requirements of SOP 10.3.

f. For field processing, extrude the sample from the tube sampler and process per SOP 30.1. Alternatively, the tube may be sealed and shipped to the laboratory.

20. Sampling with two tube, thin wall tube, piston sampler generally consists of the following:

    a. Check the fixed piston sampling equipment for proper operation of the cone clamping assembly and the condition of the "O" rings.

    b. Slide the thin wall tube over the piston, and attach it to the tube head. Position the piston at the sharpened end of the thin wall tube just above the sample relief bend.

    c. Attach the tube assembly to the extension rods and lower the sampler into position through the outer casing. Install the actuator rods through the extension rod, and attach to the actuator rod in the sampler assembly.

    d. Attach a holding ring to the to top of the actuator rod string and hook the winch cable or other hook to the holding ring to hold the actuator rods in a fixed position.

    e. Attach the pushing fork to the drill head/probe hammer and slowly apply downward pressure to the extension rods advancing the thin wall tube over the fixed piston into the soil for the length of the sampling interval.

    f. After completing the sampling interval, let the tube remain stationary for one minute. Rotate the tube slowly one revolution to shear off the sample.

    g. Remove the tube sampler from the borehole and measure the recovery, and log the borehole per the requirements of SOP 10.3.

    h. For field processing, extrude the sample from the tube sampler and process per SOP 30.1.

21. Sampling with an two tube, open solid barrel sampler generally consists of the following:

    a. This sampling technique may be used when soil conditions prevent advancement of a split barrel sampler or advancement of an outer casing.

    b. The solid, single, or segmented barrel sampler requires the use of a liner.

    c. Use sampler in advance of outer casing when this casing cannot be advanced.

    d. Follow the procedures outlined for two tube, split barrel sampling.

3.4 HOLLOW-STEM AUGER DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5784.

1. Stabilize drill rig and raise mast at desired location.
2. Attach an initial assembly of hollow-stem auger components (hollow stem auger, hollow auger head, center rod and pilot assembly, as appropriate) to the rotary drive of the drill rig.
3. Push the auger assembly below the ground surface and initiate rotation at a low velocity.
4. Decontamination of auger head may be necessary after this initial penetration if this surface soil is contaminated.
5. Continue drilling from the surface, usually at a rotary velocity of 50 to 100 rotations per minute to the depth where sampling or in-situ testing is required or until the drive assembly is within approximately 6- to 18 inches of the ground surface.
6. As appropriate, collect a soil sample from the required depth interval. The sample may be conducted by

a. Removing the pilot assembly, if used, and inserting and driving a sampler through the hollow stem auger of the auger column; or

b. Using a continuous sampling device within the lead auger section, where the sampler barrel fills with material as the auger is advanced.

7. Additional sections of hollow stems augers may be added to drill to a greater depth. After these auger sections are added, rotation of the hollow-stem auger assembly may be resumed.

8. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings may be required to isolate zones suspected contamination (see SOP 20.1). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.

   Monitoring wells or piezometers may be installed using hollow-stem augers by:

   a. Drilling with or without sampling to the target depth.

   b. Removal of the pilot assembly, if used, and insertion of the monitoring well (or piezometer) assembly.

   c. The hollow stem auger column should be removed incrementally as the monitoring well (or piezometer) completion materials are placed (see SOP 20.1 for grouting).

9. If materials enter the bottom of the auger hollow stem during the removal of the pilot assembly, it should be removed with a drive sampler or other appropriate device.

10. If sampling or *in-situ* testing is not required during completion of the boring, the boring may be advanced with an expendable knock out plate or plug of an appropriate material instead of a pilot assembly.

11. Drill cuttings should be appropriately controlled and contained as IDM per SOP 70.1. It may be necessary to drill through a hole of sheet of plywood or similar material to prevent cuttings from contacting the ground surface.

12. The hollow-auger assembly and sampling devices must be decontaminated before and after each use per the methods specified in SOP 80.1.

13. Borehole logging should be completed per SOP 10.3.

14. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.5 DIRECT AIR ROTARY DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5784.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the cyclone separator and seal it to the ground surface considering the prevailing wind direction (exhaust).

2. Establish point for borehole measurements.

3. Attach an initial assembly of a bit, down hole hammer, or core barrel with a single section of drill rod, below the rotary table or top-head drive unit, with the bit placed below the top of the dust collector.

4. Activate the air compressor to circulate air through system.

5. Initiate rotation of bit.

6. Continue with air circulation and rotation of the drill-rod column to the depth where sampling or in-situ testing is required or until the length of the drill rod section limits further penetration.

7. Monitor air pressure during drilling operations. Maintain low air pressure at bit to prevent fracturing of surrounding material.

8. Stop rotation and lift the bit slightly off the bottom of the hole to facilitate removal of drill cuttings and continue air circulation until the drill cuttings are removed from the borehole annulus.

9. Open reaching a desired depth of sampling, stop the air circulation and rest bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.
10. When sampling, remove the drill rod column from the borehole or leave the drill rod assembly in place if the sampling can be performed through the hollow axis of the drill rods and bit.
11. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
12. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it is recommended that the minimum depth below the sampler/bit be 18 inches for testing. Record the depth of sampling or in-situ testing and the depth below the sampler/bit.
13. The procedure described in Steps 8 through 12 should be conducted for each sampling or testing interval.
14. Drilling to a greater depth may be accomplished by attaching an additional drill rod section to the top of the previously advanced drill-rod column and resuming drilling operations as described above.
15. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings may be required to isolate zones suspected contamination (see SOP 20.1 for grouting requirements). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.
16. Monitoring wells or piezometers may be installed by:
    a. Drilling with or without sampling to the target depth.
    b. Removal of the drill rod assembly and insertion of the monitoring well (or piezometer) assembly.
    c. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).
17. Drill cuttings should be appropriately controlled and contained as IDM per SOP 70.1.
18. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
19. Borehole logging should be completed per SOP 10.3.
20. Borehole abandonment, when required, should be conducted according to SOP 20.3

3.6 DRILL-THROUGH CASING DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5872.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the cyclone separator and seal it to the ground surface considering the prevailing wind direction (exhaust).
2. Establish point for borehole measurements.
3. Attach an initial assembly of a bit or down hole hammer with a single section of drill rod and casing to the top-head drive unit.
4. Activate the air compressor to circulate air through system.
5. Drilling may be accomplished by
    a. Method 1- the casing will fall, or can be pushed downward behind the bit.
    b. To drill using Drive the casing first followed by drilling out the plug inside the casing.
    c. Method 2 - Advancing the casing and bit as a unit, with the drill bit or hammer, extending up to 12-inches below the casing.
6. Method 3 - Under reaming method where bit or hammer pens a hole slightly larger than the casing so that Method 1, drive the casing first and drill out the plug in the casing by moving the bit or hammer beyond

the casing and then withdrawing it into the casing. Air exiting the bit will remove the cuttings up the hole. Separate cuttings from the return air with a cyclone separator or similar device.

7. To drill using Method 2, advance casing and bit as unit with the bit or hammer extending up to 12-inches beyond the casing depending on the conditions. While drilling, occasionally stop the casing advancement, retract the bit or hammer inside the casing to clear and maintain air circulation to clear cuttings.
8. To drill using Method 3, use a special down hole bit or hammer to open a hole slightly larger than the outside diameter of the casing so that the casing will fall or can be pushed downward immediately behind the bit. After advancing the casing, retract the radial dimension of the drill bit to facilitate removal of the down hole bit or hammer and drill tools inside the casing. Cuttings are removed from the borehole with the air that operates the bit or hammer and can be separated from the air with a cyclone separator or similar device.
9. Monitor air pressure during drilling operations. Maintain low air pressure at bit or hammer to prevent fracturing of surrounding material.
10. Continue air circulation and rotation of the drill rod column until drilling is completed to the target depth (for sampling, in-situ sampling, etc.) or until the length of the drill-rod section limits further penetration.
11. Stop rotation and lift bit or hammer slightly off the bottom of the hole to facilitate removal of drill cuttings and continue air circulation until the drill cuttings are removed from the borehole annulus.
12. After reaching a desired depth of sampling, stop the air circulation and rest the bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.
13. When sampling, remove the drill rod column from the borehole. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
14. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it is recommended that the minimum depth below the sampler/bit be 18 inches for testing. Record the depth of sampling or in-situ testing and the depth below the sampler/bit.
15. The procedure described in Steps 11 through 14 should be conducted for each sampling or testing interval.
16. Drilling to a greater depth may be accomplished by attaching an additional drill rod section and casing section to the top of the previously advanced drill-rod column/casing and resuming drilling operations as described above.
17. Monitoring wells or piezometers may be installed by:
    a. Casing advancement in increments, with or without sampling to the target depth.
    b. Removal of the drill rods and the attached drill bit while the casing is temporarily left in place to support the borehole wall.
    c. Insertion of the monitoring well (or piezometer) assembly.
    d. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).
18. Drill cuttings should be appropriately controlled and contained as IDM per SOP 70.1.
19. The drill rod assembly, casing, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
20. Borehole logging should be completed per SOP 10.3.
21. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.7 DIRECT WATER-BASED ROTARY DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5783.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the mud tub and install surface casing and seal at the ground surface.
2. Establish point for borehole measurements.
3. Attach an initial assembly of a bit or core barrel with a single section of drill rod, below the rotary table or top-head drive unit, with the bit placed with the top of the surface casing.
4. Activate the drilling-fluid circulation pump to circulate drill fluid through the system.
5. Initiate rotation of bit and apply axial force to bit.
6. Document drilling conditions and sequence (fluid loss, circulation pressures, depths of lost circulation, etc.) as described in SOP 10.3.
7. Continue with drill fluid circulation as rotation and axial force are applied to the bit until drilling to the depth
    a) Where sampling or in-situ testing is required;
    b) Until the length of the drill rod section limits further penetration; or
    c) Until core specimen has completely entered the core barrel (when coring) or blockage has occurred.
8. Stop rotation and the lift bit slightly off the bottom of the hole to facilitate removal of drill cuttings and continue fluid circulation until the drill cuttings are removed from the borehole annulus.
9. After reaching a desired depth of sampling, stop the fluid circulation and rest the bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.
10. When sampling, drill rod removal is not necessary if the sampling can be performed through the hollow axis of the drill rods and bit.
11. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
12. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it is recommended that the minimum depth below the sampler/bit be 18 inches for testing. Record the depth of sampling or in-situ testing and the depth below the sampler/bit.
13. The procedure described in Steps 8 through 11 should be conducted for each sampling or testing interval.
14. Drilling to a greater depth may be accomplished by attaching an additional drill rod section to the top of the previously advanced drill-rod column and resuming drilling operations as described above.
15. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings may be required to isolate zones suspected contamination (see SOP 20.1 for grouting requirements). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.
16. Monitoring wells or piezometers may be installed using hollow-stem augers by:
    a. Drilling with or without sampling to the target depth.
    b. Removal of the drill rod assembly and insertion of the monitoring well (or piezometer) assembly.
    c. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).
17. Drill cuttings and fluids should be appropriately controlled and contained as IDM per SOP 70.1.

18. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
19. Borehole logging should be completed per SOP 10.3.
20. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.8 DIRECT ROTARY WIRELINE CASING ADVANCEMENT DRILLING

The following general procedure may be followed as outlined in ASTM Standard Guide D 5876.

1. Stabilize drill rig and raise mast at desired location. Appropriately position the mud tub (for water based rotary) and install surface casing and seal at the ground surface.
2. Record the hole depth by knowing the length of the rod-bit assemblies and comparing its position relative to the established surface datum.
3. Attach an initial assembly of a lead drill rod and a bit or core barrel below the top-head drive unit, with the bit placed with the top of the surface casing.
4. Activate the drilling-fluid circulation pump to circulate drill fluid through the system.
5. Initiate rotation of bit and apply axial force to bit.
6. Document drilling conditions and sequence (fluid loss, circulation pressures, depths of lost circulation, down feed pressures etc.) as described in SOP 10.3.
7. In general, the pilot bit or core barrel can be inserted or removed at any time during the drilling process and the large inside diameter rods can act as a temporary casing for testing or installation of monitoring devices.
8. Continue with drill fluid circulation as rotation and axial force are applied to the bit until drilling to the depth
    a) Where sampling or in-situ testing is required;
    b) Until the length of the drill rod section limits further penetration; or
    c) Until core specimen has completely entered the core barrel (when coring) or blockage has occurred.
9. Stop rotation and lift the bit slightly off the bottom of the hole to facilitate removal of drill cuttings and continue fluid circulation until the drill cuttings are removed from the borehole annulus.
10. After reaching a desired depth of sampling, stop the fluid circulation and rest the bit on bottom of hole to determine the depth. Record the borehole depth and any resultant caving in. If borehole caving is apparent set a decontaminated casing to protect the boring.
11. When sampling, drill rod removal is not necessary if the sampling can be performed through the hollow axis of the drill rods and bit.
12. Compare the sampling depth to clean-out depth by first resting the sampler on the bottom of the hole and compare that measurement with the clean-out depth measurement.
13. If bottom-hole contamination is apparent (indicated by comparison of sample depth to clean-out depth), it may be necessary to further clean the hole by rotary recirculation.
14. Continuous sampling may be conducted with a soil core barrel or rock core barrel (see Section 1.7).
15. The pilot bit or core barrel may need to be removed during drilling such as when core barrels are full or there is evidence of core blocking. Before the drill string is reinserted, the depth of the boring should be rechecked to evaluate hole quality and determine whether casing may be required.

16. Water testing may be performed in consolidated deposits by pulling back on the drill rods and passing inflatable packer(s) with pressure fitting to test the open borehole wall (see ASTM Standards D 4630 and D 4631).
17. Drilling to a greater depth may be accomplished by attaching an additional drill rod section to the top of the previously advanced drill-rod column and resuming drilling operations as described above.
18. When drilling through material suspected of being contaminated, the installation of single or multiple (nested) outer casings might be required to isolate zones suspected contamination (see SOP 20.1 for grouting requirements). Outer casings may be installed in a pre-drilled borehole or using a method in which casing is advanced at the same of drilling.
19. Monitoring wells or piezometers may be installed by:
    a. Drilling with or without sampling to the target depth.
    b. Removal of the pilot bit or core barrel and insertion of the monitoring well (or piezometer) assembly.
    c. Addition of monitoring well (or piezometer) completion materials (see SOP 20.1).
20. Drill cuttings and fluids should be appropriately controlled and contained as IDM per SOP 70.1.
21. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
22. Borehole logging should be completed per SOP 10.3.
23. Borehole abandonment, when required, should be conducted according to SOP 20.3.

3.9 DIAMOND CORE DRILLING

The following general procedure may be followed as outlined in ASTM Standard Practice D 2113.

1. Use core-drilling procedures, such as the water-rotary drilling method outlined in Section 3.6.
2. Seat the casing on bedrock or firm formation to prevent raveling of the borehole and to prevent loss of drilling fluid. Level the formation that the casing will be seated on as needed.
3. Begin core drilling using an N-size double-tube, swivel-type core barrel or other approved size or type. Continue core drilling until core blockage occurs or until the net length of the core has been drilled.
4. Remove the core barrel from the borehole, and dis-assemble the core barrel as necessary to remove the core.
5. Reassemble the core barrel and return it to hole.
6. Continue core drilling.
7. Place the recovered core in the core box with the upper (surface) end of the core at the upper-left corner of the core box. Wrap soft or friable cores, etc. as needed or required. Use spacer blocks or slugs properly marked to indicate any noticeable gap in recovered core that might indicate a change or void in the formation. Fit fracture, bedded, or jointed pieces of core together as they naturally occurred.
8. The core within each completed box should be photographed after core surface has been cleaned or peeled, as appropriate, and wetted. Each photo should be in sharp focus and contain a legible scale in feet and tenths of feet (or metric if appropriate). The core should be oriented so that the top of the core is at the top of the photograph. A color chart should be included in the photograph frame as a check on photographic accuracy. The inside lid of the box should also be shown.
9. The inside of the box lid should be labeled at a minimum with the facility name, project name, boring number, box number, and core interval.

10. A preliminary field log of the core must be completed before the core box has been packed for transport (see SOP 10.3). Detailed logging may be conducted at a later time providing the core is appropriately handled and transported.
11. Four levels of sample protection may be used depending on character of the rock and the intended use of the rock core including:
    a. *Routine care* – for rock cored in 5 to 10 foot runs. Consists of placing in structurally sound boxes. Lay flat tubing may be used prior to placing the core.
    b. *Special care* – for rock samples to be tested that are potentially moisture sensitive, such as shale. This care consists of sealing with a tight fitting wrapping of plastic film and application of wax at the ends of the sample.
    c. *Critical care* – for rock samples that may be sensitive to shock and vibration and/or temperature. Protect by encasing each sample in cushioning material, such as sawdust, rubber, polystyrene, foam, etc. A minimum one-inch thick layer of cushioning material should be used. Thermally insulate samples that are potentially sensitive to changes in temperature.
    d. *Soil-Like care* – handle per ASTM Standard D 4220.
12. Drilling conditions and sequence (fluid loss, circulation pressures, depths of lost circulation, down feed pressures, core blockage etc.) should be documented on the boring log as described in SOP 10.3.
13. Drill cuttings and fluids should be appropriately controlled and contained as investigation-derived material per SOP 70.1.
14. The drill rod assembly, sampling devices, and other drilling equipment contacting potentially contaminated material must be decontaminated before and after each use per the methods specified in SOP 80.1.
15. Borehole logging should be completed per SOP 10.3.
16. Borehole abandonment, when required, should be conducted according to SOP 20.3.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to site-specific health and safety plan included in work plan addenda.

6.0 REFERENCES

ASTM Standard D 2113-06 (2006). 1993. *Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation.*

ASTM Standard D 1586-99. 1999. *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.*

ASTM Standard D 1587-00 (2007) e1. 2007. *Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes.*

ASTM Standard D 3550-01 (2007). 2007. *Standard Practice for Think Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils.*

ASTM Standard D 4220-95 (2007). 2007. *Standard Practices for Preserving and Transporting Soil Samples.*

ASTM Standard D 4630-96 (2002). 2002. *Standard Test Method for Determining Transmissivity and Storage Coefficient of Low-Permeability Rocks by In Situ Measurements Using the Constant Head Injection Test.*

ASTM Standard D 4631-95 (2000). 2000. *Standard Test Method for Determining Transmissivity and Storativity of Low-Permeability Rocks by In Situ Measurements Using Pressure Pulse Technique.*

ASTM Standard D 5079-02 (2006). 2006. *Standard Practices for Preserving and Transporting Rock Core Samples.*

ASTM Standard D 5782-95 (2006). 2006. *Standard Guide for Use of Direct Air-Rotary Drilling for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5783-95 (2006). 2006. *Standard Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5784-95 (2006). 2006. *Standard Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5872-95 (2006). 2006. *Standard Guide for Use of Casing Advancement Drilling Methods for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 5876-95 (2005). 2005. *Standard Guide for Use of Direct Rotary Wireline Casing Advancement Drilling Methods for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.*

ASTM Standard D 6282-98 (2005). 2005. *Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations.*

USACE. 1998. *Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites.* EM 1110-1-4000. 1, November.

STANDARD OPERATING PROCEDURE 30.1
SOIL SAMPLING

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for sampling surface and subsurface soils.

2.0 MATERIALS

- Stainless steel scoop, spoon, trowel, knife, spatula, (as needed);
- Split-spoon, Shelby tube, or core barrel sampler;
- Hand auger or push tube sampler;
- Drill rig and associated equipment (subsurface soil);
- Stainless steel bowls;
- Photoionization detector or other appropriate instrument as specified in site-specific health and safety plan;
- Sampling equipment for collection of volatile organic samples;
- Appropriate sample containers;
- Appropriate sample labels and packaging material.;
- Personal protective equipment and clothing (PPE) per site-specific health and safety plan; and
- Decontamination equipment and supplies (SOP 80.1).

3.0 PROCEDURE

3.1 DOCUMENTATION

Soil sampling information should be recorded in the field logbooks as described in SOPs 10.1 and 10.2.

3.2 SURFICIAL SOIL SAMPLES

The targeted depths for surficial soil samples (surface and near surface) will be specified in the work plan addenda developed for site-specific investigations.

1. All monitoring equipment should be appropriately calibrated before beginning sampling according to the requirements of the work plan addenda and SOP 90.1 or 90.2.
2. All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.
3. Use a spade, shovel, or trowel or other equipment (manufactured from material, which is compatible with the soil to be sampled) to remove any overburden material present (including vegetative mat) to the level specified for sampling.
4. Measure and record the depth at which the sample will be collected with an engineers scale or tape.

5. Remove the thin layer that was in contact with the overburden removal equipment using a clean stainless steel scoop or equivalent and discard it.
6. Begin sampling with the acquisition of any discrete sample(s) for analysis of volatile organic compounds (VOCs), with as little disturbance as possible. VOC samples will not be composited or homogenized.
7. When a sample will not be collected with a core type of sampler (push tube, split spoon, etc.), the sample for VOC analysis will be collected from freshly exposed soil. The method of collection will follow the procedures specified in SOP 30.8 (Methanol Preservation Method) or 30.9 (En Core® Method) based on the requirements of the work plan addenda.
8. Field screen the sample with properly calibrated photoionization detector (PID) or other appropriate instrument. Cut a cross-sectional slice from the core or center of the sample and insert the monitoring instrument(s). Based on the screening results, collect the VOC fraction, as applicable.
9. Collect a suitable volume of sample from the targeted depth with a clean stainless steel scoop (or similar equipment), push tube sampler, or bucket auger
10. For core type of samplers, rough trimming of the sampling location surface should be considered if the sampling surface is not fresh or other waste, different soil strata, or vegetation may contaminate it. Surface layers can be removed using a clean stainless steel, spatula, scoop, or knife. Samples collected with a bucket auger or core type of sampler should be logged per the requirements of SOP 10.3.
11. If homogenization or compositing of the sampling location is not appropriate for the remaining parameters, the sample should be directly placed into appropriate sample containers with a stainless steel spoon or equivalent.
12. If homogenization of the sample location is appropriate or compositing of different locations is desired, transfer the sample to a stainless steel bowl for mixing. The sample should be thoroughly mixed with a clean stainless steel spoon, scoop, trowel, or spatula and then placed in appropriate sample containers per the requirements for containers and preservation specified in work plan addenda. Secure the cap of each container tightly.
13. Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
14. Return any remaining unused soil to the original sample location. If necessary, add clean sand to bring the subsampling areas back to original grade. Replace the vegetative mat over the disturbed areas.

3.3 SUBSURFACE SAMPLES

All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.

1. All monitoring equipment should be appropriately calibrated before sampling according to the requirement of the work plan addendum and SOP 90.1 or SOP 90.2.
2. All sampling equipment should be appropriately decontaminated before and after use according to the requirements of the work plan addendum and SOP 80.1.
3. Collect split-spoon; core barrel, Shelby tube, sonic core or other similar samples during drilling.
4. Upon opening sampler or extruding sample, immediately screen soil for VOCs using a PID or appropriate instrument. If sampling for VOCs, determine the area of highest concentration; use a

stainless steel knife, trowel, or lab spatula to cut the sample; and screen for VOCs with monitoring instrument(s).

5. Log the sample on the boring log before extracting from the sampler per the requirements of SOP 10.3.
6. Any required VOC samples will be collected first followed by the other parameters. VOC samples will not be composited or homogenized and will be collected from the area exhibiting the highest screening level. The method of VOC sample collection will follow the procedures specified in SOP 30.8 (Methanol Preservation Method) or 30.9 (En Core® Method) based on the requirements of the work plan addenda.
7. Field screen the sample with properly calibrated photoionization detector (PID) or other appropriate instrument. Cut a cross-sectional slice from the core or center of the sample and insert the monitoring instrument(s). Based on the screening results, collect the VOC fraction, as applicable.
8. Rough trimming of the sampling location surface should be considered if the sampling surface is not fresh or other waste, different soil strata, or vegetation may contaminate it. Surface layers can be removed using a clean stainless steel, spatula, scoop, or knife.
9. If homogenization or compositing of the sampling location is not appropriate for other parameters, the sample should be directly placed into appropriate sample containers with a stainless steel spoon or equivalent.
10. If homogenization of the sample location is appropriate or compositing of different locations is desired, transfer the sample to a stainless steel bowl for mixing. The sample should be thoroughly mixed with a clean stainless steel spoon, scoop, trowel, or spatula and placed in appropriate sample containers per the requirements for containers and preservation specified in work plan addenda. Secure the cap of each container tightly.
15. Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
16. Discard any remaining sample into the drums used for collection of cuttings.
17. Abandon borings according to procedures outlined in SOP 20.2.

3.4 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addenda for the site being investigated and SOP 70.1.

NOTES: If sample recoveries are poor, it may be necessary to composite samples before placing them in jars. In this case, the procedure will be the same except that two split-spoon samples (or other types of samples) will be mixed together. The boring log should clearly state that the samples have been composited, which samples were composited, and why the compositing was done. In addition, VOC fraction should be collected from the first sampling device.

When specified, samples taken for geotechnical analysis (e.g., percent moisture, density, porosity, and grain size) will be undisturbed samples, such as those collected using a thin-walled (Shelby tube) sampler, sonic core sampler, etc.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

Soil samples will not include vegetative matter, rocks, or pebbles unless the latter are part of the overall soil matrix.

6.0 REFERENCES

ASTM Standard D 1586-99. 1999. *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.*

ASTM Standard D 1587-00 (2007) e1. 2007. *Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes.*

ASTM Standard D 5633-04. 2004. *Standard Practice for Sampling with a Scoop.*

USACE. 2001. *Requirements for the Preparation of Sampling and Analysis Plans.* EM 200-1-3. 1 February.

STANDARD OPERATING PROCEDURE 30.2
GROUNDWATER SAMPLING

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for the collection of groundwater samples from monitoring wells.

2.0 MATERIALS

- Work Plans;
- Field logbooks and field parameter forms;
- Plastic sheeting;
- Decontamination equipment and supplies (SOP 80.1);
- Variable-speed, low-flow submersible pump with safety drop cable;
- Nylon stay-ties;
- Generator;
- Dedicated Teflon tubing or Teflon lined polyethylene tubing;
- Flow-through-cell and probes for measuring pH, temperature, specific conductance, oxidation/reduction potential, dissolved oxygen, and turbidity (SOP 40.1);
- Electronic water-level indicator;
- Appropriate sample bottles, labels, chain-of-custody forms, and sample shipping supplies etc;
- Cooler with ice;
- Silicone tubing;
- 0.45-micron disposable filters (as appropriate).
- Personal protective equipment and clothing (PPE) per site-specific health and safety plan;
- Photoionization detector (PID) or other appropriate monitoring instrument per the site-specific health and safety plan; and
- Appropriate containers for investigation-derived material.

3.0 PROCEDURE

3.1 DOCUMENTATION

Groundwater sampling information should be recorded in the field logbooks as described in SOPs 10.1 and 10.2.

The following are general rules for the field parameter logbook for groundwater, as described in SOP 10.2:

- Only information for one site or installation per logbook. The same book maybe used for more than one sampling event.

- The first five pages will be reserved for index, general notes, etc. Sign and date each entry.
- Fill in the forms.
- Duplicate copies, index pages, and calibration sheets remain intact.

3.2 OVERVIEW OF SAMPLING TECHNIQUES

In general, two different techniques may be used to sample groundwater from monitoring wells at Radford Army Ammunition Plant (RFAAP):

- Low flow purging and sampling (Type I); and
- Conventional purging and low-flow sampling (Type II).

These two sampling techniques are intended to address the different groundwater conditions that may be encountered at RFAAP.

The Type I sampling technique will be used in the following situations:

- In wells where only one discrete water-producing zone is encountered;
- In wells with no discrete water bearing zone and a low yield (generally < 0.5 liters per minute); and
- In wells sampled during seasonal low groundwater conditions with greatly reduced yield.

The Type II sampling technique will be used in the following situations:

- In a well with potential or documented multiple flow zones and where individual flow zones will not be evaluated;
- In moderately producing wells (>0.5 liters per minute) where no discrete flow zones were documented during drilling; and
- In wells sampled during seasonal high groundwater conditions with enhanced yield (and potentially additional flow zones).

Groundwater samples should be collected no sooner than 14 days after well development. Information from the boring logs, well completion records, and well development records should be reviewed before sampling a well to determine the most appropriate sampling technique. Pertinent information for each well to be sampled includes:

- Well construction;
- Depth and nature of water producing zones;
- Sustainable pumping rate of the well to be sampled;
- Well recharge characteristics; and
- Baseline turbidity.

Because of the heterogeneous nature of the fracture and solution-enhanced fractured bedrock at RFAAP, monitoring well purging and sampling techniques will need to be flexible. This flexibility is necessary to obtain representative samples that meet the data quality objectives (DQOs) specified in site-specific work plan addenda.

In general, when using the pumps specified in the following sections, situate any gasoline-powered generator on level ground approximately 15 ft downwind from the well. All generator maintenance (oil and fueling) is to be performed off site. If the hose(s) and/or power cord of the pump is not on a reel, place the pump with its hose and power cord on the plastic sheeting downhill from the well.

3.3 TYPE I SAMPLING PROCEDURES

Type I low flow purging and sampling procedures include the following:

- The work area outside the well will be prepared by placing plastic sheeting on the ground around the well casing to avoid cross-contamination.
- All equipment used to purge and sample the wells will be thoroughly decontaminated before and after use according to the requirements of the work plan addenda and SOP 80.1.
- All equipment to be used for monitoring water quality parameters will be calibrated before beginning purging according to the requirements of the work plan addenda and SOP 40.1.
- Note the condition of the well and well head.
- Monitor the headspace of the well with a photoionization detector as the well cap is removed.
- Measure and record the depth to water with an electronic water level indicator. The measurement of well depth will not be taken until after sampling is completed so that potential re-suspension of any settled solids at the bottom of the well is avoided.
- Well depth at the time of purging will be obtained from well construction and existing data.
- Slowly lower a clean, stainless steel, adjustable flow rate, submersible pump and dedicated Teflon or Teflon-lined polyethylene tubing to the desired depth. As the pump is slowly lowered into the well, secure the safety drop cable, tubing, and electrical lines to each other using nylon stay-ties.
- For wells with very low sustainable pumping rates (≤ 0.5 liters per minute), the pump should be set in the middle of the saturated screen section of the well or middle of the water column for open wells. The pump should be set 12 hours prior to purging so that the depth to water equilibrates and sediments disturbed during pump placement have time to settle.
- For wells with sustainable pumping rates (> 0.5 liters per minute), the pumps will be set at a desired depth prior to purging, allowing for the depth to water to equilibrate before sampling. The desired depth will be specified in work plan addenda based on site-specific conditions and DQOs.
- Connect the pump tubing to an in-line flow-through cell(s) and connect the multi-parameter probe to the cell(s). The end of the tubing exiting the in-line flow-through cell should be placed to discharge into a appropriate container(s) to collect purge water.
- Immediately prior to purging, the depth to water will be measured and record. Start pumping the water at a rate of 100 to 400 milliliters per minute. Avoid surging. The pumping rate should cause minimal drawdown (less than 0.2 ft). Water level measurements should be collected continuously to document stabilization of the water level. Pumping rates should, if needed, be reduced to the minimal capabilities of the pump to avoid dewatering the screen interval and ensure stabilization of indicator parameters.
- During purging, water quality indicator parameters will be monitored at the in-line flow-through cell(s) every 3 to 5 minutes. The parameters to be monitored include pH, specific conductance, oxidation/reduction potential (Eh), dissolved oxygen, and turbidity.
- Continue purging until stabilization of indicator parameters is achieved. Stabilization is defined as three consecutive readings that are within the following criteria:
  - ± 0.1 for pH;
  - ±3% for specific conductance;
  - ±10 mV for oxidation/reduction potential (Eh); and

- ±10% for turbidity and dissolved oxygen.

- If the parameters have stabilized, but the turbidity is not in the range of 5 to 10 NTU, then both filtered and unfiltered samples should be collected for any metals analysis. Filter metal samples should be collected with an in-line filter using a high capacity 0.45-micron particulate filter. This filter should be pre-rinsed according to the manufacturer's instructions.
- Once purging is completed, reduce the pumping rate to its lowest steady rate and disconnect the tubing from the in-line flow-though cell(s).
- Collect groundwater samples directly from the end of the tubing into clean containers provided by the laboratory. The container requirements and preservatives for groundwater samples are specified in work plan addenda. Allowing the pump discharge to flow gently down the inside of the container with minimal turbulence should fill all sample containers. Volatile organic compound (VOC) and gas sensitive parameter samples should be collected first followed by other parameters.
- In general, samples should be collected and containerized in the order of the volatilization sensitivity of the parameters. A preferred collection order for some common parameters is VOCs, extractable organics, metals, cyanide, sulfate and chloride, turbidity, and nitrate and ammonia. The parameters to be collected at any well location are site-specific and are specified in work plan addenda.
- Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
- After the sample collection is complete; remove the pump, tubing, and associated lines. Note: sample tubing will be dedicated to each well.
- Measure and record the total depth of the well.
- Secure the well be replacing and locking the lid.

3.4 TYPE II SAMPLING PROCEDURES

- The work area outside the well will be prepared by placing plastic sheeting on the ground around the well casing to avoid cross-contamination.
- All equipment used to purge and sample the wells will be thoroughly decontaminated before and after use according to the requirements of the work plan addenda and SOP 80.1.
- All equipment to be used for monitoring water quality parameters will be calibrated before beginning purging according to the requirements of the work plan addenda and SOP 40.1.
- Note the condition of the well and well head.
- Monitor the headspace of the well with a photoionization detector as the well cap is removed.
- Measure and record the depth to water with an electronic water level indicator. The measurement of well depth will not be taken until after sampling is completed so that potential re-suspension of any settled solids at the bottom of the well is avoided.
- Well depth at the time of purging will be obtained from well construction and existing data.
- Calculate the standing water column in the well by subtracting the depth to water from the total depth of the well as recorded during completion of the well.
- From the water depth, well diameter, sand pack length, etc., calculate the equivalent volume (1 EV) of water in the well.

1 EV = volume in casing + volume in saturated sand pack. Therefore; if the water table lies below the top of the sand pack, use the following equation:

$1\ EV = (pR_w^2h_w) + (0.30p(R_s^2-R_w^2)h_w) * (0.0043)$

If the water table lies above the top of the sand pack use this equation:

$1\ EV = [(pR_w^2h_w) + (0.30p(R_s^2-R_w^2)h_s)] * (0.0043)$

Where: R_s = radius of sand pack in inches
R_w = radius of well casing in inches
h_s = height of sand pack in inches
h_w = water depth in inches

$0.0043\ gal/in^3$
Assumed filter pack porosity = 30%

Tables and graphs showing equivalent volumes for typical well constructions are available.

- Slowly lower a clean, stainless steel, adjustable flow rate, submersible pump and dedicated Teflon or Teflon-lined polyethylene tubing to the middle of the saturated screen interval or water column in an open borehole. As the pump is slowly lowered into the well, secure the safety drop cable, tubing, and electrical lines to each other using nylon stay-ties.
- Connect the pump tubing to an in-line flow-through cell(s) and connect the multi-parameter probe to the cell(s). The end of the tubing exiting the in-line flow-through cell should be placed to discharge into an appropriate container to collect purge water.
- Start purging the well at the minimally achievable pumping rate. Gradually increase the pumping rate to achieve the maximum flow rate of the pump or the maximum sustainable flow rate that does not draw down the static water level to a point below the top of the first water bearing zone, whichever is achieved first.
- During purging, water level measurements should be collected periodically to verify water levels in the well.
- During purging, water quality indicator parameters will be monitored at the in-line flow-through cell(s) every 3 to 5 minutes. The parameters to be monitored include pH, specific conductance, oxidation/reduction potential (Eh), dissolved oxygen, and turbidity.
- Note when each indicator parameter stabilizes. Stabilization is defined as three consecutive readings that are within the following criteria:
  - ± 0.1 for pH;
  - ±3% for specific conductance;
  - ±10 mV for oxidation/reduction potential (Eh); and
  - ±10% for turbidity and dissolved oxygen.
- Three calculated eVs of water in the will be purged prior to sampling. It will be documented if stabilization of the indicator parameters has not occurred after three calculated well volumes have been removed and sampling procedures begin.
- If the turbidity is not in the range of 5 to 10 NTU when purging has been completed, then both filtered and unfiltered samples should be collected for any metals analysis. Filter metal samples should be collected with an in-line filter using a high capacity 0.45-micron particulate filter. This filter should be pre-rinsed according to the manufacturer's instructions.

- Once purging is completed, reduce the pumping rate to its lowest steady rate and disconnect the tubing from the in-line flow-though cell(s).
- Collect groundwater samples directly from the end of the tubing into clean containers provided by the laboratory. The container requirements and preservatives for groundwater samples are specified in work plan addenda. Allowing the pump discharge to flow gently down the inside of the container with minimal turbulence should fill all sample containers. Volatile organic compound (VOC) and gas sensitive parameter samples should be collected first followed by other parameters.
- Appropriately, label the samples (SOP 50.1), complete the chain-of-custody (SOP 10.4), and package the samples for shipping (SOP 50.2).
- After the sample collection is complete; remove the pump, tubing, and associated lines. Note: sample tubing will be dedicated to each well.
- Measure and record the total depth of the well.
- Secure the well be replacing and locking the lid.

3.5 INVESTIGATION-DERIVED MATERIAL

Investigation-derived material will be managed in accordance with procedures defined in the work plan addendum for the site being investigated and SOP 70.1.

4.0 MAINTENANCE

Refer to manufacturer's requirements for maintenance of pumps and generators.

5.0 PRECAUTIONS

Refer to the site-specific health and safety plan.

6.0 REFERENCES

ASTM Standard D 5903-96 (2006). 2006. *Planning and Preparing for a Groundwater Sampling Events.*

USACE. 2001. R*equirements for the Preparation of Sampling and Analysis Plans.* EM 200-1-3, 1 February.

USEPA. 1995. *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures United States Environmental Protection Agency*, Office of Solid Waste and Emergency Response, EPA/540/S-95/504, December 1995.

USEPA. 1997. *Recommended Procedure for Low-flow Purging and Sampling of Groundwater Monitoring Wells.* Bulletin No. QAD023, October.

STANDARD OPERATING PROCEDURE 30.7
SAMPLING STRATEGIES

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate sampling strategies for sampling various media.

2.0 MATERIALS

- Historical site data;
- Site topography;
- Soil types; and
- Sampled media.

3.0 PROCEDURE

The primary goal of any investigation is to collect samples representative of existing site conditions. Statistics are generally used to ensure samples are as representative as possible. Sampling plans may employ more than one approach to ensure project data quality objectives are adequately addressed. A comparison of sampling strategies is presented in Table 1.

3.1 CLASSICAL STATISTICAL SAMPLING

Classical statistical sampling strategies are appropriately applied to either sites where the source of contamination is known or small sites where the entire area is remediated as one unit. Primary limitations of this sampling approach include (1) inability to address media variability; (2) inadequate characterization of heterogenous sites; and (3) inadequate characterization of sites with unknown contamination characteristics.

3.1.1 Simple Random Sampling

Simple random sampling is generally more costly than other approaches because of the number of samples required for site characterization. This approach is generally used when minimal site information is available and visible signs of contamination are not evident and includes the following features:

- Sampling locations are chosen using random chance probabilities.
- This strategy is most effective when the number of sampling points is large.

3.1.2 Stratified Random Sampling

This sampling approach is a modification to simple random sampling. This approach is suited for large site investigations that encompass a variety of soil types, topographic features, and/or land uses. By dividing the site into homogenous sampling strata based on background and historical data, individual random sampling techniques are applied across the site. Data acquired from each stratum can be used to determine the mean or total contaminant levels and provide these advantages:

- Increased sampling precision results due to sample point grouping and application of random sampling approach.
- Control of variances associated with contamination, location, and topography.

3.1.3 Systematic Grid

The most common statistical sampling strategy is termed either systematic grid or systematic random sampling. This approach is used when a large site must be sampled to characterize the nature and extent of contamination.

Samples are collected at predetermined intervals within a grid pattern according to the following approach:

- Select the first sampling point randomly; remaining sampling points are positioned systematically from the first point.
- Determine the grid design: one or two-dimensional. One-dimensional sample grids may be used for sampling along simple man-made features. Two-dimensional grid systems are ideal for most soil applications.
- Determine the grid type: square or triangular. Sampling is usually performed at each grid-line intersection. Other strategies include sampling within a grid center or obtaining composite samples within a grid.
- Each stratum is sampled based on using the simple random sampling approach but determined using a systematic approach.

3.1.4 Hot-Spot Sampling

Hot spots are small, localized areas of media characterized by high contaminant concentrations. Hot-spot detection is generally performed using a statistical sampling grid. The following factors should be addressed:

- Grid spacing and geometry. The efficiency of hot-spot searches is improved by using a triangular grid. An inverse relationship exists between detection and grid point spacing, e.g., the probability of hot-spot detection is increased as the spacing between grid points is decreased.
- Hot-spot shape/size. The larger the hot spot, the higher the probability of detection. Narrow or semi-circular patterns located between grid sampling locations may not be detected.
- False-negative probability. Estimate the false negative (β-error) associated with hot-spot analysis.

3.1.5 Geostatistical Approach

Geostatistics describe regional variability in sampling and analysis by identifying ranges of correlation or zones of influence. The general two-stage approach includes the following:

- Conducting a sampling survey to collect data defining representative sampling areas.
- Defining the shape, size, and orientation of the systematic grid used in the final sampling event.

3.2 NON-STATISTICAL SAMPLING

3.2.1 Biased Sampling

Specific, known sources of site contamination may be evaluated using biased sampling. Locations are chosen based on existing information.

3.2.2 Judgmental Sampling

This sampling approach entails the subjective selection of sampling locations that appear to be representative of average conditions. Because this method is highly biased, it is suggested that a measure of precision be included through the collection of multiple samples.

4.0 MAINTENANCE

Not applicable.

5.0 REFERENCES

Gilbert, R.O. 1987. *Statistical Methods for Environmental Pollution Monitoring.* John Wiley & Sons, Inc. 320 p.

USACE. 2001. *Requirements for the Preparation of Sampling and Analysis Plans.* EM200-1-3. 1 February.

TABLE 1
SAMPLING STRATEGIES

SAMPLING STRATEGY	DESCRIPTION	APPLICATION	LIMITATIONS
Classical Statistical Sampling Strategies			
Simple Random Sampling	Representative sampling locations are chosen using the theory of random chance probabilities.	Sites where background information is not available and no visible signs of contamination are present.	May not be cost-effective because samples may be located too close together. Does not take into account spatial variability of media.
Stratified Random Sampling	Site is divided into several sampling areas (strata) based on background or site survey information.	Large sites characterized by a number of soil types, topographic features, past/present uses, or manufacturing storage areas.	Often more cost-effective than random sampling. More difficult to implement in the field and analyze results. Does not take into account spatial variability of media.
Systematic Grid Sampling	Most common statistical strategy; involves collecting samples at predetermined, regular intervals within a grid pattern.	Best strategy for minimizing bias and providing complete site coverage. Can be used effectively at sites where no background information exists. Ensures that samples will not be taken too close together.	Does not take into account spatial variability of media.
Hot-Spot Sampling	Systematic grid sampling strategy tailored to search for hot spots.	Sites where background information or site survey data indicate that hot spots may exist.	Does not take into account spatial variability of media. Tradeoffs between number of samples, chance of missing a hot spot, and hot spot size/shape must be weighed carefully.
Geostatistical Approach	Representative sampling locations are chosen based on spatial variability of media. Resulting data are analyzed using kriging, which creates contour maps of the contaminant concentrations and the precision of concentration estimates.	More appropriate than other statistical sampling strategies because it takes into account spatial variability of media. Especially applicable to sites where presence of contamination is unknown.	Previous investigation data must be available and such data must be shown to have a spatial relationship.
Non-Statistical Sampling Strategies			
Biased Sampling	Sampling locations are chosen based on available information.	Sites with known contamination sources.	Contaminated areas can be overlooked if background information or visual signs of contamination do not indicate them. Best used if combined with a statistical approach, depending on the project objectives.
Judgmental Sampling	An individual subjectively selects sampling locations that appear to be representative of average conditions.	Homogenous, well-defined sites.	Not usually recommended due to bias imposed by individual, especially for final investigations.

STANDARD OPERATING PROCEDURE 30.9
COLLECTION OF SOIL SAMPLES BY USEPA SW 846 METHOD 5035 USING DISPOSABLE SAMPLERS

1.0 SCOPE AND APPLICATION

This standard operating procedure (SOP) outlines the recommended protocol and equipment for collection of representative soil samples to monitor potential volatile organic contamination in soil samples.

This method of sampling is appropriate for surface or subsurface soils contaminated with low to high levels of volatile organic compounds (VOCs). This sampling procedure may be used in conjunction with any appropriate determinative gas chromatographic procedure, including, but not necessarily limited to, SW-846 Method 8015, 8021, and 8260.

2.0 MATERIALS

- Work Plans;
- Field Logbook;
- Photoionization Detector (PID) or other monitoring instrument(s) per site-specific health and safety plan;
- Personal protective equipment and clothing per site-specific health and safety plan;
- Soil sampling equipment, as applicable (SOP 30.1);
- Disposable sampler;
- T-handle and/or Extrusion Tool; and
- Decontamination equipment and supplies (SOP 80.1).

3.0 PROCEDURE

3.1 METHOD SUMMARY

Disposable samplers are sent to the field to be used to collect soil samples. Three samplers must be filled for each soil sampling location, two for the low-level method (sodium bisulfate preservation) and one for the high level method (methanol preservation). After sample collection, disposable samplers are immediately shipped back to the laboratory for preservation (adding soil sample into methanol and sodium bisulfate solution). The ratio of volume of methanol to weight of soil is 1:1 as specified in SW-846 Method 5035 (Section 2.2.2). The amount of preservative in the solution corresponds to approximately 0.2 g of preservative for each 1 g of sample. Enough sodium bisulfate should be present to ensure a sample pH of ≤ 2.

If quality assurance/quality control (QA/QC) samples are needed, seven samplers will be needed for the original, matrix spike, and matrix spike duplicate analysis. Soil samples are collected in the field using the disposable samplers, sealed and returned to the laboratory. A separate aliquot of soil is collected in a 125-mL container for dry weight determination.

3.2 SAMPLE CONTAINERS, PRESERVATION, HANDLING AND STORAGE

After sample collection, the disposable samplers must be cooled to and maintained at 4°C. The contents of the samplers will be analyzed using EPA methods 8015, 8021, and/or 8260. The **disposable** sampler is a single use device. It cannot be cleaned and/or reused.

Disposable samplers have a 48 hour holding time from sample collection to sample preparation in the laboratory. Return the samplers to the laboratory immediately after sampling.

3.3 SAMPLE PROCEDURES

Before sampling, the disposable sampler should be prepared as follows:

1. Unpack the cooler/sampling kit received from the laboratory. Disposable samplers are packed in sealed aluminized bags. These should be over packed in plastic zip lock bags. A T-Handle will also be needed to collect samples with the disposable sampler.
2. Hold coring body and push plunger rod down until small 0-ring rests against tabs. This will assure that plunger moves freely.
3. Depress locking lever on the sampler T-Handle (or other extraction device). Place coring body, plungers end first, into the open end of the T-Handle, aligning the two slots on the coring body with the two locking pins in the T-Handle. Twist the coring body clockwise to lock the pins in the slots. Check to ensure the sampler is locked in place. Sampler is ready for use.

The following procedure should be followed when using a disposable sampler to sample for VOCs in soil:

1. After the soil-sampling device (split spoon, corer, etc.) is opened, the sampling process should be completed in a minimum amount of time with the least amount of disruption.
2. Visual inspection and soil screening should be conducted after the sampler is opened and a fresh surface is exposed to the atmosphere. Soil screening should be conducted with an appropriate instrument (PID or FID).
3. Rough trimming of the sampling location surface should be considered if the sampling surface is not fresh or other waste, different soil strata, or vegetation may contaminate it. Surface layers can be removed using a clean stainless steel, spatula, scoop, or knife.
4. Orient the T-Handle with the T-up and the coring body down. This positions the plunger bottom flush with bottom of coring body (ensure that plunger bottom is in position). Using T-Handle, push sampler into soil until the coring body is completely full taking care not to trap air behind the sampler. When full, the small o-ring will be centered in the T-Handle viewing hole. Remove sampler from soil. Wipe excess soil from coring body exterior with a clean disposable paper towel.
5. Cap coring body while it is still on the T-Handle. ***Push*** cap over flat area of ridge ***and twist*** to lock cap in place. ***Cap must be seated to seal sampler.***
6. Remove the capped sampler by depressing locking lever on T-Handle while twisting and pulling sampler from T-Handle.
7. Lock plunger by rotating extended plunger rod fully counterclockwise until wings rest firmly against tabs.
8. Fill the 125-mL wide mouth jar for the non-preserved portion of the sample to be used for a moisture determination. These may be in a cardboard box. Retain all packaging to return the samples.
9. The disposable sampler should collect approximately 5 grams of soil (not necessary to weigh in the field). After a sample has been collected and capped, tear off the identification tag found at the bottom of the label on the aluminized bag. This tag is added to the sampler on the cap used to seal the sampler.

10. Place the sampler back in the aluminized bag and seal the top (a zip-lock seal). Make sure all the appropriate information is on the label. Record the sampler ID number on the chain-of-custody. Make sure each sampler and 125-mL container is labeled with the same location identification. The sampler should be placed inside the plastic zip-lock bags.

11. Place the 125-mL wide mouth jars in the cooler with the sampler on top. These should be sandwiched between bags of ice to maintain the correct temperature. If sent with the jars and samplers, a temperature bottle (used to evaluate the temperature on receipt) should be placed in the middle of the jars. The sample temperature should be 4ºC during shipment.

12. Ship the samples so that they will be received within 24 hours of sampling. The laboratory must receive the sampler within 40 hours of the collection so that they can be correctly preserved.

3.4 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

1. All data must be documented on chain-of-custody forms, field data sheets and in the field logbook.

2. An equipment blank is a QA/QC sample that will determine potential contamination from sampling equipment used to collect and transfer samples from the point of collection to the sample container. An equipment blank is performed by pouring demonstrated analyte free water from one sample container, over a sampler, and into a separate set of identical sample containers. The equipment blank is optional when sampling with the methanol preservation technique. It may be required on a site-specific basis if elevated analytical results are suspected to be due to cross contamination from sampling equipment.

3. A trip blank is a QA/QC sample, which will determine additional sources of contamination that may potentially influence the samples. The sources of the contamination may be from the laboratory, sample containers, or during shipment. The laboratory prepares a trip blank at the same time and in the same manner as the sample containers. The trip blank must accompany the sample containers to the field and back to the laboratory along with the collected samples for analysis. It must remain sealed at all times until it is analyzed at the laboratory. The frequency of collection for the trip blank must be at a rate of one per sample shipment.

3.5 LIMITATIONS IN SAMPLING

This sampling protocol will not be applicable to all solid environmental matrices, such as those that cannot be cored including non-cohesive granular material, gravel, or hard dry clay. In this case, the procedure for collecting VOC samples using Methanol Preservation should be used (see SOP 30.8).

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

En Novative Technologies, Inc. 2000. Users Manual for En Core® Sampler. February 2001.

USACE. 2001. *Requirements for the Preparation of Sampling and Analysis Plans.* EM 200-1-3, 1 February.

USEPA. 1997. *Test Methods for Evaluating Solid Waste, Volume IB: Laboratory Manual Physical/Chemical Methods,* Third Edition, (as updated through update IIIA). Office of Solid Waste and Emergency Response, Washington, DC.

STANDARD OPERATING PROCEDURE 40.1
MULTIPARAMETER WATER QUALITY MONITORING INSTRUMENT

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for field operation with the multiparameter water quality logging system (data transmitter and visual display). This system can monitor up to eleven basic parameters, including dissolved oxygen, percent saturation, temperature, pH, specific conductance, resistivity, salinity, total dissolved solids, redox, level, and depth.

2.0 MATERIALS

- Visual display;
- Data transmitter;
- Underwater cables; and
- Field logbooks.

3.0 PROCEDURE

3.1 CALIBRATION

Calibration will be performed in the field daily before use according to manufacturer's specifications. The following parameters are calibrated to the following standards:

- Temperature—none required;
- Specific conductance—KCl or seawater standards;
- pH—pH 7 buffer plus a slope buffer;
- Dissolved oxygen—saturated air or saturated water;
- Redox—quinhydrone or transfer;
- Depth—set zero in air;
- Level—set zero in air; and
- Salinity—uses calibration for specific conductance.

3.2 OPERATION

1. Attach the cable to the transmitter.
2. Connect the other end of the cable to the display.
3. Press the On/Off key on the display panel. Allow a few seconds for the transmitter to start sending data to the display screen.
4. Calibrate the transmitter.
5. Deploy the sensor into a minimum of 4 in. of water.
6. Write data values from the display screen in the appropriate field logbook.

7. Retrieve sensor and clean the transmitter to prevent cross-contamination.
8. Move to the next sampling location. If travel time is great, turn off display by pressing On/Off key. Check condition of probes after each deployment.
9. Disconnect the transmitter when finished sampling for the day.

4.0 MAINTENANCE

Maintain according to specific manufacturer's specifications.

5.0 PRECAUTIONS

- Check condition of probes frequently between sampling; and
- Do not force pins into the connectors; note the keying sequence.

6.0 REFERENCES

Manufacturer's Handbook.

STANDARD OPERATING PROCEDURE 40.2
WATER LEVEL AND WELL-DEPTH MEASUREMENTS

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for measuring water level and well depth. This procedure is applicable to the sampling of monitoring wells and must be performed before any activities that may disturb the water level, such as purging or aquifer testing.

2.0 MATERIALS

- Work Plans;
- Well construction diagrams;
- Field logbook;
- Photoionization detector (PID) or other monitoring instruments per site-specific health and safety plan;
- Decontamination equipment and supplies (SOP 80.1);
- Electric water level indicator (dipmeter) with cable measured at 0.01 ft increments;
- Oil-water interface probe (if non-aqueous phase liquid (NAPLs) are suspected to be present); and
- Plastic sheeting.

3.0 PROCEDURE

3.1 PRELIMINARY STEPS

1. Locate the well and verify its position on the site map. Record whether positive identification was obtained, including the well number and any identifying marks or codes contained on the well casing or protective casing. Gain access to the top of the well casing.
2. Locate the permanent reference mark at the top of the casing. This reference point will be scribed, notched, or otherwise noted on the top of the casing. If no such marks are present, measure to the top of the highest point of the well casing and so note this fact in field logbook. Determine from the records and record in the notebook the elevation of this point.
3. Record any observations and remarks regarding the completion characteristics and well condition, such as evidence of cracked casing or surface seals, security of the well (locked cap), and evidence of tampering.
4. Keep all equipment and supplies protected from gross contamination; use clean plastic sheeting. Keep the water level indicator probe in its protective case when not in use.

3.2 OPERATION

1. Sample the air in the well head for gross organic vapors by lifting the well cap only high enough for an organic vapor meter (PID or FID) probe to be entered into the well casing. This will indicate the presence of gross volatile contaminants as well as indicating potential sampler exposure.

2. Remove cap. Allow well to vent for 60–90 seconds. Resample headspace. Record both readings. If the second reading is lower than the first, use the second reading to determining whether respiratory protection will be required during subsequent water level and well depth determinations and sampling.
3. Note that all headspace sampling must be performed at arm's length and from the upwind side of the well if possible.
4. If NAPL contamination is suspected, use an interface probe to determine the existence and thickness of NAPLs.
    - Open the probe housing, turn the probe on, and test the alarm. Slowly lower the probe into the well until the alarm sounds. A continuous alarm indicates a NAPL, while an intermittent alarm indicates water. If a NAPL is detected, record the initial level (first alarm). Mark the spot by grasping the cable with the thumb and forefingers at the top of the casing. If a mark is present on the casing, use the mark as the reference point. If no mark is present, use the highest point on the casing as the reference point. Withdraw the cable sufficiently to record the depth.
    - Continue to slowly lower the probe until it passes into the water phase. Slowly retract the probe until the NAPL alarm sounds and record that level in the manner as described above.
    - Record the thickness of the LNAPL (see Section 3.3.1).
    - Continue to slowly lower the interface probe through the water column to check for the presence of DNAPL.
    - Measure and record the thickness of the DNAPL layer (if any) as described above.
    - Slowly raise the interface probe, recording the depth to each interface as the probe is withdrawn. If there is a discrepancy in depths, clean the probe sensors and re-check the depths.
    - NOTE: Air-liquid interface depth is more reliable if probe is lowered into liquid. NAPL-water depths are more accurate if probe is moved from water into NAPL.
    - Always lower and raise interface probe slowly to prevent undue mixing of media.
    - Always perform NAPL check in wells installed in areas with suspected NAPL contamination. Always perform NAPL check if headspace test reveals presence of volatiles. Always perform NAPL check the first time a well is sampled. If a well has been sampled previously and no NAPLs were present and none of the proceeding conditions are met, the NAPL check may be omitted.
5. If no NAPL is present, use an electronic water level detector as follows.
    - Remove the water level indicator probe from the case, turn on the sounder, and test check the battery and sensitivity scale by pushing the red button. Adjust the sensitivity scale until you can hear the buzzer.
    - Slowly lower the probe and cable into the well, allowing the cable reel to unwind. Continue lowering until the meter buzzes. Very slowly, raise and lower the probe until the point is reached where the meter just buzzes. Marking the spot by grasping the cable with the thumb and forefingers at the top of the casing. If a mark is present on the casing, use the mark as the reference point. If no mark is present, use the highest point on the casing as the reference point. Withdraw the cable and record the depth.
6. To measure the well depth, lower electric water level indicator probe or tape until slack is noted. Very slowly raise and lower the cable until the exact bottom of the well is “felt.” Measure (cable) or read the length (tape) and record the depth.

7. Note that if the electric water level indicator is used to determine depth of well, the offset distance between the tip of the probe and the electrode must be added to the reading to determine actual depth.
8. Withdraw the probe or tape.
9. Decontaminate the probe(s) and cable(s), in accordance with SOP 80.1.

3.3 DATA RECORDING AND MANIPULATION

Record the following information in the field logbook and appropriate sampling forms:

- Date and time;
- Weather;
- Method of measurement;
- Casing elevation;
- NAPL surface elevation = casing elevation - depth to NAPL;
- Apparent measured LNAPL thickness = depth to bottom of NAPL - depth to top of NAPL;
- Water level elevation = casing elevation - depth to water; and
- Well bottom elevation = casing elevation - depth to bottom (or read directly from tape).

4.0 CALIBRATION

No calibration is required. Ensure operability of electric water level indicator by testing sounder before use.

5.0 PRECAUTIONS

- Depending upon the device used, correction factors may be required for some measurements;
- Check instrument batteries before each use; and
- Exercise care not to break the seals at the top of the electric water level indicator probe.

6.0 REFERENCES

ASTM Standard D 4750-87 (2001). 2001. *Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well).*

M^{c}Alary, T. A., and Barker, J.F. 1987. "Volatilization Losses of Organics During Ground Water Sampling from Low Permeability Materials" in *Ground Water Monitoring Review.* Fall 1987.

Thornhill, Jerry T. 1989. Accuracy of Depth to Groundwater Measurements; in "EPA Superfund Ground Water Issue" EPA/540/4-89/002.

STANDARD OPERATING PROCEDURE 40.3
SLUG TESTS

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide information and technical guidance for performing falling- and rising-head *in situ* hydraulic conductivity tests and data analyses. The slug test method involves causing a sudden change in head in a control well and measuring the water level response within that control well. Head change may be induced by suddenly injecting into the well or removing from the well a known quantity of water, rapid removal of a mechanical "slug" from below the water level, increasing or decreasing the air pressure in the well casing, or emplacement of a mechanical slug into the water column.

The water level response in the well is a function of the mass of water in the well and the transmissivity and coefficient of storage of the aquifer. The results of the slug test may be used to determine an estimate of the hydraulic conductivity of the aquifer material near the well.

2.0 MATERIALS

- Work Plans;
- Field logbook;
- Well construction information and boring log;
- Photoionization detector (PID) or other monitoring instruments per site-specific health and safety plan;
- Decontamination equipment and supplies (SOP 80.1);
- Aquifer test data sheets;
- Personal protective equipment and clothing (PPE) per site-specific health and safety plan; and
- Slug-inducing equipment (solid slug, line, etc.) large enough to displace groundwater beyond the well filter pack.

3.0 PROCEDURE

Initially, an appropriate test methodology should be chosen. The selection of the appropriate test method (rising or falling head) is dependent primarily on saturated screen length, the well diameter, and the estimated hydraulic conductivity. If the screen extends above the water table, a rising-head test (water removal) should be used. The performance of a falling-head test (water added) in this circumstance would overstate the hydraulic conductivity value, as the measured response would reflect the equilibration rate of previously unsaturated material; unsaturated materials would equilibrate faster than saturated materials. When the measured water level in a monitoring well is above the screened portion of the well, a falling-head test methodology should be employed. A rising-head test may also be performed, but only if the initial water level reading (after the slug is removed) is above the screened interval.

For larger diameter and deeper wells, as a general rule and particularly for high conductivity materials, it is not feasible to remove a large enough slug or water volume to cause a sufficient change in head. In these cases the falling-head test method should be used.

It is recommended that a pressure transducer be used whenever possible to record water levels and time. A pressure transducer is required to record useful data when the hydraulic conductivity is high (greater than 10^{-3} cm/sec). The standard stopwatch and water-level indicator method is adequate for lower conductivity units.

The procedures outlined below assume use of a pressure transducer. Readings should be collected at intervals set on the data logger if used. If manual readings are collected, the following intervals should be applied:

- 0 to 5 minutes, every 10 seconds;
- 5 to 10 minutes, every 30 seconds;
- 10 to 30 minutes, every 1 minute; and
- 30 to 60 minutes, every 2 minutes.

3.1 Falling-Head Tests

1. Install pressure transducer near the total well depth and permit transducer and water levels to equilibrate to ambient conditions. Secure transducer cable to prevent movement during the test. Begin transducer readings.
2. Manually measure the static water level.
3. Insert slug completely below static water level or add a water "slug."
4. Intermittently measure water level and note the time of measurement with reference to the data logger.
5. Continue monitoring until water level is within 90% of the static level.

If a solid slug was used, stop the falling-head test recording at this point and begin a rising-head test by removing the solid slug from the well. If a solid slug was not used, simply end recording by the data logger at the completion of the falling-head test.

3.2 Rising-Head Tests

1. Install pressure transducer near the total well depth and permit transducer and water levels to equilibrate to ambient conditions. Secure transducer cable to prevent movement during testing.
2. Manually measure the static water level.
3. Remove sufficient volume of water to lower the water level a minimum of 1 ft below static water level, or
4. Install the solid slug fully below water level; permit static conditions to return and then remove the solid slug.
5. Begin readings with data logger.
6. Intermittently measure water level and note time of measurement with reference to data logger.
7. Continue monitoring until the water level is within 90% of the static level.

As a check on equipment operation and in the event that test data for a particular well are not usable, the data should be printed out in the field. If there is equipment failure (e.g., a non-attainment of a 1-foot minimum head change, unexplained fluctuations in water levels, etc.), the test can be rerun with minimum time lost.

The well numbers, static and subsequent water levels, programmed test numbers, and general comments should be recorded in the field notebook.

4.0 PRECAUTIONS

Not applicable.

5.0 REFERENCES

ASTM Standard D 4043-96 (2004). *Standard Guide for Selection of Aquifer-Test Method in Determining of Hydraulic Properties of Well Techniques.*

Hvorslev, M.J. 1951. *Time-Lag and Soil Permeability in Ground Water Observations.* U.S. Army Engineers, Bulletin 36 - This method can be applied to both unconfined and confined aquifers but provides only approximate conductivity values (Freezer R.A. and J.A. Cherry, 1979, Groundwater, Prentice-Hall, Inc.).

Cooper, H.H., J.D. Bredehoeft, I.S. Papadopulos. 1967. *Response of a Finite-Diameter Well to an Instantaneous Charge of Water.* Water Resources Division, U.S. Department of the Interior Geological Survey, Vol. 3, No. 1 - This method can be applied to aquifers under confined conditions and requires that the well completely penetrate the aquifer. This method is believed to produce most reliable data when applied to low-permeability materials.

Bouwer, H. 1989. *The Bouwer and Rice Slug Test -- An Update.* Ground Water, Vol. 27, No. 3; and Bouwer, H. and R.C. Rice. 1976. *A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells.* Water Resources Research, Vol. 12, No. 3 - This method takes into account additional well and aquifer configuration data points not considered by Hvorslev's more simplistic method. Computer analyses are available.

Nguyen, V., G.F. Pinder. 1984. *Direct Calculation of Aquifer Parameters in Slug Test Analyses, Groundwater Hydraulics.* American Geophysical Union Water Resources Monograph 9 - This method can be applied to partially penetrating wells in both confined and unconfined aquifers it produces better values for low- to moderate-permeability materials.

STANDARD OPERATING PROCEDURE 50.1
SAMPLE LABELS

1.0 SCOPE AND APPLICATION

Every sample will have a sample label uniquely identifying the sampling point and analysis parameters. The purpose of this standard operating procedure (SOP) is to delineate protocols for the use of sample labels. An example label is included as Figure 50.1-A. Other formats with similar levels of detail are acceptable.

2.0 MATERIALS

- Sample label; and
- Indelible marker.

3.0 PROCEDURE

The use of preprinted sample labels is encouraged and should be requested from the analytical support laboratory during planning activities.
As each sample is collected, fill out a sample label ensuring the following information has been collected:

- Project name;
- Sample ID: enter the SWMU number and other pertinent information concerning where the sample was taken. This information should be included in site-specific work plan addenda;
- Date of sample collection;
- Time of sample collection;
- Initials of sampler(s);
- Analyses to be performed (NOTE: Due to number of analytes, details of analysis should be arranged with lab *a priori*); and
- Preservatives (water samples only).

Double-check the label information to make sure it is correct. Detach the label, remove the backing and apply the label to the sample container. Cover the label with clear tape, ensuring that the tape completely encircles the container.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

None.

6.0 REFERENCES

USEPA. 2001 (Reissued May 2006). *EPA Requirements for Quality Assurance Project Plans.* EPA/240/B-01/003, QA/R5, Final, Office of Research and Development, Washington, D.C. March 2001

FIGURE 50.1-A
SAMPLE LABEL

PROJECT NAME _____

SAMPLE ID _____

DATE: ____/____/____ TIME: _____:_____

ANALYTES: VOC SVOC P/P METALS CN
PAH D/F HERBs ANIONS TPH
ALK TSS

PRESERVATIVE: [HCl] [HNO_3] [NaOH] [H_2SO_4]

SAMPLER: _____

STANDARD OPERATING PROCEDURE 50.2
SAMPLE PACKAGING

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for the packing and shipping of samples to the laboratory for analysis.

2.0 MATERIALS

- Waterproof coolers (hard plastic or metal);
- Metal cans with friction-seal lids (e.g., paint cans);
- Chain-of-custody forms;
- Chain-of-custody seals (optional);
- Packing material;
- Sample documentation;
- Ice;
- Plastic garbage bags;
- Clear Tape;
- Zip-top plastic bags; and
- Temperature blanks provided by laboratory for each shipment.

3.0 PROCEDURE

1. Check cap tightness and verify that clear tape covers label and encircles container.
2. Wrap sample container in bubble wrap or closed cell foam sheets. Samples may be enclosed in a secondary container consisting of a clear zip-top plastic bag. Sample containers must be positioned upright and in such a manner that they will not touch during shipment.
3. Place several layers of bubble wrap, or at least 1 in. of vermiculite on the bottom of the cooler. Line cooler with open garbage bag; place all the samples upright inside the garbage bag and tie.
4. Double bag and seal loose ice to prevent melting ice from soaking the packing material. Place the ice outside the garbage bags containing the samples.
5. Pack shipping containers with packing material (closed-cell foam, vermiculite, or bubble wrap). Place this packing material around the sample bottles or metal cans to avoid breakage during shipment.
6. A temperature blank (provided by laboratory) will be included in each shipping container to monitor the internal temperature. Samples should be cooled to 4 degrees C on ice immediately after sampling.
7. Enclose all sample documentation (i.e., Field Parameter Forms, Chain-of-Custody forms) in a waterproof plastic bag and tape the bag to the underside of the cooler lid. If more than one cooler is being used, each cooler will have its own documentation. Add the total number of shipping containers included in each shipment on the chain-of-custody form.

8. Seal the coolers with signed and dated custody seals so that if the cooler were opened, the custody seal would be broken. Place clear tape over the custody seal to prevent damage to the seal.
9. Tape the cooler shut with packing tape over the hinges and place tape over the cooler drain.
10. Ship all samples via overnight delivery on the same day they are collected if possible.

4.0 MAINTENANCE

Not applicable.

5.0 PRECAUTIONS

5.1 PERMISSIBLE PACKAGING MATERIALS

- Non-absorbent
  - — Bubble wrap; and
  - — Closed cell foam packing sheets.
- Absorbent
  - — Vermiculite.

5.2 NON-PERMISSIBLE PACKAGING MATERIALS

- Paper;
- Wood shavings (excelsior); and
- Cornstarch “peanuts”.

6.0 REFERENCES

USEPA. 1990. *Sampler's Guide to the Contract Laboratory Program.* EPA/540/P-90/006, Directive 9240.0-06, Office of Emergency and Remedial Response, Washington, D.C., December 1990.

USEPA. 1991. *User's Guide to the Contract Laboratory Program.* EPA/540/O-91/002, Directive 9240.0-01D, Office of Emergency and Remedial Response. January 1991.

USEPA. 2001 (Reissued May 2006). *EPA Requirements for Quality Assurance Project Plans.* EPA/240/B-01/003, QA/R5, Final, Office of Research and Development, Washington, D.C. March 2001

STANDARD OPERATING PROCEDURE 70.1
INVESTIGATION-DERIVED MATERIAL

1.0 SCOPE AND APPLICATION

Management of investigation-derived material (IDM) minimizes the potential for the spread of waste material onsite or offsite through investigation activities. The purpose of this standard operating procedure (SOP) is to provide general guidelines for appropriate management of potentially contaminated materials derived from the field investigations. Specific procedures related to the transportation and disposal of hazardous waste are beyond the scope of this SOP.

2.0 INTRODUCTION

Investigation derived material (IDM) consists of waste materials that are known or suspected to be contaminated with waste substances through the actions of sample collection or personnel and equipment decontamination. These materials include decontamination solutions, disposable equipment, drill cuttings and fluids, and water from groundwater monitoring well development and purging. To the extent possible, the site manager will attempt to minimize the generation of these materials through careful design of decontamination schemes and groundwater sampling programs. Testing conducted on soil and water investigation-derived material will show if they are also hazardous wastes as defined by RCRA. This will determine the proper handling and ultimate disposal requirements.

The criteria for designating a substance as hazardous waste according to RCRA is provided in 40 CFR 261.3. If IDM meet these criteria, RCRA requirements will be followed for packaging, labeling, transporting, storing, and record keeping as described in 40 CFR 262.34. Those materials that are judged potentially to meet the criteria for a regulated solid or hazardous waste will be placed in DOT-approved 55-gallon steel drums or another type of DOT approved container; based on waste characteristics and volume.

Investigation-derived material will be appropriately placed in containers, labeled, and tested to determine disposal options in accordance with RCRA regulations and Virginia Hazardous Waste Management Regulations.

3.0 INVESTIGATION-DERIVED MATERIAL MANAGEMENT

Procedures that minimize potential for the spread of waste material include minimizing the volume of material generated, material segregation, appropriate storage, and disposal according to RCRA requirements.

3.1 WASTE MINIMIZATION

In the development of work plan addenda, each aspect of the investigation will be reviewed to identify areas where excess waste generation can be eliminated. General procedures that will eliminate waste include avoidance of unnecessary exposure of materials to hazardous material and coordination of sampling schedules to avoid repetitious purging of wells and use of sampling equipment.

3.2 WASTE SEGREGATION

Waste accumulation and management procedures to be used depend upon the type of material generated. For this reason, IDM described below are segregated into separate 55-gallon storage drums or other appropriate DOT containers. Waste materials that are known to be free of potential hazardous waste contamination (such as broken sample bottles or equipment containers and wrappings) must be collected separately for disposal to municipal systems. Large plastic garbage or "lawn and leaf" bags are useful for collecting this trash. Even "clean" sample bottles or Tyvek should be disposed of with care. Although they are not legally a problem, if

they are discovered by the public they may cause concern. Therefore, items that are known to be free from contamination but are also known to represent "hazardous or toxic waste" to the public must not be disposed of in any public trash receptacle, such as found at your hotel or park.

3.2.1 Decontamination Solutions

Solutions considered investigation-derived materials range from detergents, organic solvents, and acids used to decontaminate small hand samplers to steam-cleaning rinsate used to wash drill rigs and other large equipment. These solutions are to be placed in 55-gallon drums with bolt-sealed lids or other appropriate DOT approved containers. Residual liquid IDM from decontamination pads will be removed and appropriately placed in container(s) at the end of each field day.

3.2.2 Soil Cuttings and Drilling Muds

Soil cuttings are solid to semi-solid soils generated during trenching activities or drilling for the collection of subsurface soil samples or the installation of monitoring wells. Depending on the type of drilling, drilling fluids known as "muds" may be used to remove soil cuttings. Drilling fluids flushed from the borehole must be directed into a settling section of a mud pit. This allows reuse of the decanted fluids after removal of the settled sediments. Drill cuttings, whether generated with or without drilling fluids, are to be removed with a flat-bottomed shovel and placed in 55-gallon drums with bolt-sealed lids or other appropriate DOT containers, as conditions or volume of IDM dictate.

3.2.3 Well Development and Purge Water

Well development and purge water is removed from monitoring wells to repair damage to the aquifer following well installation, obtain characteristic aquifer groundwater samples, or measure aquifer hydraulic properties. The volume of groundwater to be generated will determine the appropriate container to be used for accumulation of IDM.

For well development and purging, 55-gallon drums are typically an efficient container for accumulation. When larger volumes of water are removed from wells, such as when pumping tests are conducted, the use of large-volume portable tanks such as "Baker Tanks" should be considered for IDM accumulation.

Analytical data for groundwater samples associated with the well development and purge water will be used to assist in characterizing IDM and evaluating disposal options.

3.2.4 Personal Protective Equipment and Disposable Sampling Equipment

Personal protective equipment and clothing (PPE) may include such items as Tyvek coveralls, gloves, booties, and APR cartridges. Disposable sampling equipment may include such items as plastic sheeting, bailers, disposable filters, disposable tubing and paper towels. PPE and disposable sampling equipment that have or may have contacted contaminated media (soil, water, etc.) will be segregated and placed in 55-gallon drums separate from soil and water IDM. Disposition of this type of IDM will be determined by the results of IDM testing of the media in which the PPE and sampling equipment contacted.

3.3 MATERIAL ACCUMULATION

The IDM in containers must be placed in an appropriate designated RCRA container accumulation area at RFAAP, where it is permissible to accumulate such waste. IDM placed into a designated 90-day accumulation area will be properly sealed, labeled and covered. All drums will be placed on pallets.

A secure and controlled waste staging area will be designated by the installation prior the commencement of field sampling activities. Per the facility's requirements as a RCRA large quantity generator, waste accumulation cannot exceed 90 days for materials presumed or shown to be RCRA-designated hazardous wastes; waste which is known not to be RCRA-designated waste should be promptly disposed to municipal waste systems or appropriate facility.

3.3.1 IDM Accumulation Containers

Containers will be DOT-approved (DOT 17H 18/16GA OH unlined) open-head steel drums or other DOT approved container, as appropriate.

Container lids should lift completely off be secured by a bolt ring (for drum). Order enough containers to accumulate all streams of expected IDM including soil, PPE and disposable sampling equipment, decontamination water, purge water, etc.

Solid and liquid waste streams will not be mixed in a container. PPE and expendable sampling equipment will be segregated from other IDM and placed in different containers than soil. Containers inside containers are not permitted. PPE must be placed directly in a drum not in a plastic bag.

Pallets are often required to allow transport of filled drums to the staging area with a forklift. Normal pallets are 3×4 ft and will hold two to three 55-gallon drums depending on the filled weight. If pallets are required for drum transport or storage, field personnel are responsible for ensuring that the empty drums are placed on pallets before they are filled and that the lids are sealed on with the bolt-tighten ring after the drums are filled. Because the weight of one drum can exceed 500 lbs, under no circumstances should personnel attempt to move the drums by hand.

3.3.2 Container Labeling

Each container that is used to accumulate IDM will be appropriately labeled at the time of accumulation and assigned a unique identification number for tracking purposes. The following information will be written in permanent marker on a drum label affixed on the exterior side at a location at least two-thirds of the way up from the bottom of the drum.

- Facility name.
- Accumulation start date and completion date.
- Site identifier information (SWMU, boring, well, etc.).
- Description of IDM.
- Drum ID No.

4.0 MATERIAL CHARACTERIZATION AND DISPOSAL

IDM will be characterized and tested to determine whether it is a hazardous waste as defined by 40 CFR Part 261 and to determine what disposal options exist in accordance with RCRA regulations and the Virginia Hazardous Waste Management Regulations (VHWMR).

In general, IDM will be considered a hazardous waste if it contains a listed hazardous waste or if the IDM exhibits a characteristic of hazardous waste.

Work plan addenda will identify the appropriate characterization and testing program for IDM based on the following:

- Site-specific conditions related to chemicals of concern, etc.
- The nature and quantity of expected IDM to be generated during site-specific investigations.
- Applicable Federal, State, and local regulations, such as RCRA, VHWMR regulations and policies and procedures, and Army Regulation 200-1.
- RFAAP specific requirements and policies for IDM characterization and disposal at the time of the investigation.

In general, appropriate USEPA SW 846 Test Methods for Evaluating Solid Waste will be used for testing IDM and will be specified in work plan addenda. Other appropriate test methods may be specified by RFAAP in addition to SW 846 Methods that are specific to installation operations, the site of interest (percent explosive content, reactivity, etc.), or requirements for disposal at RFAAP water treatment facilities or publicly owned treatment works.

Responsibility for the final disposal of IDM will be determined before field activities are begun and will be described in work plan addenda. Off-site disposal of IDM will be coordinated with RFAAP (generator) to ensure appropriate disposition. The contractor will coordinate IDM transportation and disposal activities for RFAAP (generator).

At the direction of RFAAP, appropriate waste manifests will be prepared by the USACE contractor or Alliant Techsystems subcontractor for transportation and disposal. Alliant Techsystems or other appropriate RFAAP entity will be listed as the generator and an appointed representative from RFAAP will review and sign the manifest for offsite disposal.

RFAAP will make the final decision on the selection of the transporter, storage, and disposal facility (TSDFs) or recycling facility. RFAAP will provide the contractor a listing of previously used TSDFs for priority consideration. Proposed facilities that are not included on the listing are required to provide a copy of the TSDFs most recent state or federal inspection to the installation. Waste characterization and testing results will be submitted to RFAAP (generator) for review and approval before final disposition of the material.

Hazardous waste: Prior to final disposition, a hazardous waste manifest will be furnished by the TSDF to accompany transport to the disposal facility. Following final disposition, a certificate of disposal will be furnished by the disposal facility. Copies of the manifests and certificates of disposal are to be provided to RFAAP and retained on file by the contractor or subcontractor.

4.0 PRECAUTIONS

- Because the weight of one drum can exceed 500 lbs, under no circumstances should personnel attempt to move drums by hand.
- Refer to the site-specific health and safety plan when managing IDM.

5.0 REFERENCES

Safety Rules for Contractors and Subcontractors, (As Updated). Alliant Techsystems, Incorporated, Radford Army Ammunition Plant.

STANDARD OPERATING PROCEDURE 80.1
DECONTAMINATION

1.0 SCOPE AND APPLICATION

Before leaving the site, all personnel or equipment involved in intrusive sampling or having entered a hazardous waste site during intrusive sampling must be thoroughly decontaminated to prevent adverse health effects and minimize the spread of contamination. Equipment must be decontaminated between sites to preclude cross-contamination. Decontamination water will be free of contaminants as evidenced through either chemical analyses or certificates of analysis. This standard operating procedure (SOP) describes general decontamination requirements for site personnel and sampling equipment. Decontamination procedures for contaminants requiring a more stringent procedure, e.g., dioxins/furans, will be included in site-specific addenda.

2.0 MATERIALS

- Plastic sheeting, buckets or tubs, pressure sprayer, rinse bottles, and brushes;
- U.S. Army Corps of Engineers or installation approved decontamination water source;
- Deionized ultra-filtered, HPLC-grade organic free water (DIUF);
- Non-phosphate laboratory detergent;
- Nitric Acid, 0.1 Normal (N) solution;
- Pesticide-grade solvent, Methanol;
- Aluminum foil;
- Paper towels;
- Plastic garbage bags; and
- Appropriate containers for management of investigation-derived material (IDM).

3.0 PROCEDURE

3.1 SAMPLE BOTTLES

At the completion of each sampling activity the exterior surfaces of the sample bottles must be decontaminated as follows:

- Be sure that the bottle lids are on tight.
- Wipe the outside of the bottle with a paper towel to remove gross contamination.

3.2 PERSONNEL DECONTAMINATION

Review the site-specific health and safety plan for the appropriate decontamination procedures.

3.3 EQUIPMENT DECONTAMINATION

3.3.1 Drilling Rigs

Drilling rigs and associated equipment, such as augers, drill casing, rods, samplers, tools, recirculation tank, and water tank (inside and out), will be decontaminated before site entry, after over-the-road mobilization and immediately upon departure from a site after drilling a hole. Supplementary cleaning will be performed before site entry. There is a likelihood that contamination has accumulated on tires and as spatter or dust en route from one site to the next.

1. Place contaminated equipment in an enclosure designed to contain all decontamination residues (water, sludge, etc.).
2. Steam-clean equipment until all dirt, mud, grease, asphaltic, bituminous, or other encrusting coating materials (with the exception of manufacturer-applied paint) has been removed.
3. Water used will be taken from an approved source.
4. When cross-contamination from metals is a concern, rinse sampling components such as split spoons, geo-punch stems, and augers with nitric acid, 0.1N.
5. Rinse with DIUF water.
6. When semi-volatile and non-volatile organics may be present, rinse the sampling components with pesticide-grade solvent methanol.
7. Double rinse the sampling components with DIUF water.
8. Decontamination residues and fluids will be appropriately managed as IDM per work plan addenda and SOP 80.1.

3.3.2 Well Casing and Screen

Prior to use, well casing and screen materials will be decontaminated. This activity will be performed in the leak proof, decontamination pad, which will be constructed prior to commencement of the field investigation. The decontamination process will include:

- Steam cleaning with approved source water.
- Rinse with DUIF water.
- Air-dry on plastic sheeting.
- Wrap in plastic sheeting to prevent contamination during storage/transit.

3.3.3 Non Dedicated Submersible Pumps Used for Purging and Sampling

1. Scrub the exterior of the pump to remove gross (visible) contamination using appropriate brushes, approved water, and non-phosphate detergent (steam cleaning may be substituted for detergent scrub).
2. Pump an appropriate amount of laboratory detergent solution (minimum 10 gallons) to purge and clean the interior of the pump.
3. Rinse by pumping no less than 10 gallons of approved water to rinse.
4. Rinse the pump exterior with approved decontamination water.

5. When cross-contamination from metals is a concern, rinse the pump exterior with approved nitric acid 0.1N solution.
6. Rinse the pump exterior with DIUF water.
7. When semi-volatile and non-volatile organics may be present, rinse the pump exterior with pesticide-grade solvent methanol.
8. Double rinse the pump exterior with DIUF water.
9. Air-dry on aluminum foil or clean plastic sheeting.
10. Wrap pump in aluminum foil or clean plastic sheeting, or store in a clean, dedicated PVC or PTFE storage container.
11. Solutions and residuals generated from decontamination activities will be managed appropriately as IDM per work plan addenda and SOP 80.1.

3.3.4 Sample Equipment and Measuring Water Level Devices

1. Scrub the equipment to remove gross (visible) contamination using appropriate brush (es), approved water, and non-phosphate detergent.
2. Rinse with approved source water.
3. When cross-contamination from metals is a concern, rinse the sampling equipment with approved nitric acid 0.1N solution.
4. Rinse equipment with DIUF water.
5. When semi-volatile and non-volatile organics may be present, rinse the sampling equipment with pesticide-grade solvent methanol.
6. Double rinse the sampling equipment with DIUF water.
7. Air-dry on aluminum foil or clean plastic sheeting.
8. Wrap in aluminum foil, clean plastic sheeting, or zip top bag or store in a clean, dedicated PVC or PTFE storage container.
9. Solutions and residuals generated from decontamination activities will be managed appropriately as IDM per work plan addenda and SOP 80.1.

3.3.5 Other Sampling and Measurement Probes

Temperature, pH, conductivity, Redox, and dissolved oxygen probes will be decontaminated according to manufacturer's specifications. If no such specifications exist, remove gross contamination and triple-rinse probe with DIUF water.

4.0 PRECAUTIONS

- Manage IDM appropriately according to the requirements specified in work plan addenda.
- Follow appropriate procedures as specified in the site-specific health and safety plan.

5.0 REFERENCES

USACE. 2001. Requirements for the Preparation of Sampling and Analysis Plans. EM 200-1-3. 1 February.

STANDARD OPERATING PROCEDURE 90.1
PHOTOIONIZATION DETECTOR (HNu Model PI–101 and HW–101)

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to delineate protocols for field operations with a photoionization detector (HNu Systems Model PI–101 or HW–101). The photoionization detector (PID) detects total ionizables; hence it is used to monitor both organic and inorganic vapors and gases to determine relative concentrations of air contaminants. This information is used to establish level of protection and other control measures such as action levels. The PID cannot effectively detect compounds having ionization potentials above the photon energy level of the lamp used; therefore, methane, which has an ionization potential of 12.98 eV, is undetectable by PIDs because the lamps produce 9.5, 10.2, or 11.7 eV.

Use of brand names in this SOP is in not intended as an endorsement or mandate that a given brand be used. Alternate equivalent brands of detectors, sensors, meters, etc., are acceptable. If alternate equipment is to be used, the contractor shall provide applicable and comparable SOPs for its maintenance and calibration.

2.0 MATERIALS

- HNu Systems Model PI–101 or HW–101 survey probe with 9.5, 10.2, or 11.7 eV lamp;
- Lead-acid gel-cell battery;
- Calibration gas (e.g., isobutylene, 101 ppm) with regulator;
- Tygon tubing;
- Tedlar bag (optional);
- Instrument logbook; and
- Field logbook.

3.0 PROCEDURE

These procedures are to be followed when using the HNu in the field.

3.1 STARTUP

1. Before attaching the probe, check the function switch on the control panel to ensure that it is in the off position. Attach the probe by plugging it into the interface on the top of the readout module.
2. Turn the function switch to the battery check position. The needle on the meter should read within or above the green battery arc on the scale; if not, recharge the battery. If the red indicator light comes on, the battery needs recharging or service may be indicated.
3. Turn the function switch to any range setting. Listen for the hum of the fan motor. Check meter function by holding a solvent-based marker pen near the sample intake. If there is no needle deflection, look briefly into the end of the probe (no more than 1 or 2 sec) to see if the lamp is on; if it is on, it will give a purple glow. Do not stare into the probe any longer than 2 sec. Long-term exposure to UV light can damage the eyes. (See further information in Section 5.)
4. To zero the instrument, turn the function switch to the standby position and rotate the zero adjustment until the meter reads zero. A calibration gas is not needed since this is an electronic zero adjustment. If the span adjustment setting is changed after the zero is set, the zero should be rechecked and adjusted if

necessary. Allow the instrument to warm up for 3–5 min to ensure that the zero reading is stable. If necessary, readjust the zero.

3.2 OPERATIONAL CHECK

Follow the startup procedure in Section 3.1.

With the instrument set on the 0–20 range, hold a solvent-based marker near the probe tip. If the meter deflects upscale, the instrument is working.

3.3 FIELD CALIBRATION PROCEDURE

1. Follow the startup procedures in Section 3.1 and the operational check in Section 3.2.
2. Set the function switch to the range setting for the concentration of the calibration gas.
3. Attach a regulator HNu P/N 101-351 or equivalent (flow = 200 to 300 ml/min) to a disposable cylinder of isobutylene (HNu 101-351 or equivalent). Connect the regulator to the probe of the HNu with a piece of clean Tygon tubing. Turn on the valve of the regulator.
4. After 5 sec, adjust the span dial until the meter reading equals the benzene concentration of the calibration gas used, corrected to its equivalence, which should be marked on the canister (Isobutylene ~0.7X benzene).
5. Record in the field log the instrument ID No., serial No., initial and final span settings, date, time, location, concentration and type of calibration gas used, and the signature of the person who calibrated the instrument.
6. If the HNu does not function or calibrate properly, the project equipment manager is to be notified as soon as possible. Under no circumstances is work requiring monitoring with a PI–101 or HW–101 to be done with a malfunctioning instrument.

3.4 CALIBRATION TO A GAS OTHER THAN ISOBUTYLENE

The HNu may be calibrated to any certified calibration gas. However, after calibration, all subsequent instrument readings will be relative to the calibration gas used. General procedures include the following:

1. Calibrate according to procedure 3.3.
2. Partially fill and flush one-to-two times a gas bag (Tedlar recommended) with the certified National Institute of Standards and Technology (NIST) (formerly NBS) traceable calibration gas. Then fill the bag with 1–3 L of the calibration gas. If the gas is toxic, this must be done in a fume hood.
3. Feed the calibration gas into the probe with the range set for the value of the gas. After 5 sec, adjust the span control until the meter reads the value of the calibration gas.
4. Record the results of the calibration on the calibration/maintenance log and attach a new calibration sticker (if available) or correct the existing sticker to reflect the new calibration data. All subsequent readings will be relative to the new calibration gas.

3.5 OPERATION

1. Follow the startup procedure, operational check, and calibration check (refer to Section 3.1).
2. Set the function switch to the appropriate range. If the concentration of gas vapors is unknown, set the function switch to 0-20 ppm range. Adjust if necessary.
3. Prevent exposing the HNu to excessive moisture, dirt, or contaminant while monitoring the work activity as specified in the Site Health and Safety Plan.

4. When the activity is completed, or at the end of the day, carefully clean the outside of the HNu with a damp disposable towel to remove all visible dirt. Return the HNu to a secure area and place on charge. Charge after each use; the lead acid batteries cannot be ruined by over charging.
5. With the exception of the probe's inlet and exhaust, the HNu can be wrapped in clear plastic to prevent it from becoming contaminated and to prevent water from getting inside in the event of precipitation. If the instrument becomes contaminated, make sure to take necessary steps to decontaminate it. Call the Equipment Administrator if necessary; under no circumstances should an instrument be returned from the field in a contaminated condition.

4.0 MAINTENANCE

Calibration/maintenance logs are to be filled in completely whenever a PI-101 or HW-101 receives servicing. This is true of both contractor-owned and rental instruments.

The equipment manager should be called to arrange for a fresh instrument when necessary. The contractor's equipment facility is responsible for arranging all repairs that cannot be performed by the project equipment manager.

4.1 ROUTINE SERVICE

The PID's performance is affected by a number of factors. These include but are not limited to the decay of the UV lamp output over time and the accumulation of dust and other particulate material and contaminates on the lamp and in the ion chamber. Because of these factors, the PID should not be left in the field for a period of more than 2 weeks before being replaced with a fresh instrument. If a site is going to be inactive for a period of more than a week, all monitoring instruments are to be returned to the project equipment manager or his trained designee for servicing and/or reassignment. The following procedures are to be performed at the designated intervals for routine service.

Procedure	Frequency
Operational check	Before use and at instrument return
Field calibration	Before use and at instrument return
Full calibration	Bi-weekly (return instrument to equipment manager for replacement with a fresh unit)
Clean UV lamp and	Bi-weekly or as needed ion chamber
Replace UV Lamp	As needed

4.1.1 UV Lamp and Ion Chamber Cleaning

During periods of analyzer operation, dust and other foreign materials are drawn into the probe forming deposits on the surface of the UV lamp and in the ion chamber. This condition is indicated by meter readings that are low, erratic, unstable, non-repeatable, or drifting and show apparent moisture sensitivity. These deposits interfere with the ionization process and cause erroneous readings. Check for this condition regularly to ensure that the HNu is functioning properly. If the instrument is malfunctioning, call your equipment manager to arrange to have a fresh replacement.

4.1.2 Lamp eV Change

If different applications for the analyzer would require different eV lamps, separate probes, each with its own eV lamp, must be used. A single readout assembly will serve for any of the probes (9.5, 10.2, and 11.7 eV). A change in probe will require resetting of the zero control and recalibrating the instrument. The 11.7 eV

lamp will detect more compounds than either of the two lower eV lamps. However, the 11.7 eV probe needs more frequent calibration; it burns out much faster than the lower eV lamps.

5.0 PRECAUTIONS

- The HNu PI–101 and HW–101 are designed to sample air or vapors only. *Do not allow any liquids or low boiling vapors to get into the probe or meter assembly.*
- High concentrations of any gas can cause erroneous readings. High humidity can also cause the instrument readings to vary significantly from the actual concentration of gases or vapors present. This is true even through the HNu cannot react to water vapor.
- High humidity, dust, and exposure to concentrations of low boiling vapors will contaminate the ion chamber, causing a steady decrease in sensitivity.
- Continued exposure to ultraviolet light generated by the light source can be harmful to eyesight. If a visual check of the UV lamp is performed *do not look at the light source from a distance closer than 6 inches with unprotected eyes.* Use eye protection (UV-blocking sunglasses or safety glasses). Only look briefly—never more than about 2 sec.
- Place the instrument on charge after each use; the lead batteries cannot be ruined by over charging.
- If at any time the instrument does not check out or calibrate properly in the field, the equipment manager is to be notified immediately and a replacement obtained for the malfunctioning instrument. Under no circumstances should fieldwork requiring continuous air monitoring for organic vapors and/or gases be done with a malfunctioning Hnu or without a HNu or an approved comparable instrument.

6.0 REFERENCES

Manufacturer's Equipment Manual.

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APPENDIX C

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APPENDIX C
List of Sub-Appendices

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Appendix C.2 – Boring Logs
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Appendix C.4 – Field Sampling Data Sheets
- **Appendix C.4.1 – Soil Sampling Forms**
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Appendix C.5 – Investigation-Derived Material Analytical Results

Appendix C.6 – Toxicity Characteristic Leaching Procedure (TCLP) Results

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APPENDIX C.1

PHYSICAL SOIL SAMPLE RESULTS

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Radford Army Ammunition Plant
LABORATORY TESTING DATA SUMMARY

BORING NO.	DEPTH (ft)	IDENTIFICATION TESTS													PERMEABILITY (cm/sec)	REMARKS
		WATER CONTENT (%)	LIQUID LIMIT	PLASTIC LIMIT	PLAS. IND.	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	HYDROMETER % MINUS 2 μm (%)	ORGANIC CONTENT (burnoff) (%)	pH Distilled Water	pH 0.01 M CaCl Solution	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY		
13SB10	2-3	29.6		np		SM	28.6		3.5	6.9	6.6	115.9	89.4	2.688	1.3E-5	
13SB7	12.7	16.0				GC	13.3		1.1	6.3	6.2	130.0	112.0	2.711		
37SB1	6-6.5	21.8	22	18	4	SC-SM	43.0		1.5	6.3	6.0	130.1	106.8	2.677	1.6E-7	
37SB2	15.5-16	17.0				SM	33.7		1.6	5.1	5.4	122.7	104.9	2.746	2.3E-4	
38SB1	7	20.9				SM	34.8		1.7	7.1	6.6	125.8	104.1	2.713		
38SB2	15.5	3.7				SM	13.8		1.1	6.8	6.3	116.0	111.9	2.702	2.0E-3	
46SB1	14.5	24.5	32	18	14	SC	50.0	23	2.2	5.7	5.9	127.5	102.4	2.729	3.0E-8	
46SB2	9.5-10	20.4				SM	26.9		1.8	6.2	5.7	123.4	102.5	2.735		
57SB2	7.5-8	28.4				CL-ML	70.2		2.6	5.6	3.9	94.1	73.3	2.701		
57SB3	16.5-17	46.4	83	29	54	CH	89.6	46	3.6	5.3	*	106.4	72.7	2.694	1.8E-7	
68SB2	18-18.5	30.4				CL-ML	54.9		1.5	6.8	6.2	100.2	76.8	2.680		
68SB3	7-7.5	35.8	49	29	20	ML	75.9	26	3.6	5.2	3.8	115.4	85.0	2.744	1.9E-6	
69SB1	11-12	34.1	34	19	15	CL	74.1		3.3	9.5	7.8	128.2	95.6	2.688		
69SB3	7.5-8.5	32.7				CL	77.7		3.5	7.1	6.0	117.7	88.7	2.707	6.6E-9	
ASB1	22-24	36.6	63	30	33	CH	58.8		3.6	4.2	3.8	115.6	84.7	2.735		
ASB2	14-16	43.4	56	35	21	MH	78.4		2.5	4.3	3.9	110.2	76.8	2.662	6.7E-7	
FSB1	18.5-19	30.6	47	20	27	CL	79.2	30	1.4	7.1	*	119.2	91.2	2.628	8.6E-8	
FSB2	7.5-8	15.6				SM	19.9		1.4	6.8	6.3	111.0	96.1	2.807		
QSB1	9.5-10	26.4	31	21	10	CL	52.6		1.8	6.4	6.5	123.8	97.9	2.717	1.2E-7	
QSB2	24	6.2				GP	3.9		0.6	6.4	6.2	121.6	114.6	2.692		

Note: (1) CS symbol based on visual observation and Sieve and Atterberg limits reported.

TABLE _____

Radford Army Ammunition Plant

SUMMARY OF LABORATORY PERMEABILITY TESTS PERFORMED ON RECONSTITUTED SAMPLES

BORING NO.	SAMPLE NO.	DEPTH	WATER CONTENTS	TOTAL UNIT WGTS	DRY UNIT WGTS	STRESSES	DURING CONSOL.	DURING TEST	COEFFICIENT OF PERM. K,	REMARKS
			INITIAL	INITIAL	INITIAL	EFFECTIVE	TIME	PERMEANT	(@ 20 C)	
			PRE-TEST	PRE-TEST	PRE-TEST	BACK PRESSURE	VOLUMETRIC STRAIN	INITIAL GRADIENT		
		(ft)	(%)	(pcf)	(pcf)	(psi)	(days, %)		(cm/sec)	
13SB10		2-3	29.6	115.9	89.4	5.0	over night	tap water	1.3E-5	P6775
			33.2	122.9	92.3	100.0	3.2	18		
37SB1		6-6.5	21.8	130.1	106.8	5.0	over night	tap water	1.6E-7	P6776
			20.5	131.7	109.3	100.0	2.3	21		
37SB2		15.5-16	17.0	122.7	104.9	5.0	over night	tap water	2.3E-4	P6779
			23.9	130.3	105.2	100.0	0.3	4		
38SB2		15.5	3.7	116.0	111.9	5.0	over night	tap water	2.0E-3	P6785
			18.2	133.7	113.1	100.0	1.1	1		
46SB1		14.5	24.5	127.5	102.4	5.0	over night	tap water	3.0E-8	P6782
			24.4	127.8	102.8	100.0	0.4	23		
57SB3		16.5-17	46.4	106.4	72.7	5.0	over night	tap water	1.8E-7	P6783
			48.3	108.4	73.0	100.0	0.5	21		
68SB3		7-7.5	35.8	115.4	85.0	5.0	over night	tap water	1.9E-6	P6780
			36.5	116.8	85.6	100.0	0.8	18		not recon.
69SB3		7.5-8.5	32.7	117.7	88.7	5.0	over night	tap water	6.6E-9	P6773
			32.2	121.4	91.8	100.0	3.4	39		
ASB2		14-16	43.4	110.2	76.8	5.0	over night	tap water	6.7E-7	P6774
			42.0	111.4	78.4	100.0	2.1	16		
FSB-1		18.5-19.0	30.6	119.2	91.2	5.0	over night	tap water	8.6E-8	P6784
			28.8	120.8	93.8	100.0	2.7	23		
QSB1		9.5-10	26.4	123.8	97.9	5.0	over night	tap water	1.2E-7	P6781
			24.6	126.7	101.7	100.0	3.7	22		

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: 37SB1 Test No.: P6776

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 6-6.5

Specimen - Apparatus set-up - Test Information Cell No. H-1 Apparatus No. 8 Stage No.: 2

Preliminary Length/Area Calculations

Lo =	2.751	in	Lo=	6.987	cm
dLc=	0.032	in	Ao =	20.27	cm^2
Lc=	2.719	in	Vo =	141.60	cm^3
			Lc=	6.905	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	4.94	cm^3
			Vc =	136.66	cm^3
Sc =	0.349	cm^{-1}	Ac=	19.791	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or			
	x	with stones or		Stones with filter paper or		top + bottom	
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination			
3) During saturation: Water flushed up sides of specimen to remove ai	x	No		Yes			
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only	
5) Direction of permeant :	x	Up during or		Down during permeation			
6) Permeant: water used	x	Tap		Distilled			
or		Demineralized		0.005 N calcium sulfate (CaSO4)			

Equations Used

Kt = - 0.0000771 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3564

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	6.905	cm	ε_{axial} =	1.2%	
Ac =	20.037	cm^2			
Vc=	138.36	cm^3	ε_{vol} =	2.3%	
Sc =	0.345	cm^{-1}	Sc = Lc / Ac , final		

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	21.82	130.1	106.8	99.9
PreTest	20.51	131.7	109.3	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **1.62E-07** cm/sec

(i_o)ave = 20.5

Tested By: DT Reviewed By: G. Thomas

Consol Stage-Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	22.3	10/31/03	09	29	00	105.0	100.0	55.40	44.12	1.01	1.77E-07
final	22.9	10/31/03	10	12	00			53.35	44.84		1.65E-07
1	RT = 0.941	dT =	43.00 min			σ'_c =	0.7 ksf	0.162	0.159	io= 20.5	1%
initial	22.9	10/31/03	10	14	00	105.0	100.0	55.40	44.12	1.08	1.79E-07
final	23.2	10/31/03	10	37	00			54.22	44.51		1.64E-07
2	RT = 0.930	dT =	23.00 min			σ'_c =	0.7 ksf	0.093	0.086	io= 20.5	1%
initial	23.2	10/31/03	10	39	00	105.0	100.0	55.40	44.12	1.06	1.77E-07
final	23.7	10/31/03	11	05	00			54.09	44.56		1.61E-07
3	RT = 0.920	dT =	26.00 min			σ'_c =	0.7 ksf	0.103	0.097	io= 20.5	-1%
initial	23.7	10/31/03	11	06	00	105.0	100.0	55.40	44.12	0.94	1.77E-07
final	24.0	10/31/03	11	37	00			53.87	44.70		1.59E-07
4	RT = 0.910	dT =	31.00 min			σ'_c =	0.7 ksf	0.121	0.128	io= 20.5	-2%

CONSTANT HEAD HYDRAULIC CONDUCTIVITY TEST
ASTM D 5084 - 90

Project No. **31737767** BORING: 37SB2

Project Name: **Radford Army Ammunition Pla** SAMPLE: DEPTH (ft): 15.5-16 Test No.: **P6779**

Specimen - Apparatus set-up - Test Information Apparatus No. C-2 Cell No. H-7 Stage 2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or	
		with stones or		Stones with filter paper or	top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination	
3) During saturation: Water flushed up sides of specimen to remove air:			x	No	Yes
4) During consolidation:	x	Top and bottom drainage or		Top	Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation	
6) Permeant: water used	x	Tap		Distilled	
		Demineralized		0.005 N calcium sulfate (CaSO4)	

Consol Stage- Trial No.	Temp. ° C	Date	Time hr	min	sec	Initial σ_c psi	Ub psi	Dial Indicator in	Pressure Head Reading Mercury (inch)	Gage (psi)	Flow Reading (cm)	Flow Vol (cm3) Rate (cm3/sec)	Fluid Head Reading Head (cm)	Tail (cm)	Total Head Uncorrected Correction Corrected (cm)	Gradient	Permeability Preliminary Final at 20°C cm/sec
initial	24.7	11/3/03	00	00	00	105.0	100.0	0.213			3.90	33.088	68.00	35.85	32.15		
final	24.7	11/3/03	00	25	24						5.50	0.0217	68.00	35.85	2.93		2.67E-04
1	RT = 0.894	dT =		25.40 min		σ'_c =	0.7 ksf						68	35.85	29.22	4.14	2.36E-04
initial	24.7	11/3/03	00	00	00	105.0	100.0	0.213			4.10	47.564	68.00	35.85	32.15		
final	24.7	11/3/03	00	36	36						6.40	0.0217	68.00	35.85	2.92		2.66E-04
2	RT = 0.894	dT =		36.60 min		σ'_c =	0.7 ksf						68	35.85	29.23	4.14	2.35E-04
initial	24.7	11/3/03	00	00	00	105.0	100.0	0.213			3.60	64.108	68.00	35.85	32.15		
final	24.7	11/3/03	00	50	15						6.70	0.0213	68.00	35.85	2.87		2.61E-04
3	RT = 0.894	dT =		50.25 min		σ'_c =	0.7 ksf						68	35.85	29.28	4.15	2.30E-04
initial	24.7	11/3/03	00	00	00	105.0	100.0	0.213			4.50	41.36	68.00	35.85	32.15		
final	24.7	11/3/03	00	31	48						6.50	0.0217	68.00	35.85	2.92		2.66E-04
4	RT = 0.894	dT =		31.80 min		σ'_c =	0.7 ksf						68	35.85	29.23	4.14	2.35E-04

Preliminary Length/Area Calculations

Lo =	2.790	in	Lo=	7.087	cm
Ao=	3.076	in^2	Ao =	19.84	cm^2
Vo=	8.582	in^3	Vo =	140.63	cm^3
Lc =	7.054	cm	Vc =	138.67	cm^3
Ac=	19.659	cm^2			

Tested By: DT Reviewed By: G. Thomas

TEST SUMMARY

Final Specimen and Test Conditions

Lc = 7.054 cm ε_{axial} = 0.5%

Ac = 19.885 cm^2

Vc= 140.26 cm^3 ε_{vol} = 0.3%

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	16.99	122.7	104.9	70.7
PreTest	23.88	130.3	105.2	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 °C: **2.34E-04** cm/sec

(i_o)ave = 4.15

HYDRAULIC CONDUCTIVITY TEST

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 31737767 BORING: QSB1 Test No.: P6781

Project Name: Radford Army Ammunition Plant SAMPLE: DEPTH (ft): 9.5-10

Specimen - Apparatus set-up - Test Information Cell No. H-1 Apparatus No. 3 Stage No.: 2

Preliminary Length/Area Calculations

Lo =	2.929	in	Lo=	7.439	cm
dLc=	0.041	in	Ao =	20.06	cm^2
Lc=	2.888	in	Vo =	149.19	cm^3
			Lc=	7.335	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	6.27	cm^3
			Vc =	142.92	cm^3
Sc =	0.376	cm^{-1}	Ac=	19.487	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or			
	x	with stones or		Stones with filter paper or			top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination			
3) During saturation: Water flushed up sides of specimen to remove ai			x	No		Yes	
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only	
5) Direction of permeant :	x	Up during or		Down during permeation			
6) Permeant: water used	x	Tap		Distilled			
or		Demineralized		0.005 N calcium sulfate (CaSO4)			Permeability

Equations Used

Kt = - 0.0000755 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3132

Consol Stage-Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	24.1	11/3/03	09	54	00	105.0	100.0	61.50	48.57	1.00	1.33E-07
final	24.4	11/3/03	10	32	00			59.90	49.07		1.19E-07
1	RT = 0.900	dT =		38.00 min		σ'_c =	0.7 ksf	0.120	0.119	io= 22.2	0%
initial	24.4	11/3/03	10	33	00	105.0	100.0	61.50	48.57	1.00	1.40E-07
final	24.6	11/3/03	11	02	00			60.19	48.98		1.24E-07
2	RT = 0.894	dT =		29.00 min		σ'_c =	0.7 ksf	0.098	0.098	io= 22.2	5%
initial	24.6	11/3/03	11	03	00	105.0	100.0	61.50	48.57	0.98	1.33E-07
final	25.0	11/3/03	11	48	00			59.63	49.17		1.17E-07
3	RT = 0.887	dT =		45.00 min		σ'_c =	0.7 ksf	0.140	0.143	io= 22.2	-1%
initial	25.0	11/3/03	11	49	00	105.0	100.0	61.50	48.57	0.99	1.29E-07
final	25.4	11/3/03	12	50	00			59.12	49.32		1.12E-07
4	RT = 0.877	dT =		61.00 min		σ'_c =	0.7 ksf	0.178	0.179	io= 22.2	-5%

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	7.335	cm	ε_{axial} =	1.4%
Ac =	19.589	cm^2		
Vc=	143.68	cm^3	ε_{vol} =	3.7%
Sc =	0.374	cm^{-1}	Sc = Lc / Ac , final	

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	26.43	123.8	97.9	98.0
PreTest	24.61	126.7	101.7	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **1.18E-07** cm/sec

(i_o)ave = 22.2

Tested By: DT Reviewed By: G. Thomas

CONSTANT HEAD HYDRAULIC CONDUCTIVITY TEST
ASTM D 5084 - 90

Project No. **31737767** BORING: 38SB2

Project Name: **Radford Army Ammunition Pla** SAMPLE: DEPTH (ft): 15.5 Test No.: **P6785**

Specimen - Apparatus set-up - Test Information Apparatus No. C-2 Cell No. H-7 Stage 2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or	
		with stones or		Stones with filter paper or	top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination	
3) During saturation: Water flushed up sides of specimen to remove air:			x	No	Yes
4) During consolidation:	x	Top and bottom drainage or		Top	Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation	
6) Permeant: water used	x	Tap		Distilled	
		Demineralized		0.005 N calcium sulfate (CaSO4)	

Consol Stage- Trial No.	Temp. ° C	Date	Time hr	min	sec	Initial σ_c psi	Ub psi	Dial Indicator in	Pressure Head Reading Mercury (inch)	Gage (psi)	Flow Reading (cm)	Flow Vol (cm3) Rate (cm3/sec)	Fluid Head Reading Head (cm)	Tail (cm)	Total Head Uncorrected Correction Corrected (cm)	Gradient	Permeability Preliminary Final at 20°C cm/sec
initial	22.0	11/4/03	09	26	00	105.0	100.0				3.90	59.972	51.50	40.60	10.90		
final	22.0	11/4/03	09	51	48						6.80	0.0387	51.50	40.60	5.23		2.09E-03
1	RT = 0.952	dT =		25.80 min		σ'_c =	0.7 ksf						51.5	40.6	5.67	0.93	2.00E-03
initial	22.0	11/4/03	09	53	00	105.0	100.0				4.00	62.04	51.50	40.60	10.90		
final	22.4	11/4/03	10	19	36						7.00	0.0389	51.50	40.60	5.24		2.10E-03
2	RT = 0.947	dT =		26.60 min		σ'_c =	0.7 ksf						51.5	40.6	5.66	0.93	2.00E-03
initial	22.4	11/4/03	10	21	00	105.0	100.0				4.00	66.176	51.50	40.60	10.90		
final	22.5	11/4/03	10	49	06						7.20	0.0393	51.50	40.60	5.29		2.14E-03
3	RT = 0.942	dT =		28.10 min		σ'_c =	0.7 ksf						51.5	40.6	5.61	0.92	2.03E-03
initial	22.5	11/4/03	10	51	00	105.0	100.0				4.00	64.108	51.50	40.60	10.90		
final	22.7	11/4/03	11	18	06						7.10	0.0394	51.50	40.60	5.32		2.16E-03
4	RT = 0.938	dT =		27.10 min		σ'_c =	0.7 ksf						51.5	40.6	5.58	0.92	2.04E-03

Preliminary Length/Area Calculations

Lo =	2.405	in	Lo=	6.109	cm
Ao=	3.099	in^2	Ao =	20.00	cm^2
Vo=	7.454	in^3	Vo =	122.16	cm^3
Lc =	6.097	cm	Vc =	121.40	cm^3
Ac=	19.912	cm^2			

Tested By: DT Reviewed By: G. Thomas

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	6.097	cm	ε_{axial} =	0.2%	
Ac =	19.819	cm^2			
Vc=	120.83	cm^3	ε_{vol} =	1.1%	

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	3.70	116.0	111.9	19.7
PreTest	18.19	133.7	113.1	100.0

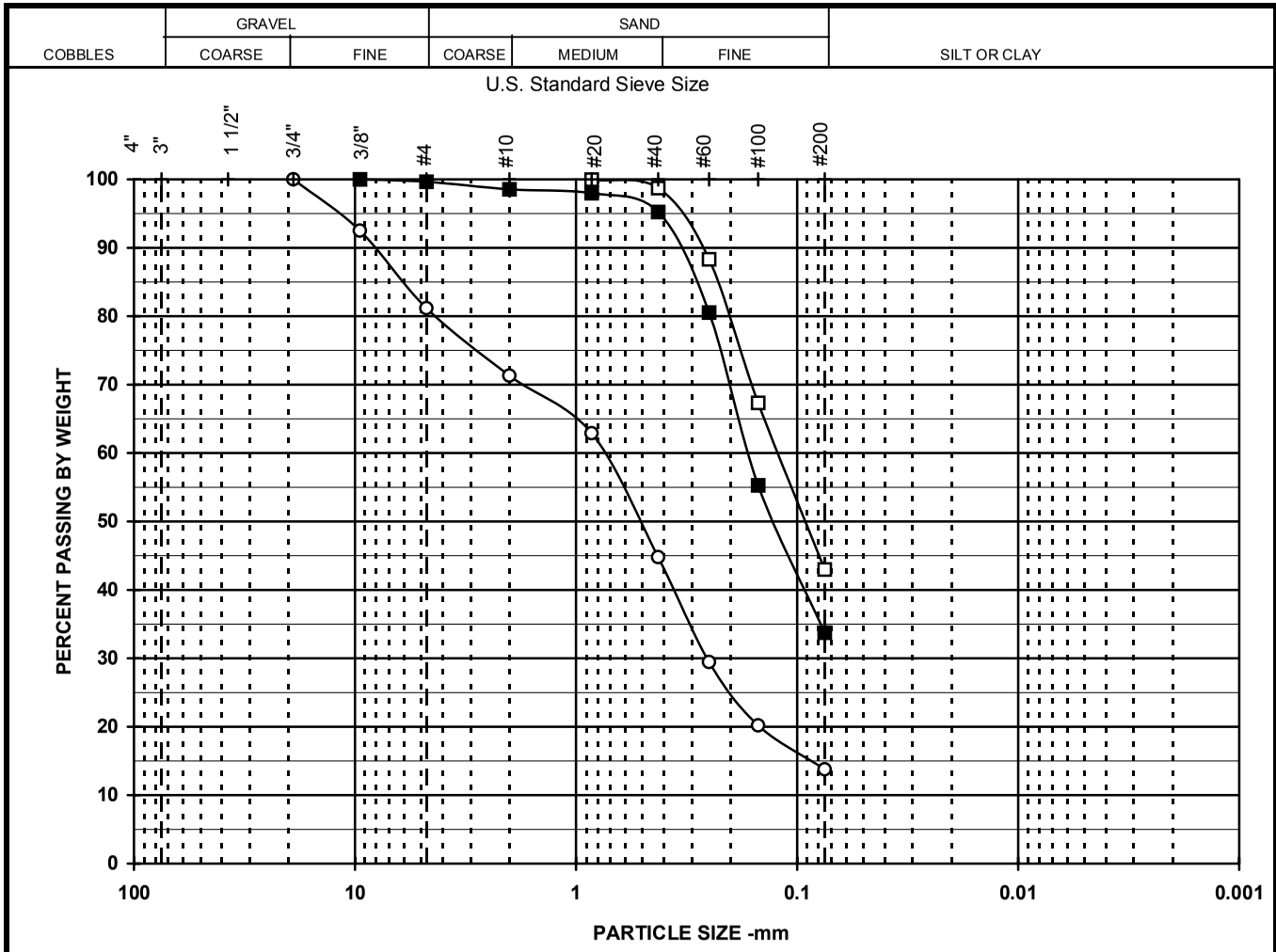
HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 °C: **2.02E-03** cm/sec

(i_o)ave = 0.92

HYDRAULIC CONDUCTIVITY TEST



SYMBOL	DESCRIPTION AND REMARKS
□	dark brown clayey f. SAND, trace m. sand.
■	brown silty f. SAND, trace c-m sand.
○	brown c-f SAND, some f. gravel, silt.

Symbol	□	■	○
Boring	37SB1	37SB2	38SB2
Sample			
Spec			
Depth	6-6.5	15.5-16	15.5
% +3"			
% Gravel		0.4	18.8
% SAND	57.0	65.9	67.4
% FINES	43.0	33.7	13.8
% -2μ			
Cc			
Cu			
LL	22		
PL	18		
PI	4		
USCS	SC-SM	SM	SM
w (%)			

Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"			100.0
3/8"		100.0	92.5
4		99.6	81.2
10		98.5	71.3
20	100.0	98.0	62.9
40	98.7	95.2	44.8
60	88.3	80.5	29.5
100	67.3	55.3	20.2
200	43.0	33.7	13.8

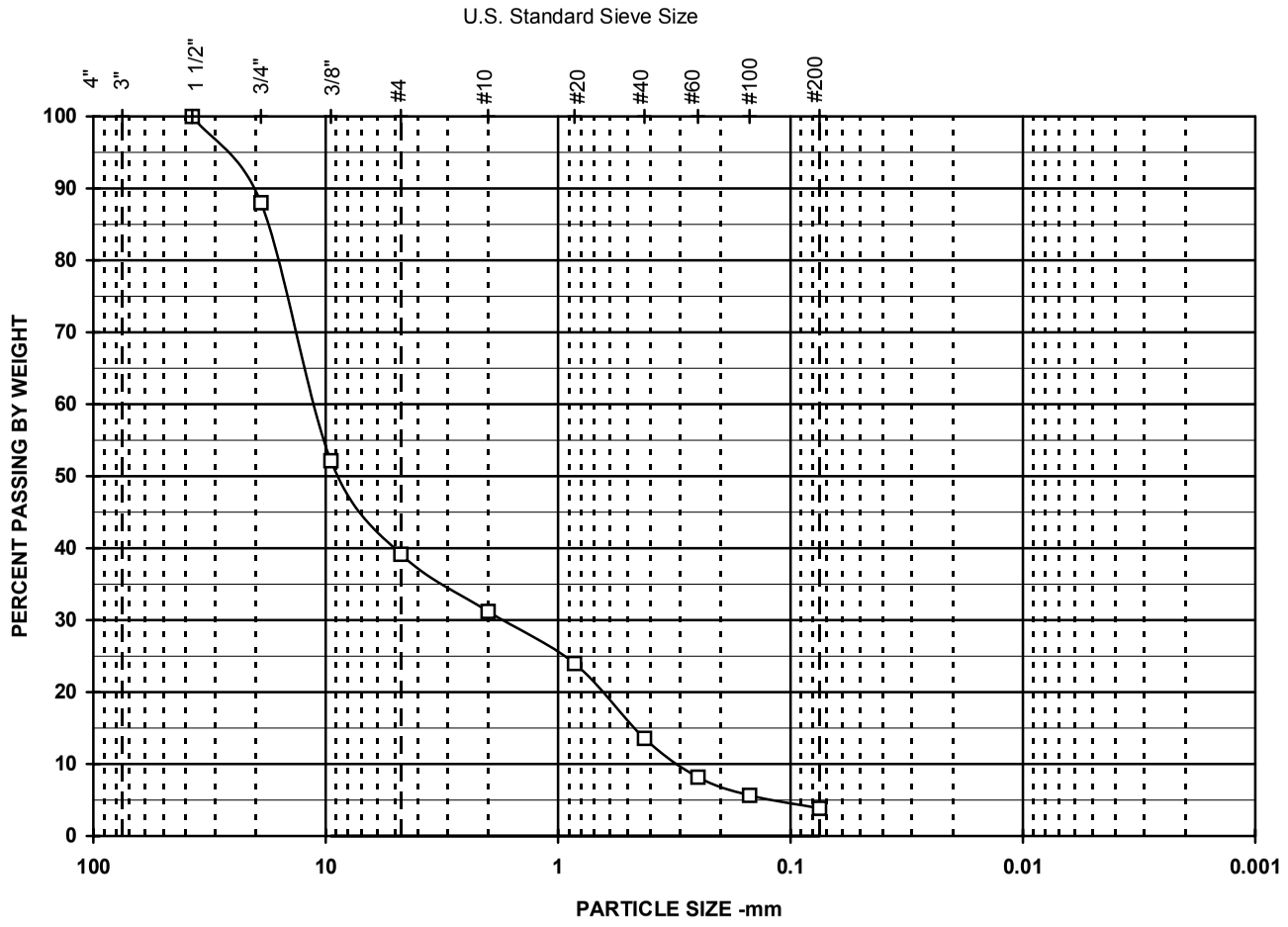
PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		Figure
31737767	December 2003	

URS Corporation

COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	



SYMBOL	DESCRIPTION AND REMARKS
□	brown c-f sandy GRAVEL, trace silt.
■	
○	

Symbol	□	■	○
Boring	QSB2		
Sample			
Spec			
Depth	24		
% +3"			
% Gravel	60.9		
% SAND	35.2		
% FINES	3.9		
% -2μ			
Cc	0.9		
Cu	37.4		
LL			
PL			
PI			
USCS	GP		
w (%)	6.2		

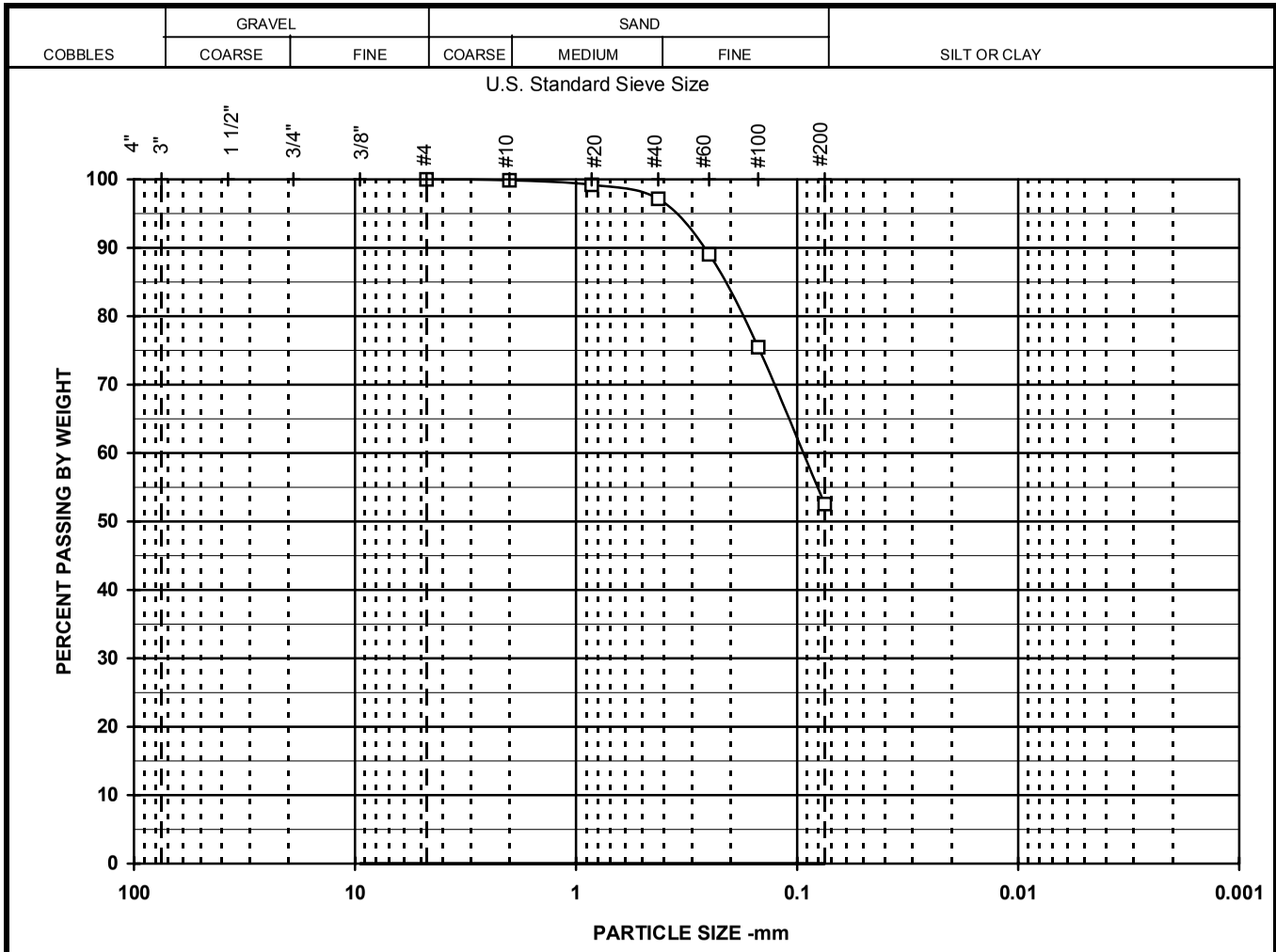
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"	100.0		
3/4"	88.0		
3/8"	52.2		
4	39.1		
10	31.2		
20	24.0		
40	13.6		
60	8.2		
100	5.7		
200	3.9		

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		Figure
31737767	December 2003	

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	brown f. sandy silty CLAY, trace m. sand.
■	
○	

Symbol	□	■	○
Boring	QSB1		
Sample			
Spec			
Depth	9.5-10		
% +3"			
% Gravel			
% SAND	47.4		
% FINES	52.6		
% -2μ			
Cc			
Cu			
LL	31		
PL	21		
PI	10		
USCS	CL		
w (%)			

Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"			
3/8"			
4	100.0		
10	99.9		
20	99.2		
40	97.2		
60	89.0		
100	75.5		
200	52.6		

PARTICLE SIZE DISTRIBUTION

Radford Army Ammunition Plant

Project No.		
31737767	December 2003	Figure

URS Corporation

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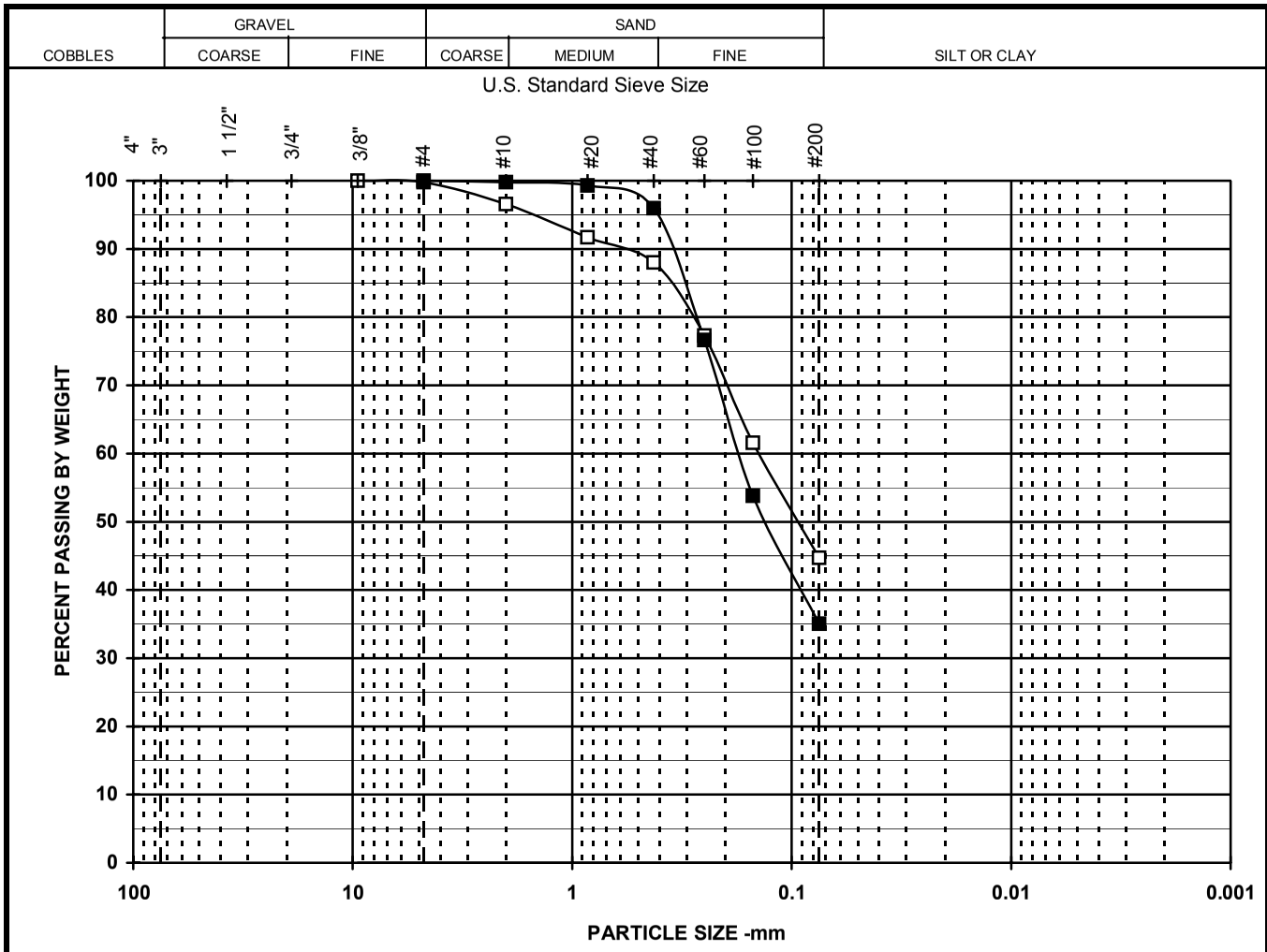
SWMU35 RFAAP

LABORATORY TESTING DATA SUMMARY

BORING NO.	DEPTH	D4318			D422	USCS	D4972 pH		D2216	VOL	D854	D2937*		D5084	CALCULATED				
		LIQUID LIMIT	PLASTIC LIMIT	PLAS. INDEX	SIEVE MINUS NO. 200	SYMBOL	Distilled Water	0.01 M CaCl Solution	MASS WATER CONTENT	WATER CONTENT	SOIL PARTICLE DENSITY	SOIL BULK DENSITY	SOIL DRY DENSITY	COEFFICIENT OF PERMEABILITY (K) @ 20° C (2)	INTRINSIC PERMEABILITY	TOTAL SOIL POROSITY	AIR-FILLED SOIL POROSITY	WATER-FILLED SOIL POROSITY	SATURATION
	(ft)	(-)	(-)	(-)	(%)				(%)	(cm^3/cm^3)	(gm/cm^3)	(pcf)	(pcf)	(cm/sec)	(cm^2)	(-)	(-)	(-)	(%)
355 B7	0-2											46.7							
355 B7	0.55								58.2										
355 B7	0.8	104	63	41	44.7	SM	7.6	7.2	36.5	33%	2.225	78.2	57.3	1.2×10^{-4}	3.4E-6	0.59	0.26	0.33	57
355 B7	1.1								109.7										
355 B7	4-7											125.8							
355 B7	4.75								19.3										
355 B7	5	29	20	9	35.0	SC	6.8	6.3	17.7	31%	2.710	126.9	107.9	1.8×10^{-6}	3.1E-6	0.36	0.05	0.31	84
355 B7	5.3								16.2										
355 B7	5.85								16.2										

Notes: (1) USCS symbol based on visual observation and Sieve and Atterberg limits reported.



Symbol	□	■	○
Boring	355 B7	355 B7	
Sample		B	
Spec			
Depth	0.8	5	
% +3"			
% Gravel	0.2		
% SAND	55.1	65.0	
% FINES	44.7	35.0	
% -2μ			
Cc			
Cu			
LL	104	29	
PL	63	20	
PI	41	9	
USCS	SM	SC	
w (%)			

Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"			
3/8"	100.0		
4	99.8	100.0	
10	96.6	99.8	
20	91.7	99.3	
40	88.0	96.0	
60	77.3	76.7	
100	61.6	53.8	
200	44.7	35.0	

SYMBOL	DESCRIPTION AND REMARKS
□	brown clayey silty c-f SAND.
■	brown silty clayey f. SAND, trace m. sand.
○	

PARTICLE SIZE DISTRIBUTION

SWMU35-RFAAP

Project No.		Figure
21354887	March 2008	

URS Corporation

CONSTANT HEAD HYDRAULIC CONDUCTIVITY TEST
ASTM D 5084 - 90

Project No. **21354887** BORING: 355 B7
Project Name: **SWMU35-RFAAP** SAMPLE: DEPTH (ft): 0-2 Test No.: **P8259**

Specimen - Apparatus set-up - Test Information Apparatus No. C-2 Cell No. 3 Stage 2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or		
		with stones or		Stones with filter paper or		top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination		
3) During saturation: Water flushed up sides of specimen to remove air:			x	No		Yes
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation		
6) Permeant: water used	x	Tap		Distilled		
		Demineralized		0.005 N calcium sulfate (CaSO4)		

Consol Stage- Trial No.	Temp. ° C	Date	Time hr	min	sec	Initial σ_c psi	Ub psi	Dial Indicator in	Pressure Head Reading Mercury (inch)	Gage (psi)	Flow Reading (cm)	Flow Vol (cm3) Rate (cm3/sec)	Fluid Head Reading Head (cm)	Tail (cm)	Total Head Uncorrected Correction Corrected (cm)	Gradient	Permeability Preliminary Final at 20ºC cm/sec
initial	21.6	11/26/07	00	00	00	105.0	100.0				4.15	26.884	77.50	36.00	41.50		
final	21.6	11/26/07	00	67	21						5.45	0.0067	77.50	36.00	0.46		1.27E-04
1	RT = 0.961	dT =		67.35 min		σ'_c =	0.7 ksf						77.5	36	41.04	4.24	1.23E-04
initial	21.6	11/26/07	00	00	00	105.0	100.0				4.00	22.748	77.50	36.00	41.50		
final	21.6	11/26/07	00	58	00						5.10	0.0065	77.50	36.00	0.45		1.25E-04
2	RT = 0.961	dT =		58.00 min		σ'_c =	0.7 ksf						77.5	36	41.05	4.24	1.21E-04
initial	21.6	11/26/07	00	00	00	105.0	100.0				4.00	27.918	77.50	36.00	41.50		
final	21.6	11/26/07	00	71	24						5.35	0.0065	77.50	36.00	0.45		1.25E-04
3	RT = 0.961	dT =		71.40 min		σ'_c =	0.7 ksf						77.5	36	41.05	4.24	1.20E-04
initial	21.6	11/26/07	00	00	00	105.0	100.0				4.50	24.816	77.50	36.00	41.50		
final	21.6	11/26/07	00	64	12						5.70	0.0064	77.50	36.00	0.45		1.23E-04
4	RT = 0.961	dT =		64.20 min		σ'_c =	0.7 ksf						77.5	36	41.05	4.24	1.19E-04
initial																	
final																	
5		dT =		0.00 min		σ'_c =											
initial																	
final																	
6		dT =		0.00 min		σ'_c =											

Preliminary Length/Area Calculations

Lo =	3.838	in	Lo=	9.748	cm
Ao=	1.935	in^2	Ao =	12.48	cm^2
Vo=	7.427	in^3	Vo =	121.70	cm^3
Lc =	3.811	in	Lc =	9.679	cm
Ac=	1.908	in^2	Ac=	12.308	cm^2
Vc =	7.270	in^3	Vc =	119.13	cm^3

Tested By: DT Reviewed By: G. Thomas

TEST CONDITIONS

Final Specimen and Test Conditions

Lc = 9.679 cm ε_{axial} = 0.7%
Ac = 12.285 cm^2
Vc= 118.92 cm^3 ε_{vol} = 2.3%

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	36.47	78.2	57.3	57.0
PreTest	61.55	94.7	58.6	100.0

Project No. 21354887
Project Name: SWMU35-RFAAP

BORING: 355 B7
SAMPLE: DEPTH (ft): 0-2

HYDRAULIC CONDUCTIVITY TEST SUMMARY

Averages for trials: 1-4
ave K @ 20 °C: **1.21E-04** cm/sec
(i_o)ave = 4.24

PERMEABILITY TEST: FALLING HEAD - CONSTANT VOLUME U-TUBE

ASTM D 5084 - 90

Project No.: 21354887 | BORING: 355 B7 | Test No.: P8260

Project Name: SWMU35-RFAAP | SAMPLE: B | DEPTH (ft): 5.0

Specimen - Apparatus set-up - Test Information | Cell No. 6 | Apparatus No. 2 | Stage No.: 2

Preliminary Length/Area Calculations

Lo =	3.427	in	Lo=	8.705	cm
dLc=	0.000	in	Ao =	11.45	cm^2
Lc=	3.427	in	Vo =	99.69	cm^3
			Lc=	8.705	cm
dVc = 3 Vo * (dLc/Lo)			dVc=	0.00	cm^3
			Vc =	99.69	cm^3
Sc =	0.760	cm^{-1}	Ac=	11.452	cm^2

1) Specimen Tested in :	x	Triaxial Cell or		Compaction Mold or		
	x	with stones or		Stones with filter paper or		top + bottom
2) Specimen orientation for:	x	Vertical or		Horizontal permeability determination		
3) During saturation: Water flushed up sides of specimen to remove air			x	No		Yes
4) During consolidation:	x	Top and bottom drainage or		Top		Bottom only
5) Direction of permeant :	x	Up during or		Down during permeation		
6) Permeant: water used	x	Tap		Distilled		
or		Demineralized		0.005 N calcium sulfate (CaSO4)		Permeability

Equations Used

Kt = - 0.0000746 * Sc/dT(min) * ln (ho/hf)

RT = (-0.02452*(ave. temp in C) + 1.495)

K @ 20 ºC = RT * Kt TubeC= 1.3214

Consol Stage-Trial No.	Temp. ° C	Date	Time hr	Time min	Time sec	Initial σ_c psi	Initial Ub psi	U-tube Reading Head (cm) (cc)	U-tube Reading Tail (cm) (cc)	Flow in/out gradient	Preliminary Final at 20ºC cm/sec Dev. from Ave.
initial	21.5	11/26/07	10	22	00	105.0	100.0	55.00	44.50	0.98	1.97E-06
final	21.4	11/26/07	10	30	00			53.07	45.13		1.90E-06
1	RT = 0.969	dT =	8.00 min			σ'_c =	0.7 ksf	0.144	0.146	io= 15.2	4%
initial	21.4	11/26/07	10	31	00	105.0	100.0	55.00	44.50	0.99	1.88E-06
final	21.3	11/26/07	10	49	00			51.43	45.66		1.82E-06
2	RT = 0.971	dT =	18.00 min			σ'_c =	0.7 ksf	0.266	0.269	io= 15.2	-1%
initial	21.3	11/26/07	10	50	00	105.0	100.0	55.00	44.50	1.01	1.87E-06
final	21.3	11/26/07	10	59	00			52.96	45.15		1.81E-06
3	RT = 0.973	dT =	9.00 min			σ'_c =	0.7 ksf	0.152	0.15	io= 15.2	-1%
initial	21.3	11/26/07	11	01	00	105.0	100.0	55.00	44.50	1.02	1.86E-06
final	21.4	11/26/07	11	11	00			52.78	45.20		1.80E-06
4	RT = 0.971	dT =	10.00 min			σ'_c =	0.7 ksf	0.165	0.162	io= 15.2	-2%
initial											
final											
5		dT =	0.00 min			σ'_c =		0.000	0.000		
initial											
final											
6		dT =	0.00 min			σ'_c =		0.000	0.000		

TEST SUMMARY

Final Specimen and Test Conditions

Lc =	8.705	cm	ε_{axial} =	0.0%	
Ac =	11.513	cm^2			
Vc=	100.22	cm^3	ε_{vol} =	-0.5%	
Sc =	0.756	cm^{-1}	Sc = Lc / Ac , final		

	w (%)	γ_τ (pcf)	γ_d (pcf)	S (%)
Initial	17.69	126.9	107.9	84.3
PreTest	21.29	130.1	107.3	100.0

HYDRAULIC CONDUCTIVITY SUMMARY

Averages for trials: 1-4

ave K @ 20 ºC: **1.83E-06** cm/sec

(i_o)ave = 15.2

Tested By: DT Reviewed By: G. Thomas

APPENDIX C.2

BORING LOGS

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APPENDIX C.2.1

PREVIOUS INVESTIGATION BORING LOGS

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Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 37SB1

Sheet 1 of 1

Date(s) Drilled	10-01-03 1528; 10-02-03 0748	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	24.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	20.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments	Two Boreholes-10/01/03 TD 16.0; 10/02/03 TD 24.0		

Elevation, feet / Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0		1	3.7	ND		SLUDGE	10YR 6/4 light yellowish brown, $CaSO_4$ Sludge, soft 7.5YR 8/1 white mottled with 7.5YR 4/6 strong brown, $CaSO_4$ Sludge, soft	Sample 37SB1A collected 0.0-1.0 ft bgs
						SM	7.5YR 4/6 strong brown, Silty Sand, fine, moist, well-sorted, micaceous, and dense.	
5		2	3.8	ND		SM	7.5YR 3/2 dark brown, Silty Sand, very fine, moist, micaceous, medium dense with soft layers grading soft	
						SM	7.5YR 4/6 brown, Sand, some silt, wet, well sorted, micaceous, homogeneous	
10		3	3.4	ND		CL	7.5YR 3/2 dark brown, Clay, moist, moderately stiff, plastic; increasing sand, fine to medium with depth	
		4	4.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, fine, moist, dense, micaceous	Sample 37SB1B collected 14.0-16.0 ft bgs
15		5	3.5	ND				Sample 37SB1C collected 18.0-20.0 ft bgs
20		6	0.5	ND		GM	5YR 4/6 yellowish red, Silty Gravel with sand; gravel, medium to coarse; sand, medium	
25							Boring terminated 24.0 ft bgs; groundwater 20.5 ft bgs	
30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 37SB1

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 37SB2

Sheet 1 of 1

Date(s) Drilled	10-03-03 0845-0910	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	22.9 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0		1	3.5	ND		SLUDGE	7.5YR 7/6 reddish yellow, $CaSO_4$ Sludge, soft	Sample 37SB2A, MS, MSD collected 0.0-1.0 ft bgs
	5		2	4.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, fine, some clay, slightly moist, micaceous, medium dense	
								grades to loose	
	10		3	4.0	ND				Sample 37SB2B collected 10.0-12.0 ft bgs
			4	3.7	ND				
	15		5	3.5	ND		SP/SM	5YR 4/6 yellowish red, Sand with gravel and lenses of silty sand, fine, micaceous	Sample 37SB2C collected 18.0-20.0 ft bgs
	20		6	2.0	ND		ML	7.5YR 5/8 strong brown, Silt, with siltstone inclusions, wet, very soft	
	25							Boring Refusal 22.9 feet bgs	
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 37SB2

URS

Project: Radford Army Ammunition Plant- SSP Project Location: Radford, Virginia Project Number: 09604-317	Log of Borehole 37SB3 Sheet 1 of 1

Date(s) Drilled	10-02-03 1015-1120	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	28.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	25.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						Fill	2.5YR 4/6 red, Sandy Clay, medium grained, moist, moderately stiff and moderately plastic; possible fill soil	Sample 37SB3A collected 0.0-1.0 ft bgs
			1	3.5	ND			7.5YR 3/4 dark brown, Silty Sand, medium, slightly moist, moderately dense and micaceous	
							SM	grades to loose	
	5		2	4.0	ND				
								5YR 4/4 reddish brown, lean Clay, some fine sand, moist, micaceous	
	10		3	4.0	ND		CL		
								7.5YR 4/6 strong brown, lean Clay, some fine sand and silt, moist	Sample 37SB3B, MS, MSD collected 10.0-12.0 ft bgs
			4	3.6	ND		CL		
	15						SM	5YR 4/6 yellow red, Silty Sand, fine, moist, micaceous, homogeneous, dense	
								5YR 4/6 yellowish red, Silty Sand, fine, moist, micaceous, homogeneous	
			5	3.5	ND		SM		
								Trace gravel present at 19.5 ft bgs	
	20							Gravel increases with depth	
							SM		
			6	3.0	ND				Sample 37SB3C collected 22.0-24.0 ft bgs
								5YR 4/6 yellowish red, Gravel with sand, moist	
	25						GP		
			7	2.0	ND				
								Boring terminated 28.0 ft bgs; groundwater at 25.5 ft bgs	
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 37SB3

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 38SB1

Sheet 1 of 1

Date(s) Drilled	10-03-03 1045-1120	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Hand Auger	Drilling Contractor	URS Group, Inc.	Total Depth of Borehole	7.5 feet
Drill Rig Type	NA	Drill Bit Size/Type	3-inch Hand Auger	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	Stainless-Steel 3-inch Hand Auger	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0			1.0				5YR 4/6 yellowish red, Sandy Silt, fine, dry, very soft and light weight	Sample 38SB1A collected 0.0-1.0 ft bgs
	1			1.0	ND				
	2			1.0			ML	Grades to moist from surface to 3.0 ft bgs	
	3			1.0	ND				Sample 38SB1B collected 3.5 ft bgs
	4			1.0					
	5			1.0	ND			Increasing fine sand 5.0-7.0 ft bgs	
	6			1.0 0.5					Sample 38SB1C collected 7.0-7.5 ft bgs
	7				ND		SM	5YR 5/8 yellowish red, Silty Sand, fine to medium, trace medium gravel, moist, micaceous	
	8							Boring Refusal 7.5 ft bgs	
	9								
	10								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 38SB1

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 38SB2

Sheet 1 of 1

Date(s) Drilled	10-02-03 0905-1000	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	22.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0				30			10YR 3/4 dark yellowish brown, Silty Sand, fine, moist, micaceous, moderately dense.	Sample 38SB2A collected 0.0-1.0 ft bgs
			1	3.8	1.5		SM	Increasing silt with depth	
					5				
					ND			5YR 4/4 reddish brown, Sand with silt, very fine, moist, micaceous, very stiff	
	5				0.2				
			2	3.8	1.2		SM		
					0.2				
					ND			5YR 5/8 yellowish red, Silty Sand, very fine, trace clay, moist, micaceous, homogeneous	
	10		3	4.0	ND		SM		Sample 38SB2B and SBD4collected 10.0-12.0 ft bgs
							SM	7.5YR 5/6 strong brown, Silty Sand, some fine gravel, moist, loose to moderately dense	
			4	3.6			SM	Gravel layer	
	15							7.5YR 5/6 strong brown, Silty Sand, some fine gravel, moist, loose to moderately dense	
								5YR 4/6 yellowish red, Gravel, some medium sand and silt, moist	
								Initial Boring Refusal 16.8 ft bgs. Boring was offset 5 ft to the North to achieve desired sampling depths.	
			5	2.6			GP		Sample 38SB2C collected 18.0-20.0 ft bgs
	20								
			6	2.0					
								Offset Boring Refusal 22.0 ft bgs	
	25								
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 38SB2

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole 38SB3

Sheet 1 of 1

Date(s) Drilled	10-03-03 1200-1230	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Hand Auger	Drilling Contractor	URS Group, Inc.	Total Depth of Borehole	6.0 feet
Drill Rig Type	NA	Drill Bit Size/Type	3-inch Hand Auger	Ground Surface Elevation	
Groundwater Level(s)	NA	Sampling Method	Stainless-Steel 3-inch Hand Auger	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0			1.0	ND		ML/CL	5YR 4/6 yellowish red, Silt and Clay, moist, soft, moderately plastic	Sample 38SB3A collected 0.0-1.0 ft bgs
	1			1.0					
	2			1.0					
	3			1.0	ND		ML	7.5YR 4/6 strong brown, Silt with trace sand, moist, micaceous	Sample 38SB3B collected 4.0 ft bgs
	4			1.0			ML	5YR 4/6 yellowish red, Sandy Silt, very fine, moist	
	5			1.0	ND				Sample 39SB3C collected 6.0 ft bgs
	6							Boring Refusal at 6.0 ft bgs	
	7								
	8								
	9								
	10								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 38SB3

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole QSB1

Sheet 1 of 1

Date(s) Drilled	10-02-03 1300-1330	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	20.6 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	19.5 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						Sludge	10YR 4/4 very pale brown, Sludge, very soft, moist; no stains, odors, or PID detections	Sample QSB1A and SBD3 collected 0.0-1.0 ft bgs
			1	3.6	ND		ML	7.5YR 3/4 dark brown, Sandy Silt with some clay, very fine, soft, micaceous, cohesive, homogeneous	
	5		2	4.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, fine, moist, micaceous, moderately dense	
							ML	5YR 5/4 reddish brown, Silt with some clay, moderately stiff	
	10		3	4.0	ND		SM	5YR 4/4 reddish brown, Silty Sand, fine, moist, micaceous Grades to less Silt	Sample QSB1B collected 10.0-12.0 ft bgs
							SM	5YR 4/4 reddish brown, Sand with silty sand lenses, fine, moist, micaceous, loose	
			4	2.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, very fine, moist, micaceous	
	15						SM	7.5YR 5/8 strong brown, Sand with trace silt, medium to coarse, moist	Sample QSB1C collected 17.0-19.0 ft bgs
			5	2.0	ND				
	20		6	0.6	ND		GM	7.5YR 5/4 brown, Gravel with silt and sand Groundwater at 19.5 ft bgs ▽	
								Boring Refusal 20.6 ft bgs	
	25								
	30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 QSB1

URS

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole QSB2

Sheet 1 of 1

Date(s) Drilled	10-02-03 1510-1530	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	28.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	23.0 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet / Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							5YR 4/4 reddish brown, Silty Sand, fine, slightly moist, moderately dense, micaceous	Sample QSB2A collected 0.0-1.0 ft bgs
		1	3.4	ND 1.9				
5							Some clay	
		2	3.4	ND		SM		
							9.0-9.5 ft bgs; 7.5YR 5/4 brown, less silt	
10		3	4.0	ND			9.5-14.0 ft bgs; Silt with trace fine sand and clay, slightly moist, homogeneous	Sample QSB2B collected 10.0-12.0 ft bgs
		4	4.0	ND				
15							7.5YR 4/6 strong brown, Sand, fine, slightly moist, micaceous, dense, homogeneous	
							Grades to 7.5YR 6/6 reddish yellow, fine to coarse	
						SP		
		6	2.2	ND			18.0 ft bgs; becomes Silty, SM	Sample QSB2C collected 18.0-20.0 ft bgs
20							7.5YR 5/6 strong brown, Sandy Gravel; gravel, coarse; sand, fine to coarse	
		8	1.2	ND		GP		
							Groundwater at 23.0 ft bgs	
25							No Recovery; presumed Sandy Gravel	
		9	0.0			NR		
							Boring terminated 28.0 ft bgs	
30								

URS

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 QSB2

Project: Radford Army Ammunition Plant- SSP
Project Location: Radford, Virginia
Project Number: 09604-317

Log of Borehole QSB3

Sheet 1 of 1

Date(s) Drilled	10-02-03 1400-1500	Logged By	J. Spangler	Reviewed By	C. Lawrence
Drilling Method	Geoprobe - Direct Push Technology	Drilling Contractor	Richard Simmons Drilling	Total Depth of Borehole	20.0 feet
Drill Rig Type	Tractor- Mounted Geoprobe	Drill Bit Size/Type	4 ft x 2 in Rectractable Macrocore Sampler	Ground Surface Elevation	
Groundwater Level(s)	19.8 ft bgs during drilling	Sampling Method	4 ft x 2 in Macrocore Sampler with Liner	Hammer Data	NA
Borehole Backfill	Bentonite Pellets	Comments			

Elevation, feet / Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						Sludge	Leaf litter 10YR 7/4 very pale brown, Sludge, moist, very soft	Sample QSB3A collected 0.0-1.0 ft bgs
		1	3.5	ND		ML	5YR 3/3 dark reddish brown, Sandy Silt with trace clay, very fine, slightly moist, stiff, micaceous	
5		2	3.0	ND		ML	5YR 4/6 yellowish red, Sandy Silt, very fine, with occasional soft seams, slightly moist, micaceous, stiff Increasing sand, very fine	
10		3	3.0	ND		SM	5YR 4/6 yellowish red, Silty Sand, fine, slightly moist, moderately dense, micaceous	Sample QSB3B colleceted 10.0-12.0 ft bgs
		4	2.2	ND		SM/SP	Grading less silty to sandy, fine to medium	
15		5	2.6	ND		SM	7.5YR 5/6 strong brown, Sand, medium to coarse, with trace silt, slightly moist, loose to moderately dense	Sample QSB3C collected 17.0-19.0 ft bgs
20							Boring terminated 20.0 ft bgs	
25								
30								

Report: ENV_12AS_CLEVELAND+/-USCS; File: RFAAP_SSP.GPJ; 12/8/2003 QSB3

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APPENDIX C.2.2

RCRA FACILITY INVESTIGATION
BORING LOGS

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Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 35SB1

Sheet 1 of 1

Date(s) Drilled	**11/13/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**10.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located outside perimeter of $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							Topsoil, dark brown, organic.	Sample 35SB1A was collected from 0 - 1 feet below organic material.
						ML	5YR 4/6 yellowish red fine sandy SILT, soft, dry.	
2		1	48	0			Same as above except 5YR 3/1 very dark grey.	
4								
6		2	48	0			Same as above except moist at ~6 feet bgs.	
8							5YR 4/6 yellowish red fine sandy SILT, micaceous, soft, moist.	
		3	24	0				
10							Boring was terminated at 10 ft bgs.	
12								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 35SB1

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 35SB2

Sheet 1 of 1

Date(s) Drilled	**11/13/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**10.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located outside perimeter of $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (in)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							Topsoil, dark brown, organic.	Samples 35SB2A and 35SB2 MS/MSD collected from 0 - 1 feet below organic material.
							5YR 4/4 reddish brown fine sandy SILT with minor amounts of gravel, soft, dry.	
2		1	48	0				
							Same as above except 5YR 3/4 dark reddish brown.	
4								
						ML	5YR 4/6 yellowish red fine sandy SILT, micaceous, soft, moist.	
6		2	48	0				
8								
		3	24	0				
10							Boring was terminated at 10 ft bgs.	
12								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 35SB2

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 35SB3

Sheet 1 of 1

Date(s) Drilled	**11/12/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**10.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located outside perimeter of $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							Topsoil, dark brown to black, organic.	
							10YR 3/4 dark yellowish brown, gravelly, clayey, silty fine SAND, loose, dry.	35SB3A sample was collected from 0 - 1 feet below organic material.
2		1	48	0				
4						SC/ML	5YR 3/4 dark reddish brown gravelly, clayey, silty fine SAND, clay content increasing with depth, micaceous, loose, moist.	
6		2	48	0			Same as above except 10YR 5/6 yellowish brown.	
8							10YR 5/6 yellowish brown silty fine SAND, loose, moist.	
		3	24	0		SM		
10							Boring was terminated at 10 ft bgs.	
12								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 35SB3

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 35SB4

Sheet 1 of 1

Date(s) Drilled	**11/13/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**10.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located outside perimeter of $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							Topsoil, dark brown, organic.	
						ML	5YR 3/4 dark reddish brown fine sandy SILT, minor gravel, soft, dry.	Samples 35SB4A and DUP-1 were collected from 0 - 1 feet below organic material.
2		1	48	0				
4								
6		2	48	0		ML	Same as above except gravel not present after 5.5 feet bgs.	
8								
10		3	24	0			Boring was terminated at 10 ft bgs.	
12								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 35SB4

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 35SB5

Sheet 1 of 1

Date(s) Drilled	**11/14/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**18.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**16 feet bgs**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							Topsoil, dark brown, organic.	Samples 35SB5A and DUP-2 were collected from 0 - 1 feet below organic material.
0 - 2		1	40	0		SM	7.5YR 3/4 dark brown silty fine SAND, loose, dry.	
2 - 4								
4 - 6		2	48	0				
6 - 8								
8							7.5YR 5/8 strong brown fine sandy SILT, soft, moist.	
8 - 10		3	48	0		ML		Sample 35SB5B was collected from the 9 - 11 ft bgs interval.
10 - 12								
12 - 14		4	48	0				Sample 35SB5C was collected from the 14 - 16 ft bgs interval.
14 - 16							Same as above except wet at 16 ft.	
16 - 18		5	24	0				
18							Boring was terminated at 18 ft bgs.	
18 - 20								

URS

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 35SB5

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 35SB6

Sheet 1 of 1

Date(s) Drilled	**11/13/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**16.5 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**16 feet bgs**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							Topsoil, dark brown, organic.	Sample 35SB6A was collected from 0 - 1 feet below organic material.
0 - 2		1	48	0		SLUDGE	7.5YR 7/4 pink $CaSO_4$ SLUDGE, very soft, dry.	
2 - 4						SM	5YR 4/6 yellowish red silty fine SAND, loose, moist.	
4						SLUDGE	5YR 5/4 reddish brown $CaSO_4$ SLUDGE, very soft, moist.	
4 - 6						ML	5YR 5/4 reddish brown fine sandy SILT, micaceous, soft, moist.	
6 - 8		2	48	0				Sample 35SB6B was collected from the 6 - 8 ft bgs interval.
8 - 10								
10 - 12		3	48	0				
12 - 14						SM	5YR 5/4 reddish brown silty fine SAND, loose, moist.	
14 - 16		4	48	0				Sample 35SB6C was collected from the 14 - 16 ft bgs interval.
16		5	6	0			▽ Same as above except wet at 16 feet bgs.	
16 - 18							Refusal at 16.5 ft; boring was terminated at 16.5 ft bgs.	
18 - 20								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 35SB6

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 35SB7

Sheet 1 of 1

Date(s) Drilled	**11/14/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**16.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**15.5 feet bgs**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							Topsoil, dark brown, organic.	Sample 35SB7A was collected from 0 - 1 feet below organic material.
0 - 4		1	40	0		SLUDGE	7.5YR 7/6 reddish yellow $CaSO_4$ SLUDGE, very soft, dry.	
4 - 6							5YR 4/6 yellowish red silty fine SAND, loose, dry.	
6 - 8		2	44	0		SM		Sample 35SB7B was collected from the 6 - 8 ft bgs interval.
8 - 10							5YR 4/6 yellowish red gravelly silty fine SAND, loose to medium dense, dry.	
10 - 12		3	40	0		SM/SW	Same as above except moist.	
12 - 14								Sample 35SB7C was collected from the 13.5 - 15.5 ft bgs interval.
14 - 16		4	12	0			Same as above except wet at 15.5 ft bgs. ▽	
16							Boring was terminated at 16 ft bgs.	
16 - 20								

URS

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 35SB7

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 35SB8

Sheet 1 of 1

Date(s) Drilled	**11/14/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**16.5 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**16 feet bgs**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							Topsoil, dark brown, organic.	Sample 35SB8A was collected from 0 - 1 feet below organic material.
							7.5YR 3/4 dark brown silty fine SAND, loose, dry.	
2		1	20	0		SM		
4						SM/SW	7.5YR 3/4 dark brown gravelly, silty fine SAND, loose, dry.	
							7.5YR 3/4 dark brown silty fine SAND, loose, dry.	
6		2	24	0				
8							Same as above except color changes to 7.5YR 5/8 strong brown.	
10		3	48	0		SM	Same as above except consistency is medium dense at the 10 - 11 ft bgs interval then grading back to a loose consistency.	Sample 35SB8B was collected from the 9 - 11 ft bgs interval.
12								
14		4	28	0				Sample 35SB8C was collected from the 14 - 16 ft bgs interval.
16		5	6	0			▽ Same as above except wet at 16 ft bgs.	
							Refusal at 16.5 ft. Boring was terminated at 16.5 ft bgs.	
18								
20								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 35SB8

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 35SB9

Sheet 1 of 1

Date(s) Drilled	**11/13/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**16.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**16 feet bgs**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						SLUDGE	7.5YR 7/6 reddish yellow $CaSO_4$ SLUDGE, very soft, dry.	Sample 35SB9A was collected from 0 - 1 feet below organic material.
						ML	7.5YR 4/2 fine sandy SILT, soft, dry.	
2		1	48	0		SLUDGE	7.5YR 5/6 strong brown $CaSO_4$ SLUDGE, very soft, dry.	
4							10YR 5/4 yellowish brown fine sandy SILT, micaceous, soft, dry.	Sample 35SB9B was collected from the 4 - 8 ft bgs interval.
6		2	48	0				
8						ML	Same as above except moist.	
10		3	48	0				
12							10YR 5/4 yellowish brown gravelly, fine sandy SILT, soft, moist.	
14		4	24	0		ML		Sample 35SB9C was collected from the 14 - 16 ft bgs interval.
16							Same as above except wet at ~ 16 ft bgs. ▽ Boring was terminated at 16 ft bgs.	
18								
20								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 35SB9

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 35SB10

Sheet 1 of 1

Date(s) Drilled	**11/13/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**16.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**16 feet bgs**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0							Topsoil, dark brown, organic.	Sample 35SB10A was collected from 0 - 1 feet below organic material.
							7.5YR 7/6 reddish yellow $CaSO_4$ SLUDGE, very soft, dry.	
2		1	48	0		SLUDGE		
4							Same as above except color darkens slightly to 7.5YR 6/6.	
							7.5YR 5/6 strong brown fine sandy SILT, micaceous, soft, dry.	
6		2	48	0				Sample 35SB10B was collected from the 6 - 8 ft bgs interval.
8								
10		3	48	0		ML	Same as above except moist.	
12								
14		4	8	0				Sample 35SB10C was collected from the 14 - 16 ft bgs interval.
16							Same as above except wet at 16 ft bgs. ▽	
							Boring was terminated at 16 ft bgs.	
18								
20								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 35SB10

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 37SB4

Sheet 1 of 1

Date(s) Drilled	**11/15/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located outside perimeter of $CaSO_4$ drying bed.**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						TOPSOIL	Topsoil, dark brown, organic.	Sample 37SB4A was collected from 0 - 1 feet below organic material.
							SM	7.5YR 4/2 brown silty fine SAND, loose, dry.	
	2		1	48	0				
	4								
	6		2	48	0				
	8							Boring was terminated at 8 ft bgs.	
	10								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 37SB4

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 37SB5

Sheet 1 of 1

Date(s) Drilled	**11/15/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located outside perimeter of $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0					TOPSOIL	Topsoil, dark brown, organic.	Sample 37SB5A and 37SB5 MS/MSD were collected from 0 - 1 feet below organic material.
						2.5YR 4/6 red silty fine SAND, micaceous, medium dense, dry.	
						7.5YR 4/3 brown silty fine SAND, micaceous, loose, dry.	
2	1	44	0				
4					SM	5YR 4/6 yellowish red fine silty SAND, micaceous, medium dense, dry.	
6	2	48	0				
8						Boring was terminated at 8 ft bgs.	
10							

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 37SB5

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 37SB6

Sheet 1 of 1

Date(s) Drilled	**11/15/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located outside perimeter of $CaSO_4$ drying bed.**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						TOPSOIL	Topsoil, dark brown, organic.	Sample 37SB6A was collected from 0 - 1 feet below organic material.
							SM	2.5YR 4/6 red silty fine SAND, micaceous, medium dense, dry.	
							GP/GM	7.5YR 2.5/1 black silty, sandy, gravel, loose, dry.	
	2		1	32	0		SM	7.5YR 4/3 brown silty fine SAND, micaceous, medium dense, dry.	
	4								
	6		2	48	0				
	8							Boring was terminated at 8 ft bgs.	
	10								

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 37SB7

Sheet 1 of 1

Date(s) Drilled	**11/14/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						TOPSOIL	Topsoil, dark brown, organic.	Sample 37SB7A was collected from 0 - 1 feet below organic material.
						SLUDGE	7.5YR 7/4 & 4/4 (pink w/~ 20% mottled brown) $CaSO_4$ SLUDGE, very soft, moist.	
2		1	32	0				
4						SM	10YR 4/6 dark yellowish brown silty fine SAND, micaceous, medium dense, moist.	
6		2	48	0				Sample 37SB7B was collected from the 5.5 - 6.5 ft bgs interval.
				0				Sample 37SB7C was collected from the 7 - 8 ft bgs interval.
8							Boring was terminated at 8 ft bgs.	
10								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 37SB7

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 37SB8

Sheet 1 of 1

Date(s) Drilled	**11/15/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						TOPSOIL	Topsoil, dark brown, organic.	Samples 37SB8A and DUP-4 were collected from 0 - 1 feet below organic material.
						SLUDGE	7.5YR 7/4 pink $CaSO_4$ SLUDGE, very soft, moist.	
2		1	42	0				
						SM	5YR 4/6 yellowish red silty fine SAND, loose, dry.	
4								Sample 37SB8B was collected from the 4 - 5 ft bgs interval.
						GP/GM	5YR 4/6 yellowish brown silty sandy GRAVEL, loose, dry.	
						SM	5YR 4/6 yellowish red silty fine SAND, loose, dry.	
6		2	48	0				
						GP/GM	5YR 4/6 yellowish brown silty sandy GRAVEL, loose, dry.	
				0		SM	5YR 4/6 yellowish red silty fine SAND, loose, dry.	Sample 37SB8C was collected from the 7 - 8 ft bgs interval.
8							Boring was terminated at 8 ft bgs.	
10								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 37SB8

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 37SB9

Sheet 1 of 1

Date(s) Drilled	**11/14/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						TOPSOIL	Topsoil, dark brown, organic.	Samples 37SB9A and DUP-4 were collected from 0 - 1 feet below organic material.
						SLUDGE	7.5YR 7/6 reddish yellow $CaSO_4$ SLUDGE, soft, moist.	
				0				
2		1	42				10YR 4/4 dark yellowish brown silty fine SAND, micaceous, very loose, moist.	Sample 37SB9B was collected from the 2 - 3 ft bgs interval.
4				0		SM		
6		2	44					Sample 37SB9C was collected from the 7 - 8 ft bgs interval.
				0				
8							Boring was terminated at 8 ft bgs.	
10								

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 37SB10

Sheet 1 of 1

Date(s) Drilled	**11/14/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						TOPSOIL	Topsoil, dark brown to black, organic.	Sample 37SB10A was collected from 0 - 1 feet below organic material.
							7.5YR 6/3 light brown $CaSO_4$ SLUDGE, soft, moist.	
2		1	40	0		SLUDGE		
							7.5YR 3/3 dark brown silty fine SAND, loose, dry.	
4				0			7.5YR 5/6 strong brown silty fine SAND, loose, moist.	Sample 37SB10B was collected from the 4 - 5 ft bgs interval.
						SM		
6		2	48					
				0				Sample 37SB10C was collected from the 7 - 8 ft bgs interval.
8							Boring was terminated at 8 ft bgs.	
10								

URS

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 37SB10

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 38SB4

Sheet 1 of 1

Date(s) Drilled	**11/16/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**10.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located outside perimeter of $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type Number	SAMPLES:	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						TOPSOIL	Topsoil, dark brown, organic.	Samples 38SB4A and DUP-6 were collected from 0 - 1 feet below organic material.
							5YR 4/4 reddish brown silty fine SAND, micaceous, loose, moist.	
2	1		48	0				
4						SM		
6	2		48	0				
8	3		24	0				
10							Boring was terminated at 10 ft bgs.	
12								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 38SB4

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 38SB5

Sheet 1 of 1

Date(s) Drilled	**11/16/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**10.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located outside perimeter of $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						TOPSOIL	Topsoil, dark brown, organic.	Samples 38SB5A and 38SB5 MS/MSD were collected from 0 - 1 feet below organic material.
						SP	7.5YR 2.5/1 black gravelly coarse SAND, loose, moist.	
						SM	5YR 4/4 reddish brown silty fine SAND, micaceous, loose, dry.	
2		1	48	0				
4								
6		2	48	0				
8							Same as above except moist.	
		3	24	0				
10							Boring was terminated at 10 ft bgs.	
12								

URS

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 38SB5

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 38SB6

Sheet 1 of 1

Date(s) Drilled	**11/16/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**10.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located outside perimeter of $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						TOPSOIL	Topsoil, dark brown, organic.	
						GP	5YR 5/1 gray sandy GRAVEL, loose, dry.	Sample 38SB6A was collected from 0 - 1 feet below organic material.
							5YR 4/4 reddish brown silty fine SAND, micaceous, loose, dry.	
2		1	40	0				
4								
						SM		
6		2	48	0			Same as above except moist.	
8							5YR 4/6 yellowish red silty fine SAND, micaceous, loose, moist.	
		3	24	0				
10							Boring was terminated at 10 ft bgs.	
12								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 38SB6

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 38SB7

Sheet 1 of 1

Date(s) Drilled	**11/15/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						SLUDGE	5YR 6/6 reddish yellow SLUDGE, very soft, moist.	Samples 38SB7A and DUP-5 were collected from 0 - 1 feet below organic material.
						SM	5YR 4/6 yellowish red silty fine SAND, micaceous, loose, moist.	
2		1	48	0				Sample 38SB7B was collected from the 1.5 - 3 ft bgs interval.
4								
6		2	48	0				
						GP	5YR 4/6 yellowish red sandy GRAVEL, loose, moist.	
						SM	5YR 4/6 yellowish red silty fine SAND, micaceous, loose, moist.	Sample 38SB7C was collected from the 7 - 8 ft bgs interval.
8							Boring was terminated at 8 ft bgs.	
10								

URS

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 38SB7

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 38SB8

Sheet 1 of 1

Date(s) Drilled	**11/15/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						SLUDGE	5YR 6/6 reddish yellow $CaSO_4$ SLUDGE, very soft, moist.	Sample 38SB8A was collected from 0 - 1 feet below organic material.
							5YR 4/6 yellowish red silty fine SAND, micaceous, loose, moist.	Sample 38SB8B was collected from the 1 - 3 ft bgs interval.
2		1	48	0				
4						SM		
6		2	48	0				Sample 38SB8C was collected from the 7 - 8 ft bgs interval.
8							Boring was terminated at 8 ft bgs.	
10								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 38SB8

URS

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 38SB9

Sheet 1 of 1

Date(s) Drilled	**11/15/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0						SLUDGE	5YR 5/6 yellowish red $CaSO_4$ SLUDGE, very soft, moist.	Sample 38SB9A was collected from 0 - 1 feet below organic material.
								5YR 4/4 reddish brown silty fine SAND, micaceous, medium dense, moist.	Sample 38SB9B was collected from the 1 - 3 ft bgs interval.
	2		1	48	0				
	4						SM		
	6		2	48	0				Sample 38SB9C was collected from the 7 - 8 ft bgs interval.
	8							Boring was terminated at 8 ft bgs.	
	10								

URS

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 38SB9

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring 38SB10

Sheet 1 of 1

Date(s) Drilled	**11/16/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						TOPSOIL	Topsoil, medium brown to dark brown, organic.	Sample 38SB10A was collected from 0 - 1 feet below organic material.
							5YR 5/6 yellowish red $CaSO_4$ SLUDGE, very soft, dry.	
							7.5YR 4/4 reddish brown silty fine SAND, micaceous, loose, dry.	
2		1	40	0				Sample 38SB10B was collected from the 2 - 4 ft interval.
							Same as above, except moist.	
4						SM		
6		2	48	0				Sample 38SB10C was collected from the 7 - 8 ft bgs interval.
8							Boring was terminated at 8 ft bgs.	
10								

URS

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 38SB10

Project: RFAAP SWMU 35/37/38 AOC Q
Project Location: Radford, Virginia
Project Number: 21354887

Log of Boring QSB4

Sheet 1 of 1

Date(s) Drilled	**11/16/07**	Geologist	**Jim Carter**	Reviewer	**Tina Devine**
Drilling Method	**Direct Push Technology**	Drilling Contractor	**Marshall Miller**	Total Depth of Borehole	**8.0 feet**
Drill Rig and Bit	**Direct Push Macrocore**	Sampling Method	**Macrocore with disposable acetate liner**	Ground Surface Elevation	
Groundwater Level(s)	**Groundwater was not encountered.**	Hammer Data	**Continuous hydraulic pressure**	Coordinates	**N E**
Borehole Backfill	**Bentonite pellets**	Comments	**Boring is located inside $CaSO_4$ drying bed.**		

Elevation feet / Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (in)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
0						TOPSOIL	Topsoil, dark brown, organic.	Sample QSB4A was collected from 0 - 1 feet below organic material.
							5YR 8/3 pink $CaSO_4$ SLUDGE, very soft, moist.	
2		1	40	0		SM	5YR 4/2 dark reddish gray silty fine SAND, loose, moist.	
4								
6		2	48	0				
8							Boring was terminated at 8 ft bgs.	
10								

Report: ENV_12S_CLEVELAND+/-USCS; File: RFAAP SWMU 35 37 38 RFI.GPJ; 4/4/2008 QSB4

URS

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Project: RAAP 10 Well Installation - SWMU 35
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 35MW1

Sheet 1 of 2

Date(s) Drilled and Installed	**December 14, 2007**	Logged By	**Jim Carter**	Reviewed By	**Tina DeVine**
Drilling Method	**Mixed - Direct Push, Hollow-Stem Auger, Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**31.0 feet**
Sampling Method	**4' Macrocore with disposable acetate liner**	Hammer Data	**Continuous hydraulic pressure**	Top of Casing Elevation	**1706.42 Mean Sea Level**
Size and Type of Well Casing	**2-inch, Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Surface Elevation	**1703.72 Mean Sea Level**
Seal or Backfill	**Bentonite pellets/Bentonite-cement grout**	Groundwater Level(s)	**19.82 bgs Static TOC**	Coordinates	**N 3,599,735.7 E 10,890,978.6**

Elevation feet	Depth, feet	SAMPLES Type	Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
1703.72	0						GW	Topsoil, dark brown, organic material.	
								7.5YR 4/1 dark gray sandy GRAVEL, loose, moist.	
								7.5YR 4/3 brown sandy SILT, medium stiff, moist.	Grout: 10% Bentonite/Cement Slurry
			1	48	1.6				
1700									
	5		2	48	0		ML		
								Same as above except micaceous and color changes to 5YR 4/4 reddish brown.	3/8-inch Hydrated Bentonite Pellets
1695									
	10		3	48	2.8				No. 1 Silica Quartz Sandpack
								5YR 4/6 yellowish red silty fine SAND, micaceous, medium dense, moist.	
1690			4	24	1.6				
	15						SM		Screen: 0.01-inch Factory Slotted, Sch 40, 2-inch PVC
			5	40	9.2				
1685								7.5YR 4/3 brown sandy GRAVEL, medium dense, wet (water at 19').	
	20						GW	Direct-push refusal at 20 ft bgs. Hollow-stem auger refusal at 20.2 ft bgs.	
								7.5YR 4/1 dark gray LIMESTONE (determined from cuttings).	
1680									
	25								

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU35.GPJ; 7/29/2010 35MW1

URS

Project: RAAP 10 Well Installation - SWMU 35
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 35MW1

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Type Number	SAMPLES: Recovery (in.)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
	25					LS			
1675									
	30						Boring was terminated at 31 ft bgs.		
1670									
	35								
1665									
	40								
1660									
	45								
1655									
	50								
1650									

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU35.GPJ; 7/29/2010 35MW1

URS

Project: RAAP 10 Well Installation - SWMU 35
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 35MW2

Sheet 1 of 2

Date(s) Drilled and Installed	**December 17, 2007**	Logged By	**Jim Carter**	Reviewed By	**Tina DeVine**
Drilling Method	**Mixed - Direct Push, Hollow-Stem Auger, Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**31.0 feet**
Sampling Method	**4' Macrocore with disposable acetate liner**	Hammer Data	**Continuous hydraulic pressure**	Top of Casing Elevation	**1706.88 Mean Sea Level**
Size and Type of Well Casing	**2-inch, Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Surface Elevation	**1703.91 Mean Sea Level**
Seal or Backfill	**Bentonite pellets/Bentonite-cement grout**	Groundwater Level(s)	**21.32 bgs Static TOC**	Coordinates	**N 3,599,774.5 E 10,890,901.0**

Elevation feet	Depth, feet	SAMPLES Type	Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
1703.91	0							Topsoil, dark brown, organic material.	
							ML	2.5YR 4/8 red clayey sandy SILT, stiff, moist.	
							GW	7.5YR 4/1 dark gray sandy GRAVEL, loose, dry.	Grout: 10% Bentonite/Cement Slurry
			1	48	1.2			7.5YR 3/4 dark brown sandy silt, medium stiff, moist.	
1700									
	5							Same as above except stiff consistency.	
			2	48	0.8		ML		
									3/8-inch Hydrated Bentonite Pellets
1695									
	10		3	32	0.8			7.5YR 5/4 clayey sandy SILT, medium stiff, moist.	No. 1 Silica Quartz Sandpack
							ML		
1690			4	32	0.7				
	15							5YR 4/4 reddish brown silty fine to medium SAND, medium dense, moist.	Screen: 0.01-inch Factory Slotted, Sch 40, 2-inch PVC
			5	42	0.4		SM		
1685								Same as above except wet (water at 19 ft.) ▽	
	20								
			6	24	0.6			7.5YR 4/3 brown sandy GRAVEL, medium dense, wet.	
							GW	Direct-push refusal at 22 ft bgs. Hollow-stem auger refusal at 22.5 ft bgs.	
1680									
	25								

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU35.GPJ; 7/29/2010 35MW2

URS

Project: RAAP 10 Well Installation - SWMU 35
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 35MW2

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES Type Number	SAMPLES Recovery (in.)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
1675	25					LS	7.5YR 4/1 dark gray LIMESTONE (determined from cuttings).		
	30						Boring was terminated at 31 ft bgs.		
1670	35								
1665	40								
1660	45								
1655	50								
1650									

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU35.GPJ; 7/29/2010 35MW2

URS

Project: RAAP 10 Well Installation - SWMU 37
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 37MW1

Sheet 1 of 2

Date(s) Drilled and Installed	**December 13, 2007**	Logged By	**Jim Carter**	Reviewed By	**Tina DeVine**
Drilling Method	**Mixed - Direct Push, Hollow-Stem Auger, Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**40.0 feet**
Sampling Method	**4' Macrocore with disposable acetate liner**	Hammer Data	**Continuous hydraulic pressure**	Top of Casing Elevation	**1716.02 Mean Sea Level**
Size and Type of Well Casing	**2-inch, Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Surface Elevation	**1713.35 Mean Sea Level**
Seal or Backfill	**Bentonite pellets/Bentonite-cement grout**	Groundwater Level(s)	**32.61 bgs Static TOC**	Coordinates	**N 3,598,111.6 E 10,884,945.0**

Elevation feet	Depth, feet	SAMPLES Type	Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
1713.35	0						GP	7.5YR 2.5/1 black GRAVEL, loose, dry.	
								7.5YR 5/6 strong brown sandy SILT, micaceous, medium stiff, moist.	
	2		1	42	2.8				
1710									
	4								
	6		2	40	9.8				Grout: 10% Bentonite/Cement Slurry
							ML		
	8							Same as above except color changes to 7.5YR 5/8 strong brown.	
1705									
	10		3	24	6.6				
	12								3/8-inch Hydrated Bentonite Pellets
1700									
	14		4	38	7.2			7.5YR 6/6 reddish yellow silty sandy GRAVEL, medium dense, moist.	No. 1 Silica Quartz Sandpack
	16						GM		
	18		5	30	3.6				
1695									
	20								

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU37.GPJ; 7/29/2010 37MW1

URS

Project: RAAP 10 Well Installation - SWMU 37
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 37MW1

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	20								
	22		6	28	9.1		GM		
1690								Same as above except wet (water at ~ 23 ft bgs).	
	24							7.5YR 6/6 reddish yellow gravelly silty CLAY, medium stiff, wet.	
	26		7	28	6.5		CL		
							LS	Gray LIMESTONE, weathered, friable.	Screen: 0.01-inch Factory Slotted, Sch 40, 2-inch PVC
1685	28								
							WLS	Weathered zone, clayey with gravel-sized rock fragments, reddish-gray, wet.	
	30		8	24	4.8				
							LS	Gray LIMESTONE, weathered, friable.	
							WLS	Weathered zone, clayey with gravel-sized rock fragments, reddish-gray, wet.	
	32							Gray LIMESTONE, weathered, friable. Direct-push refusal.	
1680									
	34								
	36						LS		
	38								
1675									
	40							Boring was terminated at 40 ft bgs.	
	42								

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU37.GPJ; 7/29/2010 37MW1

URS

Project: RAAP 10 Well Installation - SWMU 37
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 37MW2

Sheet 1 of 2

Date(s) Drilled and Installed	**December 11, 2007**	Logged By	**Jim Carter**	Reviewed By	**Tina DeVine**
Drilling Method	**Mixed - Direct Push, Hollow-Stem Auger, Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**41.0 feet**
Sampling Method	**4' Macrocore with disposable acetate liner**	Hammer Data	**Continuous hydraulic pressure**	Top of Casing Elevation	**1716.82 Mean Sea Level**
Size and Type of Well Casing	**2-inch, Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Surface Elevation	**1714.38 Mean Sea Level**
Seal or Backfill	**Bentonite pellets/Bentonite-cement grout**	Groundwater Level(s)	**27.86 bgs Static TOC**	Coordinates	**N 3,598,329.5 E 10,884,637.1**

Elevation feet	Depth, feet	SAMPLES Type	Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
1714.38	0							Topsoil, dark brown, organic material.	
							GW	7.5YR 2.5/1 black sandy GRAVEL, loose, moist.	
			1	36	32.1			7.5YR 4/4 brown sandy SILT, micaceous, soft, moist.	
1710	5						ML		
			2	48	2.5				
							SW	7.5YR 3/1 dark gray gravelly medium to coarse SAND, loose, moist.	Grout: 10% Bentonite/Cement Slurry
1705								7.5YR 4/4 brown silty fine SAND, loose, moist.	
	10		3	48	35.7		SM		
								7.5YR 4/4 brown gravelly fine to medium SAND, loose, moist.	
1700			4	48	28.8				
	15						SW		
			5	48	41.0				3/8-inch Hydrated Bentonite Pellets
1695								Same as above but grain size increases to medium to coarse.	
	20							7.5YR 5/1 gray LIMESTONE.	No. 1 Silica Quartz Sandpack

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU37.GPJ; 7/29/2010 37MW2

URS

Project: RAAP 10 Well Installation - SWMU 37
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 37MW2

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES Type	Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
			6	36	16.4		GC	7.5YR 4/4 clayey sandy GRAVEL, medium dense, moist.		
1690	25		7	24	38.8			Same as above except wet (water at 25 ft bgs).	▽	
							LS	7.5YR 7/1 light gray LIMESTONE, weathered, friable. Direct-push refusal at 26 ft bgs.		
								Gray LIMESTONE, competent bedrock. Hollow-stem auger refusal at 27 ft bgs.	▽	
1685	30									Screen: 0.01-inch Factory Slotted, Sch 40, 2-inch PVC
1680	35						LS			
1675	40									
								Boring was terminated at 41 ft bgs.		
1670	45									

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU37.GPJ; 7/29/2010 37MW2

URS

Project: RAAP 10 Well Installation - SWMU 37
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 37MW3

Sheet 1 of 2

Date(s) Drilled and Installed	**December 12, 2007**	Logged By	**Jim Carter**	Reviewed By	**Tina DeVine**
Drilling Method	**Mixed - Direct Push, Hollow-Stem Auger, Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**41.0 feet**
Sampling Method	**4' Macrocore with disposable acetate liner**	Hammer Data	**Continuous hydraulic pressure**	Top of Casing Elevation	**1714.55 Mean Sea Level**
Size and Type of Well Casing	**2-inch, Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Surface Elevation	**1712.00 Mean Sea Level**
Seal or Backfill	**Bentonite pellets/Bentonite-cement grout**	Groundwater Level(s)	**29.51 bgs Static TOC**	Coordinates	**N 3,598,419.4 E 10,884,697.0**

Elevation feet	Depth, feet	SAMPLES Type	Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
1712.00	0							Topsoil, dark brown, organic material.	
								7.5YR 5/3 grading downward to 7.5YR 3/1 sandy silty GRAVEL, loose, moist.	
								7.5YR 3/2 dark brown silty fine SAND, micaceous, loose, moist.	
1710			1	30	10.9				
								Same as above except color changes to 7.5YR 5/4 brown.	
	5								
			2	48	20.5				
1705									Grout: 10% Bentonite/Cement Slurry
	10		3	46	14.0		SM		
1700								Same as above except color changes to 7.5YR 5/6 strong brown.	
			4	40	0				
	15								
1695									3/8-inch Hydrated Bentonite Pellets
			5	46	21.8				
								7.5YR 5/6 strong brown clayey sandy GRAVEL, medium dense, moist.	
	20						GC		No. 1 Silica Quartz Sandpack
1690									

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU37.GPJ; 7/29/2010 37MW3

URS

Project: RAAP 10 Well Installation - SWMU 37
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 37MW3

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES Type	Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
1690			6	28	17.6		GC	Same as above except wet (water at 23.5 ft bgs).	
	25		7	12	21.9				
1685								LIMESTONE interbedded with clayey gravel layers. Hollow-stem auger refusal at 27 ft bgs.	
	30								Screen: 0.01-inch Factory Slotted, Sch 40, 2-inch PVC
1680							LS		
	35								
1675									
	40								
1670								Boring was terminated at 41 ft bgs.	
	45								
1665									

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU37.GPJ; 7/29/2010 37MW3

URS

Project: RAAP 10 Well Installation - SWMU 37
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 37MW4

Sheet 1 of 2

Date(s) Drilled and Installed	**May 25, 2010**	Logged By	**Doann Hamilton**	Reviewed By	**Jim Spencer**
Drilling Method	**Air Rotary**	Drilling Contractor	**Richard Simmons Drilling**	Total Depth of Borehole	**45.5 feet**
Sampling Method	**Cuttings**	Drill Bit Size/Type	**0.5" Tricone Carbon Button Bit**	Top of Casing Elevation	**1716.01 Mean Sea Level**
Size and Type of Well Casing	**2-inch, Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Surface Elevation	**1713.38 Mean Sea Level**
Seal or Backfill	**Portland cement / Bentonite chips**	Groundwater Level(s)	**30.31 bgs Static TOC**	Coordinates	**N 3,598,240.8 E 10,884,863.4**

Elevation feet	Depth, feet	SAMPLES Type Number	SAMPLES Recovery (inches)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
1713.38	0						Grass surface.	
						SM	10YR 3/4 dark yellowish brown, silty fine SAND, medium dense, damp, no odor (FILL).	Concrete seal
1710								
	5			0.5				
1705								
	10			0.5			Becomes 7.5YR 4/6 strong brown.	
1700								
	15			0.5			Some rubber o-rings in cuttings.	Bentonite chips
1695						GM	Driller ID gravel layer 18 to19 feet bgs.	
	20			0.5			10YR 3/4 dark yellowish brown, sandy fine GRAVEL with silt, dense, angular, sand is fine.	Grade 2 - filter pack
1690								2-inch Schedule 40 PVC, 0.010-inch Factory Slotted
	25							

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU37.GPJ; 7/29/2010 37MW4

URS

Project: RAAP 10 Well Installation - SWMU 37
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 37MW4

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES: Type Number	SAMPLES: Recovery (inches)	SAMPLES: PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
	25			0		LS	2.5Y 6/1 gray, LIMESTONE, R2-moderately weak, slightly weathered.	
1685								
	30			0				
1680								
	35			0				2-inch Schedule 40 PVC, 0.010-inch Factory Slotted
1675								
	40			0				
1670							Becomes moist.	
	45			0				End cap - Grade 2
							Boring Terminated at 45.5 ft. bgs. May 25, 2010. Installed well.	
1665								
	50							
1660								

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU37.GPJ; 7/29/2010 37MW4

URS

Project: RAAP 10 Well Installation - SWMU 38
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 38MW1

Sheet 1 of 2

Date(s) Drilled and Installed	**December 20, 2007**	Logged By	**Jim Carter**	Reviewed By	**Tina DeVine**
Drilling Method	**Mixed - Direct Push, Hollow-Stem Auger, Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**40.0 feet**
Sampling Method	**4' Macrocore with disposable acetate liner**	Hammer Data	**Continuous hydraulic pressure**	Top of Casing Elevation	**1712.00 Mean Sea Level**
Size and Type of Well Casing	**2-inch, Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Surface Elevation	**1709.40 Mean Sea Level**
Seal or Backfill	**Bentonite pellets/Bentonite-cement grout**	Groundwater Level(s)	**29.25 bgs Static TOC**	Coordinates	**N 3,598,826.5 E 10,885,186.6**

Elevation feet	Depth, feet	SAMPLES Type	Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
1709.40	0							Topsoil, dark brown, organic material.	
							ML	7.5YR 3/2 dark brown sandy SILT, soft, dry.	
			1	48	4.9			7.5YR 5/4 brown sandy SILT, micaceous, stiff, dry.	
1705	5		2	48	7.2		ML		
								7.5YR 6/6 reddish yellow sandy SILT, micaceous, soft, dry. Includes an approximately 1" thick rock layer at 10 ft bgs.	Grout: 10% Bentonite/Cement Slurry
1700	10		3	40	4.7				
			4	42	4.1				
1695	15							7.5YR 6/6 reddish yellow sandy GRAVEL, dry, loose.	3/8-inch Hydrated Bentonite Pellets
			5	20	8.2		GW		No. 1 Silica Quartz Sandpack
1690	20							Same as above except moist.	

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU38.GPJ; 7/29/2010 38MW1

URS

Project: RAAP 10 Well Installation - SWMU 38
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 38MW1

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES Type	Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
			6	36	9.2				
1685	25		7	24	9.7		GW	Same as above except wet (water at ~ 26.5 ft bgs).	
1680	30		8	12	8.5				Screen: 0.01-inch Factory Slotted, Sch 40, 2-inch PVC
1675	35		9	24	7.4		LS	7.5YR 5/1 gray LIMESTONE, weathered. Direct-push refusal at 34 ft bgs.	
1670	40							Boring was terminated at 40 ft bgs.	
1665	45								

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU38.GPJ; 7/29/2010 38MW1

URS

Project: RAAP 10 Well Installation - SWMU 38
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 38MW2

Sheet 1 of 2

Date(s) Drilled and Installed	**December 21, 2007**	Logged By	**Jim Carter**	Reviewed By	**Tina DeVine**
Drilling Method	**Mixed - Direct Push, Hollow-Stem Auger, Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**36.0 feet**
Sampling Method	**4' Macrocore with disposable acetate liner**	Hammer Data	**Continuous hydraulic pressure**	Top of Casing Elevation	**1710.30 Mean Sea Level**
Size and Type of Well Casing	**2-inch, Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Surface Elevation	**1707.58 Mean Sea Level**
Seal or Backfill	**Bentonite pellets/Bentonite-cement grout**	Groundwater Level(s)	**27.13 bgs Static TOC**	Coordinates	**N 3,598,794.8 E 10,884,946.0**

Elevation feet	Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (in.)	SAMPLES PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
1707.58	0							Topsoil, dark brown, organic material.	
								7.5YR 4/4 brown silty fine SAND, medium dense, dry.	
	2		1	48	1.0				
1705								Same as above except color changes to 7.5YR 6/4 light brown.	
	4								
	6		2	48	0		SM		Grout: 10% Bentonite/Cement Slurry
1700									
	8								
	10		3	48	0				
	12							7.5YR 6/4 light brown gravelly silty fine to medium SAND, medium stiff, moist.	
1695									3/8-inch Hydrated Bentonite Pellets
	14		4	36	0		SM		No. 1 Silica Quartz Sandpack
	16							7.5YR 6/4 light brown sandy GRAVEL, medium dense, moist.	
1690									
	18		5	32	0.2		GW		
	20								

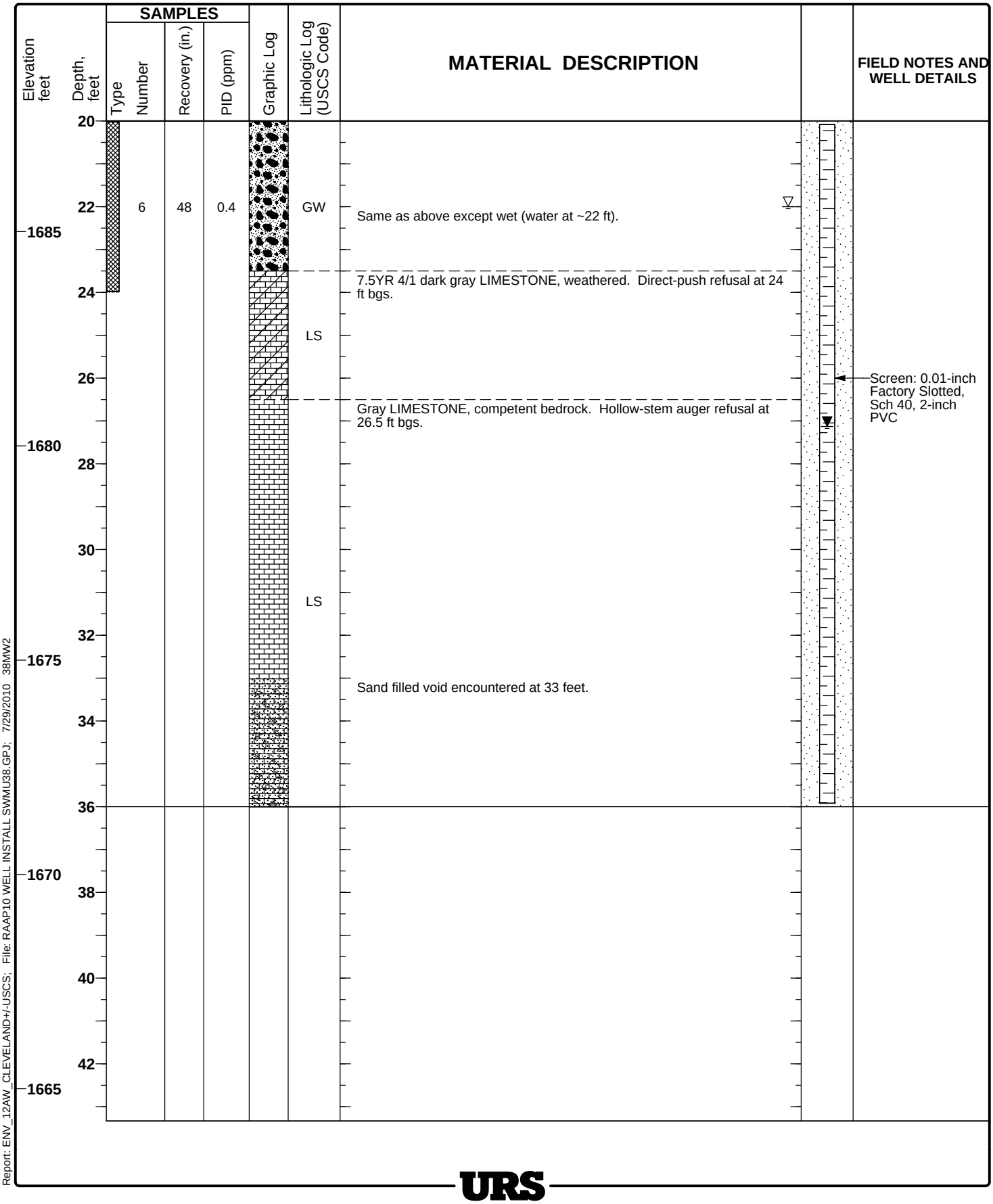
Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU38.GPJ; 7/29/2010 38MW2

URS

Project: RAAP 10 Well Installation - SWMU 38
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 38MW2

Sheet 2 of 2



Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU38.GPJ; 7/29/2010 38MW2

URS

Project: RAAP 10 Well Installation - SWMU 38
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 38MW3

Sheet 1 of 2

Date(s) Drilled and Installed	**December 12, 2007**	Logged By	**Jim Carter**	Reviewed By	**Tina DeVine**
Drilling Method	**Mixed - Direct Push, Hollow-Stem Auger, Air Rotary**	Drilling Contractor	**Parratt Wolff**	Total Depth of Borehole	**41.0 feet**
Sampling Method	**4' Macrocore with disposable acetate liner**	Hammer Data	**Continuous hydraulic pressure**	Top of Casing Elevation	**1707.69 Mean Sea Level**
Size and Type of Well Casing	**2-inch, Schedule 40 PVC**	Screen Perforation	**0.010-inch**	Surface Elevation	**1705.03 Mean Sea Level**
Seal or Backfill	**Bentonite pellets/Bentonite-cement grout**	Groundwater Level(s)	**24.95 bgs Static TOC**	Coordinates	**N 3,599,062.1 E 10,884,979.7**

Elevation feet	Depth, feet	SAMPLES Type	Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES AND WELL DETAILS
1705	0							Topsoil, dark brown, organic material.	
1703.98								7.5YR 4/6 strong brown silty fine SAND, micaceous, loose, moist.	
			1	48	0.4				
1700	5		2	38	0.3				Grout: 10% Bentonite/Cement Slurry
1695	10		3	48	0.3		SM		
								Same as above except color changes to 7.5YR 5/4 brown.	
			4	48	0.1				3/8-inch Hydrated Bentonite Pellets
1690	15								No. 1 Silica Quartz Sandpack
			5	36	0.2				
1685	20								

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU38.GPJ; 7/29/2010 38MW3

URS

Project: RAAP 10 Well Installation - SWMU 38
Project Location: Radford Army Ammunition Plant
Project Number: 21354887

Log of Boring 38MW3

Sheet 2 of 2

Elevation feet	Depth, feet	SAMPLES Type	Number	Recovery (in.)	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION		FIELD NOTES AND WELL DETAILS
			6	28	0.5		GW	7.5YR 6/8 reddish yellow sandy GRAVEL, loose, wet.		
								7.5YR 6/8 reddish yellow gravelly, sandy CLAY, soft, wet.		
			7	12	0.3					
1680	25						CL	Direct-push refusal at 25 ft bgs.		
							LS	7.5YR 5/1 gray LIMESTONE, weathered.		
								Gray LIMESTONE, competent bedrock. Hollow-stem auger refusal at 28 ft bgs.		Screen: 0.01-inch Factory Slotted, Sch 40, 2-inch PVC
1675	30									
1670	35									
1665	40							Boring was terminated at 41 ft bgs.		
1660	45									

Report: ENV_12AW_CLEVELAND+/-USCS; File: RAAP10 WELL INSTALL SWMU38.GPJ; 7/29/2010 38MW3

URS

APPENDIX C.3

SLUG TEST DATA

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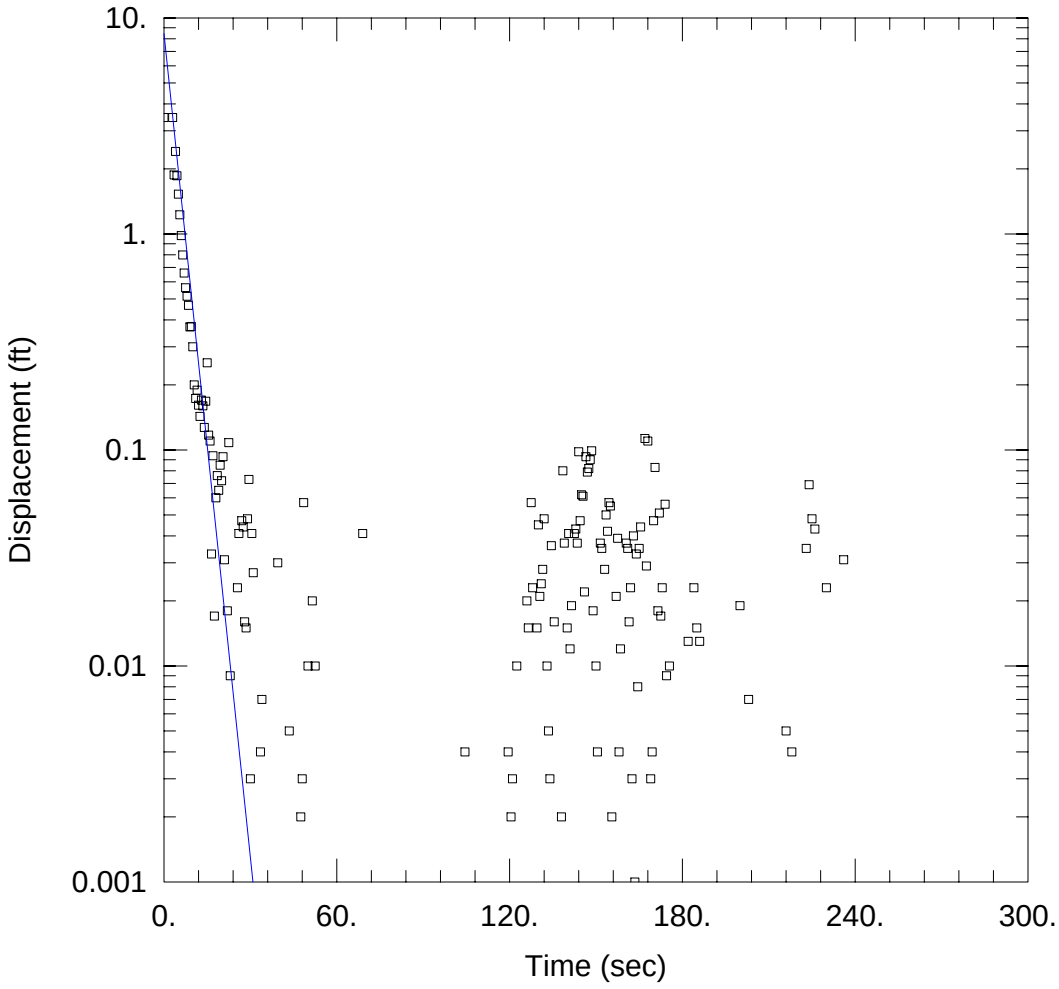


35MW1 RISING HEAD TEST

Data Set: P:\...\35MW1 Rising Head.aqt
Date: 04/03/08 Time: 08:43:05

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 35MW1
Test Date: 3-19-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

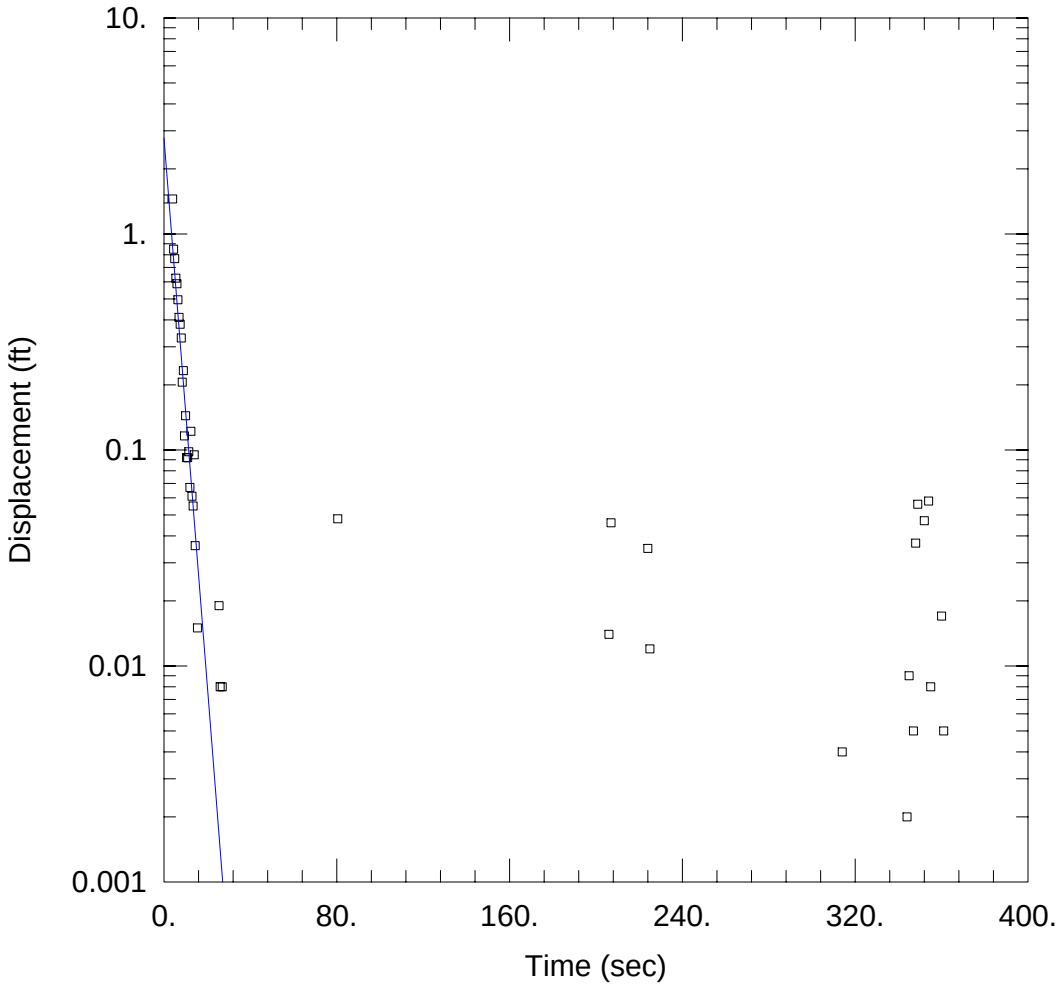
WELL DATA (35MW1)

Initial Displacement: 3.461 ft
Wellbore Radius: 0.083 ft
Screen Length: 25. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 14.08 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.004645 cm/sec y0 = 8.453 ft



35MW2 RISING HEAD

Data Set: P:\...\35MW2 Rising Head.aqt
Date: 04/03/08 Time: 08:45:11

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 35MW2
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

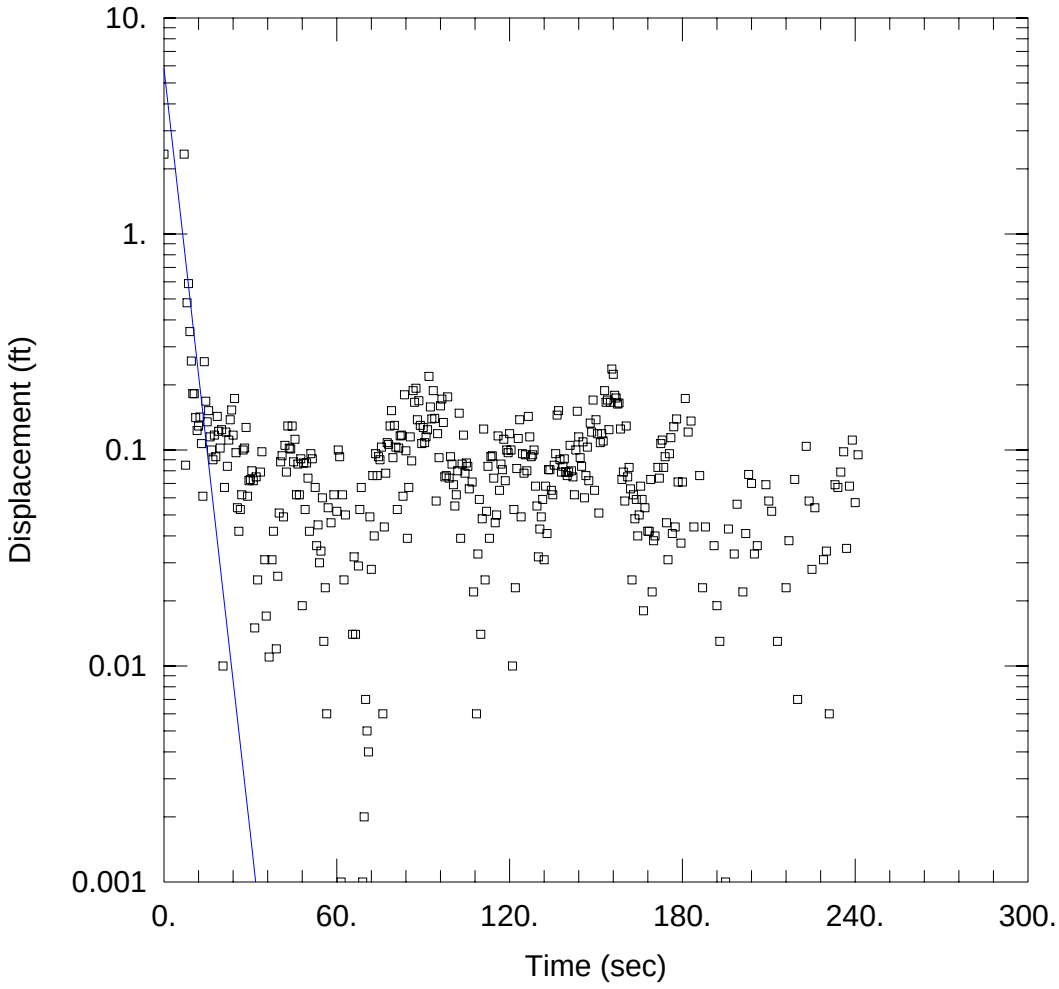
WELL DATA (35MW2)

Initial Displacement: 1.452 ft
Wellbore Radius: 0.083 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 11.8 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.005483 cm/sec y0 = 2.776 ft



35MW2 FALLING HEAD TEST

Data Set: P:\...\35MW2 Falling Head.aqt
Date: 04/03/08 Time: 08:43:50

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 35MW2
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

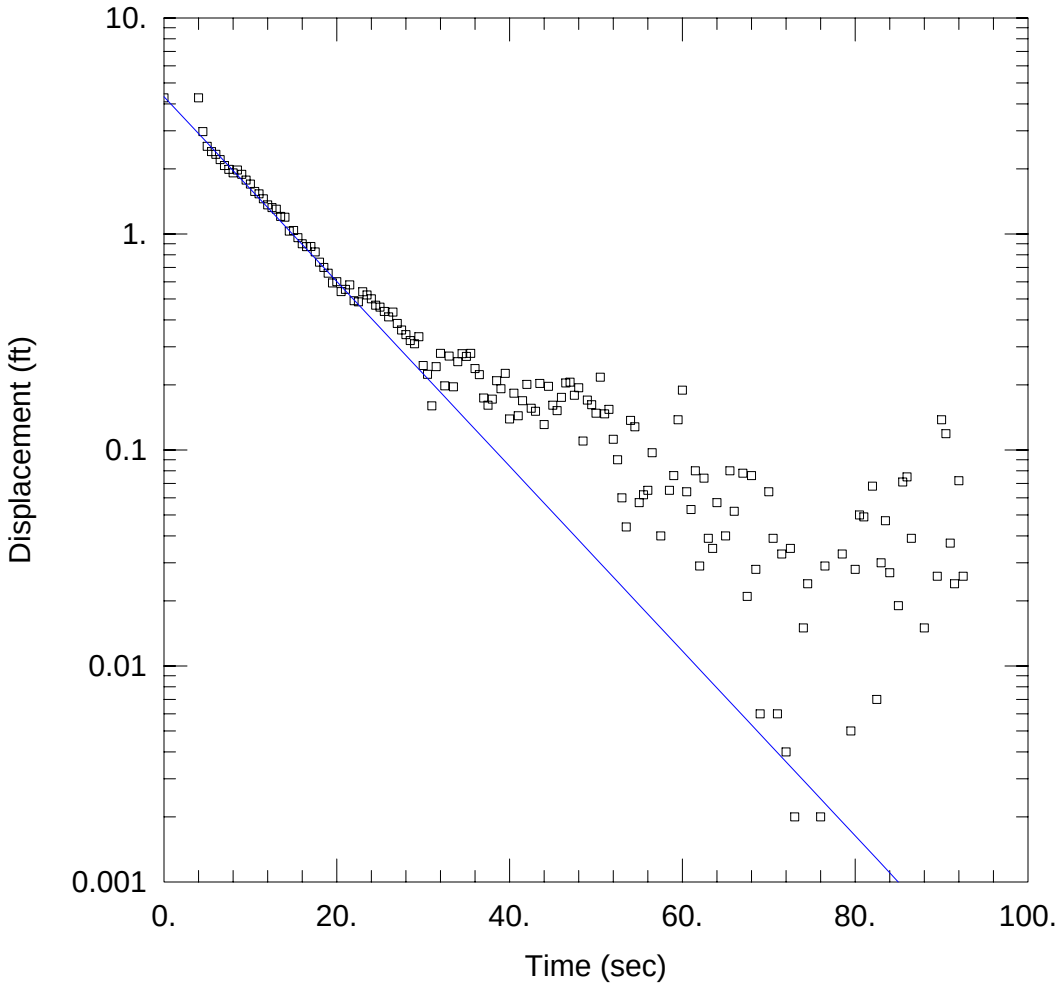
WELL DATA (35MW2)

Initial Displacement: 2.34 ft
Wellbore Radius: 0.083 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 11.8 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.005122 cm/sec y0 = 5.824 ft



37MW1 RISING HEAD TEST

Data Set: P:\...\37MW1 Rising Head.aqt
Date: 04/03/08 Time: 08:46:56

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 37MW1
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

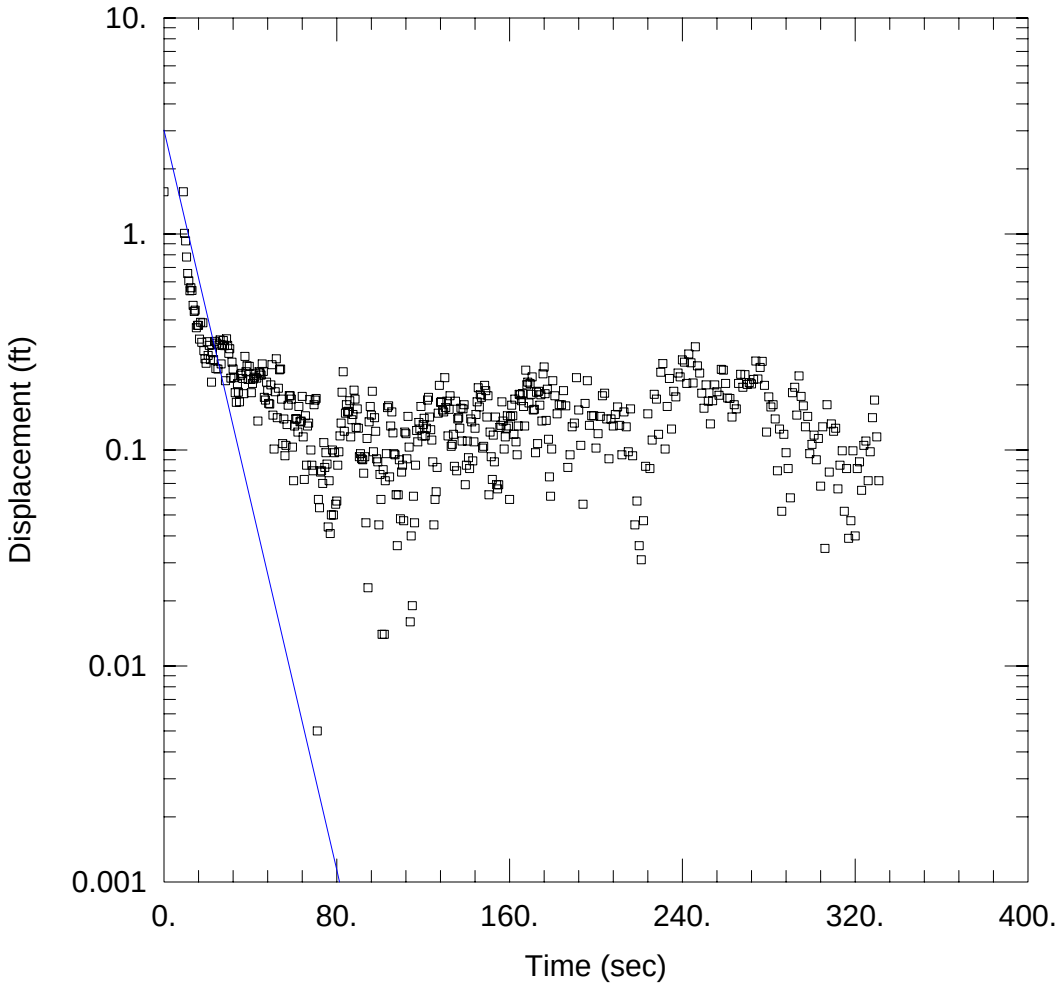
WELL DATA (37MW1)

Initial Displacement: 4.263 ft
Wellbore Radius: 0.083 ft
Screen Length: 25. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 10.35 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.00148 cm/sec y0 = 4.319 ft



37MW1 FALLING HEAD TEST

Data Set: P:\...\37MW1 Falling Head.aqt
Date: 04/03/08 Time: 08:46:04

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 37MW1
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

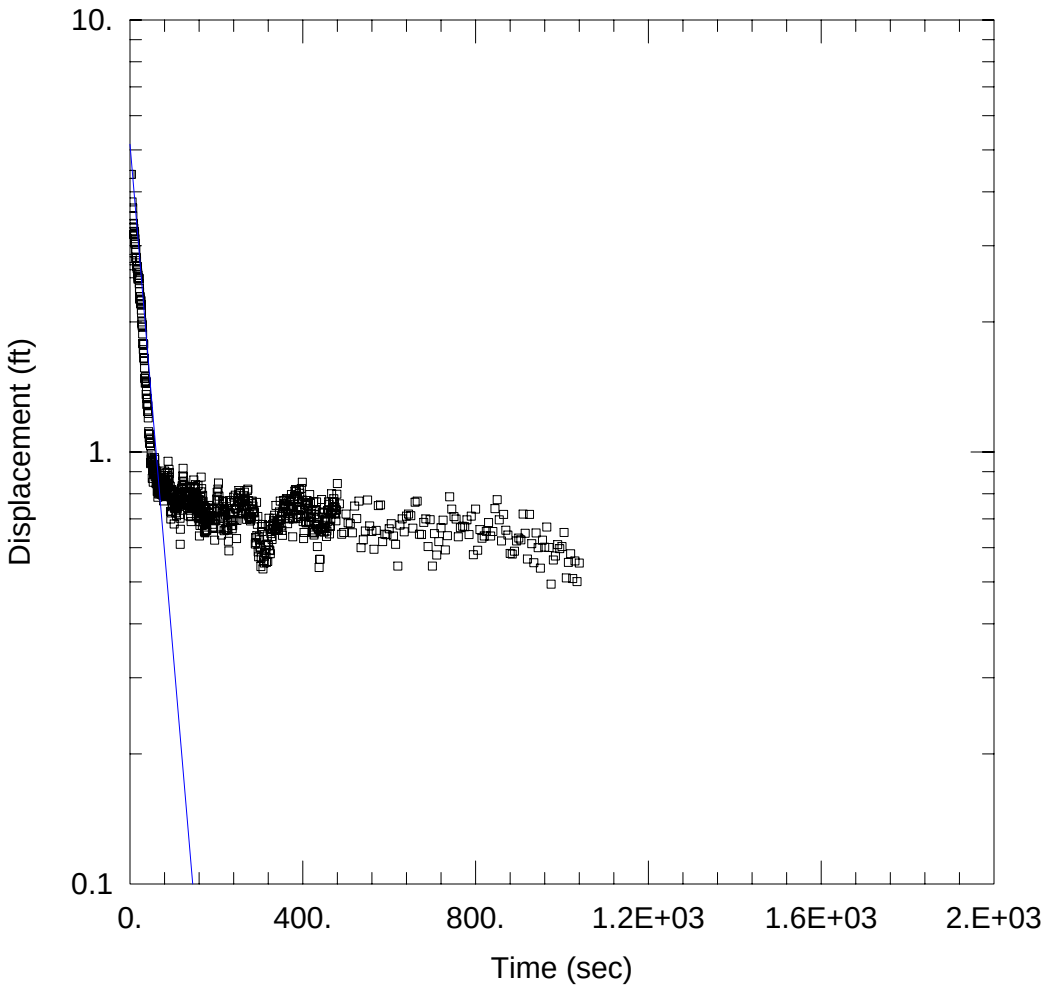
WELL DATA (37MW1)

Initial Displacement: 1.568 ft
Wellbore Radius: 0.083 ft
Screen Length: 25. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 10.35 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.001482 cm/sec y0 = 3.025 ft



37MW2 RISING HEAD TEST

Data Set: P:\...\37MW2 Rising Head.aqt
Date: 04/03/08 Time: 08:48:30

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 37MW2
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

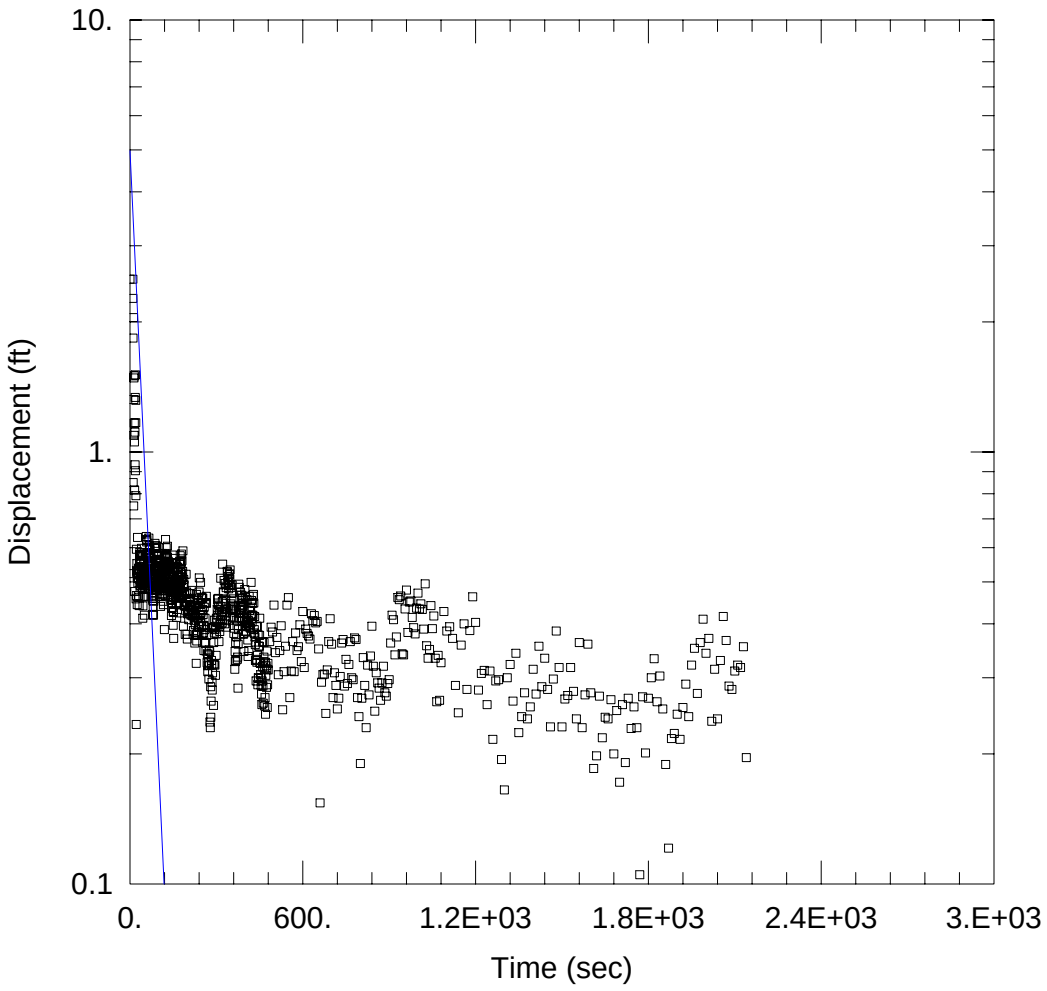
WELL DATA (37MW2)

Initial Displacement: 4.388 ft
Wellbore Radius: 0.083 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 15.62 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0005369 cm/sec y0 = 5.154 ft



37MW2 FALLING HEAD TEST

Data Set: P:\...\37MW2 Falling Head.aqt
Date: 04/03/08 Time: 08:48:01

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 37MW2
Test Date: 3-19-08

AQUIFER DATA

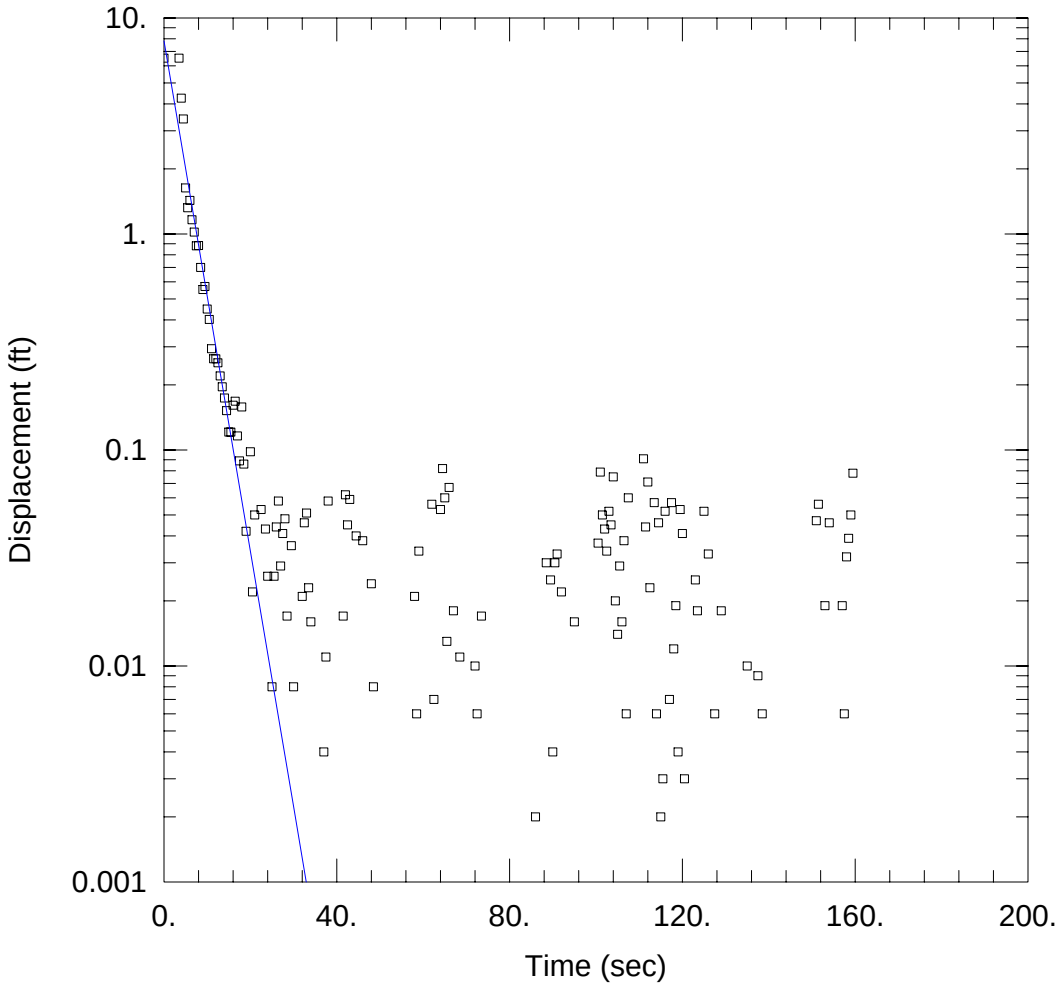
Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (37MW2)

Initial Displacement: 2.51 ft
Wellbore Radius: 0.083 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 15.62 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.0006514 cm/sec
y0 = 4.98 ft



37MW3 RISING HEAD TEST

Data Set: P:\...\37MW3 Rising Head.aqt
Date: 04/03/08 Time: 08:49:45

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 37MW3
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

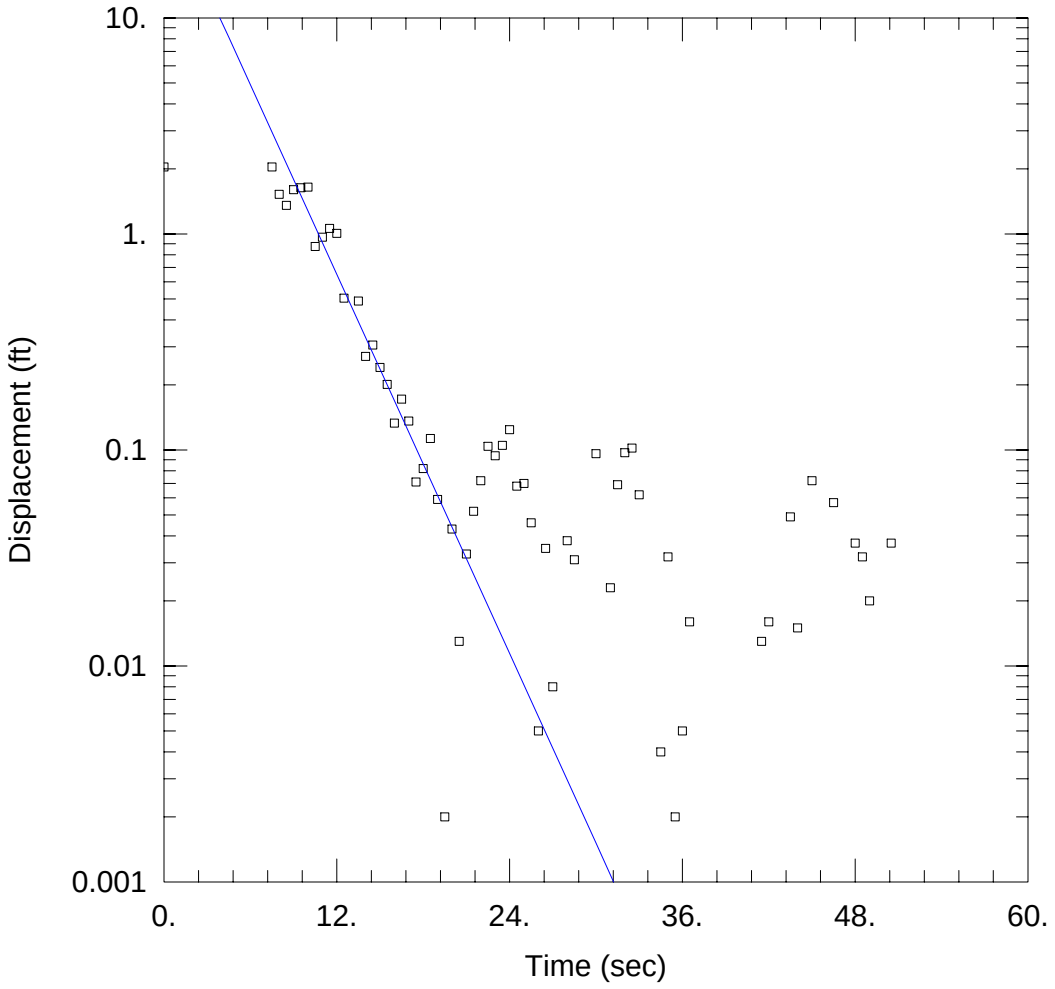
WELL DATA (37MW3)

Initial Displacement: 6.512 ft
Wellbore Radius: 0.083 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 13.85 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.00527 cm/sec y0 = 7.835 ft



37MW3 FALLING HEAD TEST

Data Set: P:\...\37MW3 Falling Head.aqt
Date: 04/03/08 Time: 08:48:58

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 37MW3
Test Date: 3-18-08

AQUIFER DATA

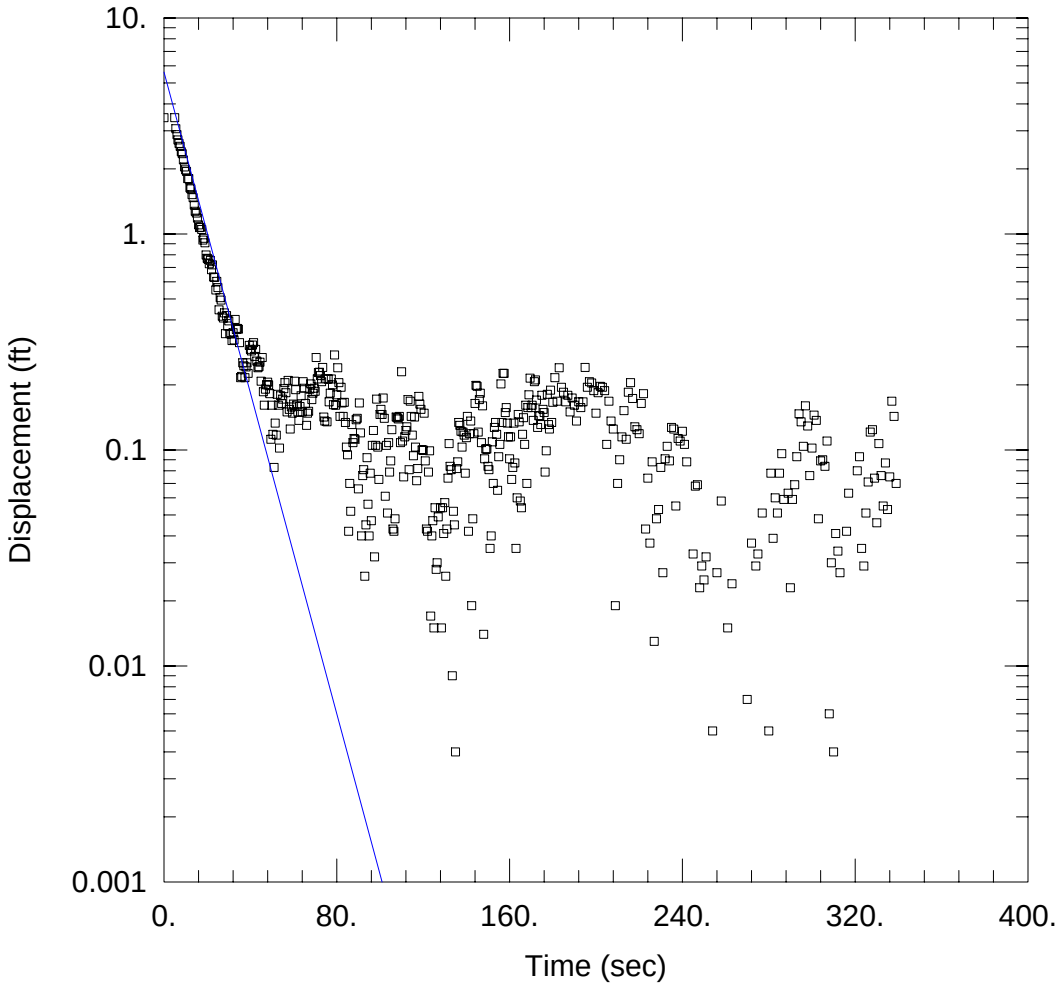
Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (37MW3)

Initial Displacement: 2.041 ft
Wellbore Radius: 0.083 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 13.85 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.006524 cm/sec
y0 = 37.04 ft



38MW1 RISING HEAD TEST

Data Set: P:\...\38MW1 Rising Head.aqt
Date: 04/03/08 Time: 08:51:32

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 38MW1
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

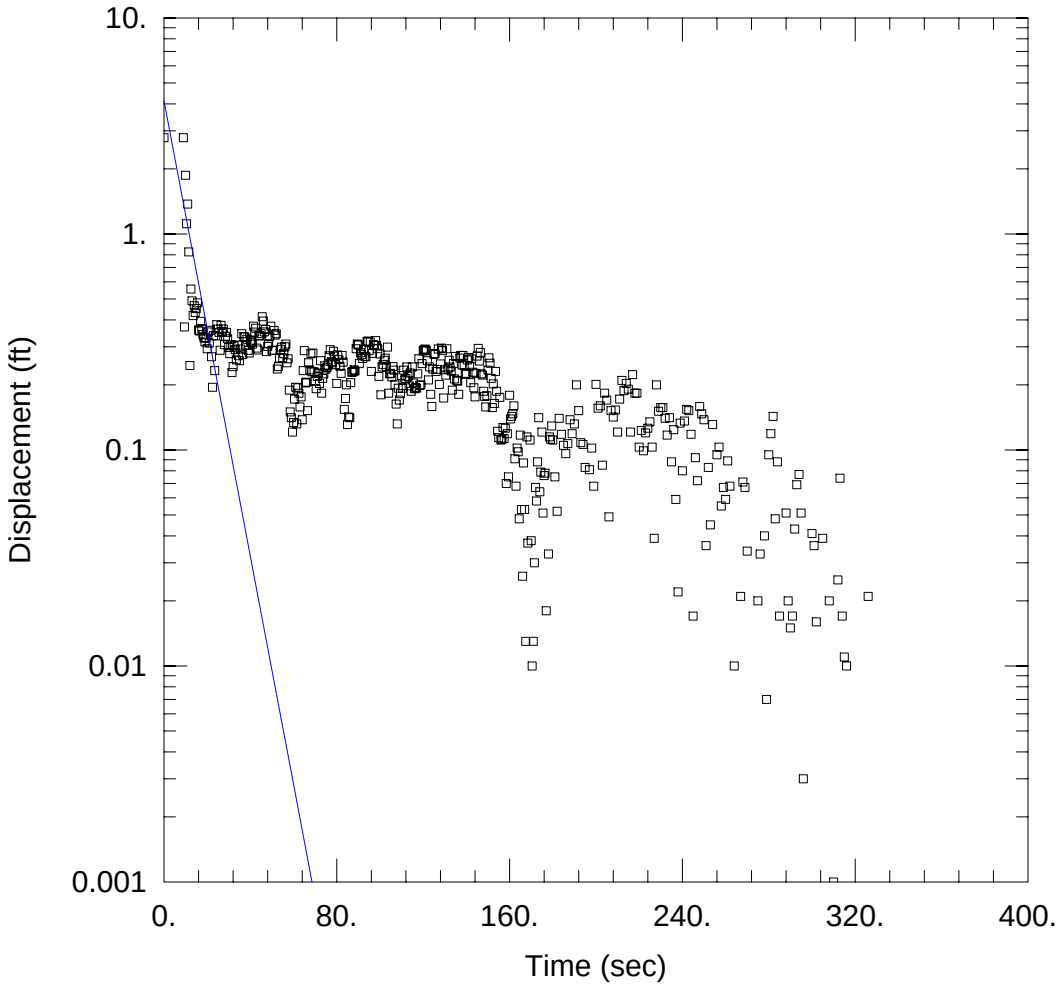
WELL DATA (38MW1)

Initial Displacement: 3.451 ft
Wellbore Radius: 0.083 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 13.22 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.001643 cm/sec y0 = 5.611 ft



38MW1 FALLING HEAD TEST

Data Set: P:\...\38MW1 Falling Head.aqt
Date: 04/03/08 Time: 08:50:37

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 38MW1
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

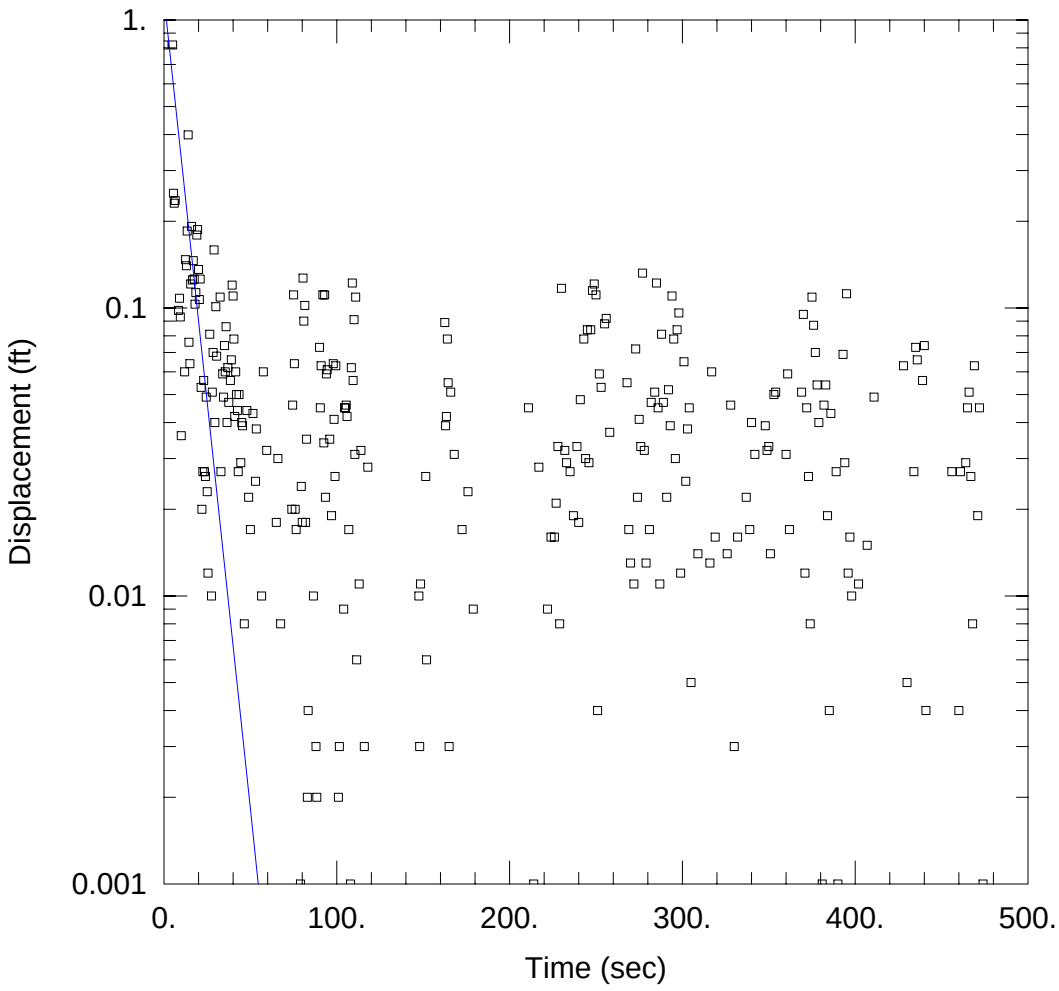
WELL DATA (38MW1)

Initial Displacement: 2.789 ft
Wellbore Radius: 0.083 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 13.22 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.002333 cm/sec y0 = 4.129 ft



38MW2 RISING HEAD TEST

Data Set: P:\...\38MW2 Rising Head.aqt
Date: 04/03/08 Time: 08:54:18

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 38MW2
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

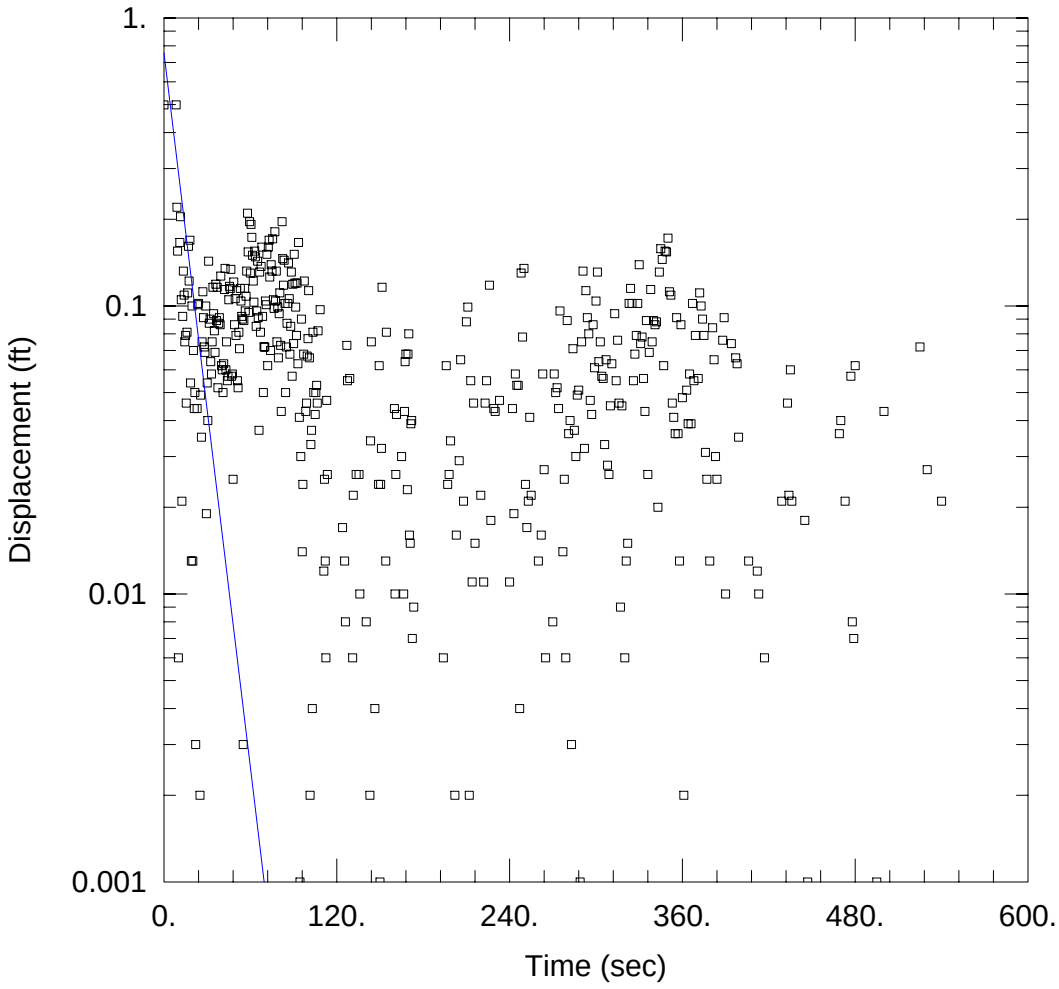
WELL DATA (38MW2)

Initial Displacement: 0.819 ft
Wellbore Radius: 0.083 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 11.61 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.002442 cm/sec y0 = 1.212 ft



38MW2 FALLING HEAD TEST

Data Set: P:\...\38MW2 Falling Head.aqt
Date: 04/03/08 Time: 08:52:36

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 38MW2
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

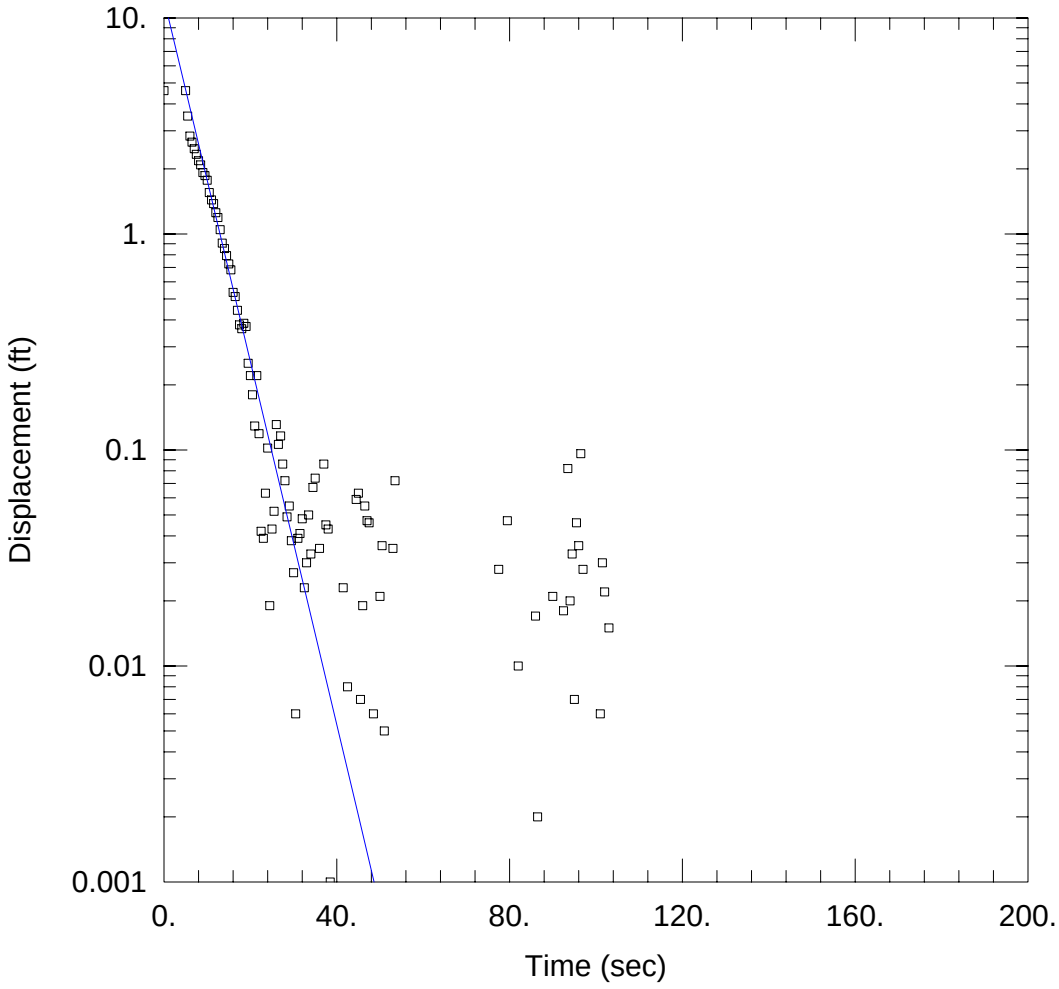
WELL DATA (38MW2)

Initial Displacement: 0.499 ft
Wellbore Radius: 0.083 ft
Screen Length: 20. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 11.61 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.001788 cm/sec y0 = 0.7548 ft



38MW3 RISING HEAD TEST

Data Set: P:\...\38MW3 Rising Head.aqt
Date: 04/03/08 Time: 08:56:17

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 38MW3
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

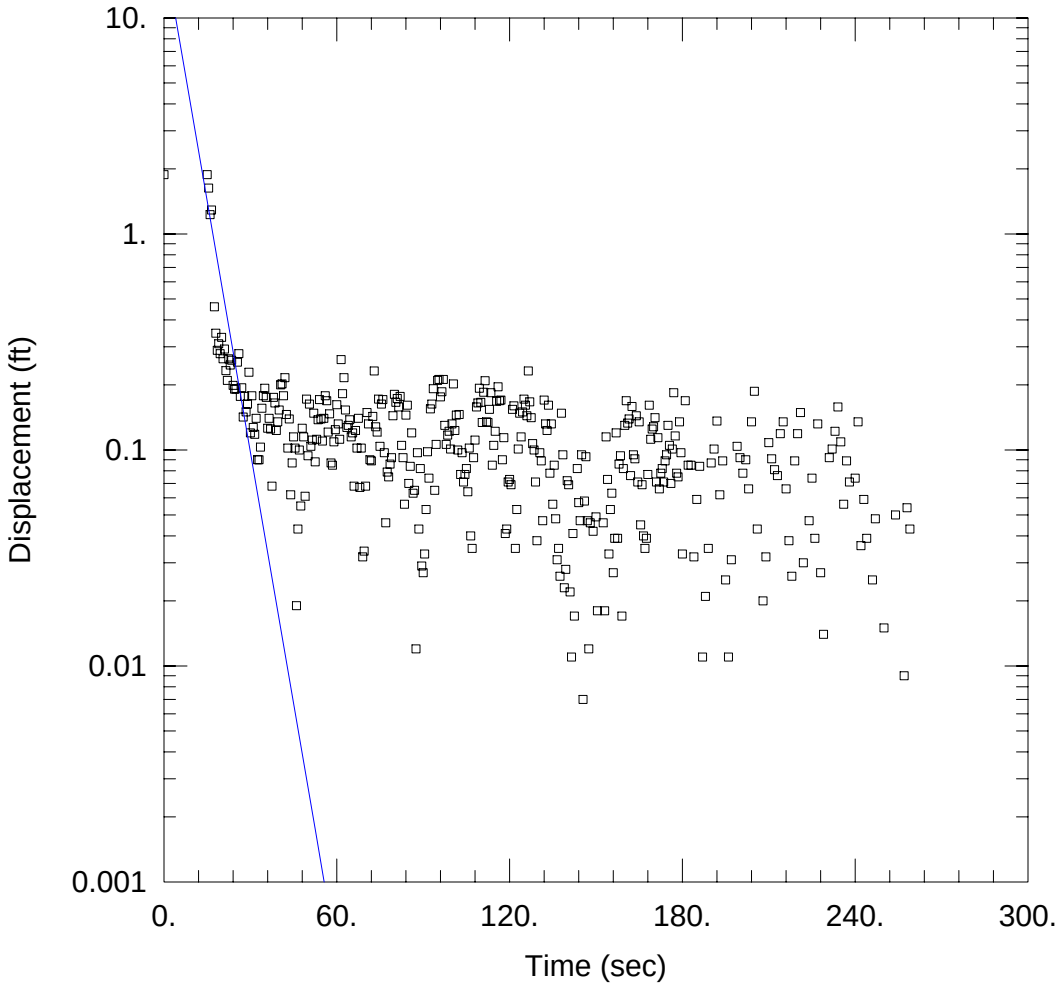
WELL DATA (38MW3)

Initial Displacement: 4.61 ft
Wellbore Radius: 0.083 ft
Screen Length: 25. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 17.17 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.003179 cm/sec y0 = 12.27 ft



38MW3 FALLING HEAD TEST

Data Set: P:\...\38MW3 Falling Head.aqt
Date: 04/03/08 Time: 08:55:18

PROJECT INFORMATION

Company: URS Corporation
Client: RFAAP
Project: 11656351
Test Location: Radford, VA
Test Well: 38MW3
Test Date: 3-18-08

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (38MW3)

Initial Displacement: 1.881 ft
Wellbore Radius: 0.083 ft
Screen Length: 25. ft
Gravel Pack Porosity: 0.2
Casing Radius: 0.083 ft
Well Skin Radius: 0.1875 ft
Total Well Penetration Depth: 17.17 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.002934 cm/sec y0 = 20.68 ft

Hydraulic Conductivity (K) Values

SWMU 35	Water Level	Screen Interval	Hydraulic Cond (cm/sec)	Hydraulic Cond (ft/day)	Test Used
35MW-1	1686.6	1692.72-1672.72	4.65E-03	13.17	rising head
35MW-2	1685.56	1692.91-1672.91	5.48E-03	15.54	rising head
D-2	1691.59	1692.41-1677.41	No Data	No Data	No Data
D-4	1691.88	1692.45-1677.45	2.80E-03	7.94	VI data
		Avg. Hyd. Cond.	4.31E-03	12.22	

SWMU 37, 38, Q	Water Level	Screen Interval	Hydraulic Cond (cm/sec)	Hydraulic Cond (ft/day)	Test Used
37MW-1	1683.41	1698.35-1673.35	1.48E-03	4.20	rising head
37MW-2	1688.96	1693.38-1673.38	5.37E-04	1.52	rising head
37MW-3	1685.04	1691.00-1671.00	5.27E-03	14.94	rising head
38MW-1	1682.75	1689.40-1669.40	1.64E-03	4.66	rising head
38MW-2	1683.17	1691.58-1671.58	2.44E-03	6.92	rising head
38MW-3	1682.74	1689.03-1669.03	3.18E-03	9.01	rising head
		Avg. Hyd. Cond.	2.43E-03	6.89	

Note:
Rising head slug test results were used where water level elevations were within the well screened interval. Falling head slug test results were used where water elevations were above the well screened interval.

Hydraulic Gradient (i) Calculations

Using Equation **i = dh/l**

i = hydraulic gradient
dh = difference in water column height
l = length or distance between measuring points

Use figure for line reference

SWMU 35	(l)	(dh)	(i)
Line A	281	6.32	0.022
Line B	266	6.00	0.023
		Avg Hyd Grd	0.023

SWMU 37, 38, Q	(l)	(dh)	(i)
Line A	182	5	0.027
Line B	49	3.92	0.080
Line C	225	2.5	0.011
Line D	120	0.42	0.004
		Avg Hyd Grd	0.031

Groundwater Flow Velocity (Vs)

Using Equation **$Vs = Ki/n_e$**

Vs = Groundwater Flow (seepage) Velocity (ft/day)
K = hydraulic conductivity (ft/day)
i = hydraulic gradient (ft/ft)
n_e = effective porosity (%)

Note:
Calculation assumes an estimated effective porosity of 0.30 percent for the Elbrook Formation

SWMU 35	(K)	(i)	(n_e)	(Vs) ft/day	(Vs) ft/year
Line A	12.22	0.022	0.30	0.9158	334.27
Line B	12.22	0.023	0.30	0.9185	335.24
			Avg. GW Flow Velocity	0.92	334.75

SWMU 37, 38, Q	(K)	(i)	(n_e)	(Vs) ft/day	(Vs) ft/year
Line A	6.89	0.027	0.30	0.6305	230.14
Line B	6.89	0.080	0.30	1.8361	670.17
Line C	6.89	0.011	0.30	0.2550	93.08
Line D	6.89	0.004	0.30	0.0803	29.32
			Avg. GW Flow Velocity	0.7005	255.68

APPENDIX C.4

FIELD SAMPLING DATA SHEETS

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APPENDIX C.4.1

SOIL SAMPLING FORMS

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Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/12/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Sunny / mild	Sampling Team:	MF, JC

Sample ID: 35SB3A — Sample Collection Time: 1600

Sampling Device: Geoprobe — Depth (top): — Depth Interval: 0.5 - 1.5 ft.

Sample Containers/Preservatives

VOC	✓
SVOC	✓
Pesticides	✓
PCBs	✓
Herbicides	
Metals	✓
Comments:	

Physical Analysis: — PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —

MS/MSD Samples Taken Here: —

Sample ID: — Sample Collection Time: —

Sampling Device: — Depth (top): — Depth Interval: —

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	
Comments:	

Physical Analysis: — PID Reading: —

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —

MS/MSD Samples Taken Here: —

Sample ID: — Sample Collection Time: —

Sampling Device: — Depth (top): — Depth Interval: —

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	
Comments:	

Physical Analysis: — PID Reading: —

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —

MS/MSD Samples Taken Here: —

Signature of Samplers: [signature] — Date Completed: 11/12/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/13/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Overcast / mild	Sampling Team:	MF, JC

Sample ID: 35534A Sample Collection Time: 0750

Sampling Device: Geoprobe Depth (top): ____

Depth Interval: 0.5 - 1.5 ft

Sample Containers/Preservatives

VOC	✓
SVOC	✓
Pesticides	✓
PCBs	✓
Herbicides	
Metals	✓

Physical Analysis: ____

PID Reading: 0.0

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ Dup-1 Photo No: ____

MS/MSD Samples Taken Here: ____

Sample ID: ____ Sample Collection Time: ____

Sampling Device: ____ Depth (top): ____

Depth Interval: ____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: ____

PID Reading: ____

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Sample ID: ____ Sample Collection Time: ____

Sampling Device: ____ Depth (top): ____

Depth Interval: ____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: ____

PID Reading: ____

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Signature of Samplers: [signature] Date Completed: 11/13/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/13/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Overcast / Cool	Sampling Team:	MF, JC

Sample ID: 35SB1 A Sample Collection Time: 0825

Sampling Device: Geoprobe Depth (top):
Depth Interval: 0.5 - 1.5ft

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: Photo No:
MS/MSD Samples Taken Here:

Sample ID: Sample Collection Time:

Sampling Device: Depth (top):
Depth Interval:

Sample Containers/Preservatives

VOC
SVOC
Pesticides
PCBs
Herbicides
Metals
Comments:

Physical Analysis:
PID Reading:

Field QC / Photo ID

Duplicate Sample Taken Here: Photo No:
MS/MSD Samples Taken Here:

Sample ID: Sample Collection Time:

Sampling Device: Depth (top):
Depth Interval:

Sample Containers/Preservatives

VOC
SVOC
Pesticides
PCBs
Herbicides
Metals
Comments:

Physical Analysis:
PID Reading:

Field QC / Photo ID

Duplicate Sample Taken Here: Photo No:
MS/MSD Samples Taken Here:

Signature of Samplers: Date Completed: 11/13/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/13/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Overcast cool	Sampling Team:	MF, JC

Sample ID: 35SB2A Sample Collection Time: 0920

Sampling Device: Geoprobe Depth (top): _____
Depth Interval: 0 - 1 ft

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides _____
Metals ✓
Comments: _____

Physical Analysis: _____
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____
MS/MSD Samples Taken Here: ✓

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____
Depth Interval: _____

Sample Containers/Preservatives

VOC _____
SVOC _____
Pesticides _____
PCBs _____
Herbicides _____
Metals _____
Comments: _____

Physical Analysis: _____
PID Reading: _____

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____
MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____
Depth Interval: _____

Sample Containers/Preservatives

VOC _____
SVOC _____
Pesticides _____
PCBs _____
Herbicides _____
Metals _____
Comments: _____

Physical Analysis: _____
PID Reading: _____

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____
MS/MSD Samples Taken Here: _____

Signature of Samplers: [signature] Date Completed: 11/13/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/13/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	overcast / cool	Sampling Team:	MF, JC

Sample ID: 355B9A Sample Collection Time: 1045

Sampling Device: Geoprobe Depth (top): ____ Depth Interval: 0-1 ft

Sample Containers/Preservatives

VOC	✓	Physical Analysis:	____
SVOC	✓	PID Reading:	0.0
Pesticides	✓		
PCBs	✓		
Herbicides	____		
Metals	✓		

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Sample ID: 355B9B Sample Collection Time: 12:10

Sampling Device: ____ Depth (top): ____ Depth Interval: 5-8 ft

Sample Containers/Preservatives

VOC	✓	Physical Analysis:	____
SVOC	✓	PID Reading:	0.0
Pesticides	✓		
PCBs	✓		
Herbicides	____		
Metals	✓		

Comments: Sludge first found to 2ft, 2nd boring showed ending @ 4ft

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Sample ID: 355B9C Sample Collection Time: 12:00

Sampling Device: ____ Depth (top): ____ Depth Interval: 14-16 ft.

Sample Containers/Preservatives

VOC	✓	Physical Analysis:	____
SVOC	✓	PID Reading:	0.0
Pesticides	✓		
PCBs	____		
Herbicides	____		
Metals	✓		

Comments: Groundwater found @ 16 ft. bgs

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Signature of Samplers: [signature] Date Completed: 11/13/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/13/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	overcast / cool	Sampling Team:	MF, JC

Sample ID: 35SB10A Sample Collection Time: 1330

Sampling Device: Geoprobe Depth (top): _____

Depth Interval: 0-1 ft

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides _____
Metals ✓
Comments: _____

Physical Analysis: _____
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____
MS/MSD Samples Taken Here: _____

Sample ID: 35SB10B Sample Collection Time: 1338

Sampling Device: _____ Depth (top): _____

Depth Interval: 6-8 ft.

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides _____
Metals ✓
Comments: _____

Physical Analysis: _____
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____
MS/MSD Samples Taken Here: _____

Sample ID: 35SB10C Sample Collection Time: 1345

Sampling Device: _____ Depth (top): _____

Depth Interval: 14-16 ft.

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides _____
Metals ✓
Comments: _____

Physical Analysis: _____
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____
MS/MSD Samples Taken Here: _____

Signature of Samplers: [signature] Date Completed: 11/13/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/13/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Overcast (cool)	Sampling Team:	MF, JC

Sample ID: 355B6A | Sample Collection Time: 1445

Sampling Device: Geoprobe | Depth (top): | Depth Interval: 0-1ft

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: | Photo No:
MS/MSD Samples Taken Here:

Sample ID: 355B6B | Sample Collection Time: 1455

Sampling Device: | Depth (top): | Depth Interval: 6-8 ft

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: | Photo No:
MS/MSD Samples Taken Here:

Sample ID: 355B6C | Sample Collection Time: 1505

Sampling Device: | Depth (top): | Depth Interval: 14-16 ft.

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments: Took EQBK-1 after this boring

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: | Photo No:
MS/MSD Samples Taken Here:

Signature of Samplers: MF JC | Date Completed: 11/13/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/14/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	foggy / mild	Sampling Team:	MF, JC

Sample ID: 355B7A Sample Collection Time: 0800

Sampling Device: Geoprobe Depth (top): _____

Depth Interval: 0 - 1 ft

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides _____
Metals ✓
Comments: _____

Physical Analysis: ✓
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____
MS/MSD Samples Taken Here: _____

Sample ID: 355B7B Sample Collection Time: 0808

Sampling Device: _____ Depth (top): _____

Depth Interval: 6 - 8 ft

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides _____
Metals ✓
Comments: _____

Physical Analysis: _____
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____
MS/MSD Samples Taken Here: _____

Sample ID: 355B7C Sample Collection Time: 0825

Sampling Device: _____ Depth (top): _____

Depth Interval: 13.5 - 15.5 ft.

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides _____
Metals ✓
Comments: Hit refusal @ 9ft needed more sample from 14-16ft. So kept moving over until no refusal

Physical Analysis: _____
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____
MS/MSD Samples Taken Here: _____

Signature of Samplers: _____ Date Completed: 11/14/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/14/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	partial Sun / mild	Sampling Team:	MF, JC

Sample ID: 355B5A Sample Collection Time: 1010

Sampling Device: Geoprobe Depth (top): ____

Depth Interval: 0-1ft

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides ____
Metals ✓
Comments: ____

Physical Analysis: ____
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ Dup-2 Photo No: ____
MS/MSD Samples Taken Here: ____

Sample ID: 355B5B Sample Collection Time: 1023

Sampling Device: ____ Depth (top): ____

Depth Interval: 9-11ft

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides ____
Metals ✓
Comments: ____

Physical Analysis: ____
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____
MS/MSD Samples Taken Here: ____

Sample ID: 355B5C Sample Collection Time: 1027

Sampling Device: ____ Depth (top): ____

Depth Interval: 14-16ft.

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides ✓
Metals ✓
Comments: ____

Physical Analysis: ____
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____
MS/MSD Samples Taken Here: ____

Signature of Samplers: [signature] Date Completed: 11/14/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/14/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:		Sampling Team:	MF, JC

Sample ID: 35SB8A Sample Collection Time: 1105

Sampling Device: Geoprobe Depth (top): ____

Depth Interval: 0 - 1ft

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides ____
Metals ✓

Physical Analysis: ____
PID Reading: 0.0

Comments: Since boring initially was located next to concrete block moved ≈5ft towards river. Re-GPS'd location

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____
MS/MSD Samples Taken Here: ____

Sample ID: 35SB8B Sample Collection Time: 1115

Sampling Device: ____ Depth (top): ____

Depth Interval: 9 - 11 ft

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides ____
Metals ✓

Physical Analysis: ____
PID Reading: 0.0

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____
MS/MSD Samples Taken Here: ____

Sample ID: 35SB8C Sample Collection Time: 1120

Sampling Device: ____ Depth (top): ____

Depth Interval: 14 - 16 ft.

Sample Containers/Preservatives

VOC ✓
SVOC ✓
Pesticides ✓
PCBs ✓
Herbicides ____
Metals ✓

Physical Analysis: ____
PID Reading: 0.0

Comments: Sumv 35 IDM Soil Collected @ 1150

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____
MS/MSD Samples Taken Here: ____

Signature of Samplers: [signature] Date Completed: 11/14/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/14/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Sunny / mild	Sampling Team:	MF, JC

Sample ID: 37SB10 A — Sample Collection Time: 1395

Sampling Device: Geoprobe — Depth (top): — Depth Interval: 0 - 1ft.

Sample Containers/Preservatives

VOC —
SVOC —
Pesticides ✓
PCBs ✓
Herbicides —
Metals ✓
Comments: —

Physical Analysis: —
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —
MS/MSD Samples Taken Here: —

Sample ID: 37SB10 B — Sample Collection Time: 1347

Sampling Device: — Depth (top): — Depth Interval: 4 - 5ft.

Sample Containers/Preservatives

VOC —
SVOC —
Pesticides ✓
PCBs ✓
Herbicides —
Metals ✓
Comments: —

Physical Analysis: —
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —
MS/MSD Samples Taken Here: —

Sample ID: 37SB10 C — Sample Collection Time: 1347

Sampling Device: — Depth (top): — Depth Interval: 7 - 8ft.

Sample Containers/Preservatives

VOC —
SVOC —
Pesticides ✓
PCBs ✓
Herbicides —
Metals ✓
Comments: —

Physical Analysis: —
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No: —
MS/MSD Samples Taken Here: —

Signature of Samplers: [signature] — Date Completed: 11/14/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/14/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Sunny / mild	Sampling Team:	MF, JC

Sample ID: 375B9 A Sample Collection Time: 1430

Sampling Device: Geoprobe Depth (top): ____

Depth Interval: 0 - 1ft

Sample Containers/Preservatives

VOC	____
SVOC	____
Pesticides	✓
PCBs	✓
Herbicides	____
Metals	✓

Physical Analysis: ____

PID Reading: 0.0

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ Dup-3 Photo No: ____

MS/MSD Samples Taken Here: ____

Sample ID: 375B9 B Sample Collection Time: 1430

Sampling Device: ____ Depth (top): ____

Depth Interval: 2-3ft

Sample Containers/Preservatives

VOC	____
SVOC	____
Pesticides	✓
PCBs	✓
Herbicides	____
Metals	✓

Physical Analysis: ____

PID Reading: 0.0

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Sample ID: 375B9 C Sample Collection Time: 1435

Sampling Device: ____ Depth (top): ____

Depth Interval: 7-8 ft

Sample Containers/Preservatives

VOC	____
SVOC	____
Pesticides	✓
PCBs	✓
Herbicides	____
Metals	✓

Physical Analysis: ____

PID Reading: 0.0

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Signature of Samplers: [signature] Date Completed: 11/14/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/14/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:		Sampling Team:	MF, JC

Sample ID: 37SB7 A Sample Collection Time: 1510

Sampling Device: Geoprobe Depth (top):
Depth Interval: 0-1ft.

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: Photo No:
MS/MSD Samples Taken Here:

Sample ID: 37SB7 B Sample Collection Time: 1515

Sampling Device: Depth (top):
Depth Interval: 5.5-6.5ft.

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: Photo No:
MS/MSD Samples Taken Here:

Sample ID: 37SB7 C Sample Collection Time: 1515

Sampling Device: Depth (top):
Depth Interval: 7-8ft.

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments: EQBK-2 taken after this boring @ 1600

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: Photo No:
MS/MSD Samples Taken Here:

Signature of Samplers: Date Completed: 11/14/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/15/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Cold / windy	Sampling Team:	MF, JC

Sample ID: 37SB8 A Sample Collection Time: 0740

Sampling Device: Geoprobe Depth (top): ____ Depth Interval: 0 - 1ft

Sample Containers/Preservatives

VOC		Physical Analysis:	
SVOC		PID Reading:	0.0
Pesticides	✓		
PCBs	✓		
Herbicides			
Metals	✓		

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ Dup-4 Photo No: ____

MS/MSD Samples Taken Here: ____

Sample ID: 37SB8B Sample Collection Time: 0800

Sampling Device: ____ Depth (top): ____ Depth Interval: 4 - 5ft

Sample Containers/Preservatives

VOC		Physical Analysis:	
SVOC		PID Reading:	0.0
Pesticides	✓		
PCBs	✓		
Herbicides			
Metals	✓		

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Sample ID: 37SB8C Sample Collection Time: 0800

Sampling Device: ____ Depth (top): ____ Depth Interval: 7 - 8 ft.

Sample Containers/Preservatives

VOC		Physical Analysis:	
SVOC		PID Reading:	0.0
Pesticides	✓		
PCBs	✓		
Herbicides			
Metals	✓		

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Signature of Samplers: [signature] Date Completed: 11/15/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/15/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Cold / windy	Sampling Team:	MF, JC

Sample ID: 37SB34A Sample Collection Time: 0850

Sampling Device: Geoprobe Depth (top): ____

Depth Interval: 0 - 1 ft.

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	✓
PCBs	✓
Herbicides	
Metals	✓

Physical Analysis: ____

PID Reading: 0.0

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Sample ID: ____ Sample Collection Time: ____

Sampling Device: ____ Depth (top): ____

Depth Interval: ____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: ____

PID Reading: ____

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Sample ID: ____ Sample Collection Time: ____

Sampling Device: ____ Depth (top): ____

Depth Interval: ____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	

Physical Analysis: ____

PID Reading: ____

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Signature of Samplers: [signature] Date Completed: 11/15/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/15/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	cold / windy	Sampling Team:	MF, JC

Sample ID: 37SB35A Sample Collection Time: 0930

Sampling Device: Geoprobe Depth (top): ____

Depth Interval: 0-1 ft.

Sample Containers/Preservatives

VOC		Physical Analysis:	
SVOC		PID Reading:	0.0
Pesticides	✓		
PCBs	✓		
Herbicides			
Metals	✓		

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ✓

Sample ID: ____ Sample Collection Time: ____

Sampling Device: ____ Depth (top): ____

Depth Interval: ____

Sample Containers/Preservatives

VOC		Physical Analysis:	
SVOC		PID Reading:	
Pesticides			
PCBs			
Herbicides			
Metals			

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Sample ID: ____ Sample Collection Time: ____

Sampling Device: ____ Depth (top): ____

Depth Interval: ____

Sample Containers/Preservatives

VOC		Physical Analysis:	
SVOC		PID Reading:	
Pesticides			
PCBs			
Herbicides			
Metals			

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____

MS/MSD Samples Taken Here: ____

Signature of Samplers: [signature] Date Completed: 11/15/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/15/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Cold / windy	Sampling Team:	MF, JC

Sample ID: 375136 A Sample Collection Time: 1000

Sampling Device: Geoprobe Depth (top):

Depth Interval: 0 - 1 ft.

Sample Containers/Preservatives

VOC

SVOC

Pesticides ✓

PCBs ✓

Herbicides

Metals ✓

Comments:

Physical Analysis:

PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: Photo No:

MS/MSD Samples Taken Here:

Sample ID: Sample Collection Time:

Sampling Device: Depth (top):

Depth Interval:

Sample Containers/Preservatives

VOC

SVOC

Pesticides

PCBs

Herbicides

Metals

Comments:

Physical Analysis:

PID Reading:

Field QC / Photo ID

Duplicate Sample Taken Here: Photo No:

MS/MSD Samples Taken Here:

Sample ID: Sample Collection Time:

Sampling Device: Depth (top):

Depth Interval:

Sample Containers/Preservatives

VOC

SVOC

Pesticides

PCBs

Herbicides

Metals

Comments:

Physical Analysis:

PID Reading:

Field QC / Photo ID

Duplicate Sample Taken Here: Photo No:

MS/MSD Samples Taken Here:

Signature of Samplers: Date Completed: 11/15/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/15/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Cold / windy / overcast	Sampling Team:	MF, JC

Sample ID: 38SB10A — Sample Collection Time: 1058

Sampling Device: Geoprobe — Depth (top): — Depth Interval: 0 - 1 ft.

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:
MS/MSD Samples Taken Here:

Sample ID: 38SB10B — Sample Collection Time: 1058

Sampling Device: — Depth (top): — Depth Interval: 3-4 ft

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:
MS/MSD Samples Taken Here:

Sample ID: 38SB10C — Sample Collection Time: 1110

Sampling Device: — Depth (top): — Depth Interval: 7-8 ft.

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments: ~~Took ESB3K-3 after this boring~~

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:
MS/MSD Samples Taken Here:

Signature of Samplers: [signature] — Date Completed: 11/15/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/15/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Cold/windy/cloudy	Sampling Team:	MF, JC

Sample ID: 385B9A | Sample Collection Time: 1135

Sampling Device: Geoprobe | Depth (top): | Depth Interval: 0-1ft.

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: | Photo No:
MS/MSD Samples Taken Here:

Sample ID: 385B9B | Sample Collection Time: 1135

Sampling Device: | Depth (top): | Depth Interval: 2-4 ft

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: | Photo No:
MS/MSD Samples Taken Here:

Sample ID: 385B9C | Sample Collection Time: 1140

Sampling Device: | Depth (top): | Depth Interval: 7-8 ft

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments: Took EQBIC-3 after this boring.

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: | Photo No:
MS/MSD Samples Taken Here:

Signature of Samplers: [signature] | Date Completed: 11/15/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/15/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Cold / windy / Started snowing	Sampling Team:	MF, JC

Sample ID: 38538 A — Sample Collection Time: 1318

Sampling Device: Geoprobe — Depth (top): — Depth Interval: 0 - 1ft.

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:
MS/MSD Samples Taken Here:

Sample ID: 38538 B — Sample Collection Time: 1318

Sampling Device: — Depth (top): — Depth Interval: 1-3ft

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:
MS/MSD Samples Taken Here:

Sample ID: 38538 C — Sample Collection Time: 1322

Sampling Device: — Depth (top): — Depth Interval: 7-8ft

Sample Containers/Preservatives

VOC
SVOC
Pesticides ✓
PCBs ✓
Herbicides
Metals ✓
Comments:

Physical Analysis:
PID Reading: 0.0

Field QC / Photo ID

Duplicate Sample Taken Here: — Photo No:
MS/MSD Samples Taken Here:

Signature of Samplers: [signature] — Date Completed: 11/15/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/15/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Cold / windy / Snow	Sampling Team:	MF, JC

Sample ID: 38537A Sample Collection Time: 1415

Sampling Device: Geoprobe Depth (top): ____

Depth Interval: 0-1 ft.

Sample Containers/Preservatives

VOC ____
SVOC ____ Physical Analysis: ____
Pesticides ✓ PID Reading: 0.0
PCBs ✓
Herbicides ____
Metals ✓
Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ Dup-5 Photo No: ____
MS/MSD Samples Taken Here: ____

Sample ID: 38537B Sample Collection Time: 1415

Sampling Device: ____ Depth (top): ____

Depth Interval: 1.5-3ft.

Sample Containers/Preservatives

VOC ____
SVOC ____ Physical Analysis: ____
Pesticides ✓ PID Reading: 0.0
PCBs ✓
Herbicides ____
Metals ✓
Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____
MS/MSD Samples Taken Here: ____

Sample ID: 38537C Sample Collection Time: 1420

Sampling Device: ____ Depth (top): ____

Depth Interval: 7-8ft.

Sample Containers/Preservatives

VOC ____
SVOC ____ Physical Analysis: ____
Pesticides ✓ PID Reading: 0.0
PCBs ✓
Herbicides ____
Metals ✓
Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____
MS/MSD Samples Taken Here: ____

Signature of Samplers: [signature] Date Completed: 11/15/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/16/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Cold / windy	Sampling Team:	MF, JC

Sample ID: 38SB4A Sample Collection Time: 0810

Sampling Device: Geoprobe Depth (top): _____

Depth Interval: 0 - 1ft

Sample Containers/Preservatives

VOC _____

SVOC _____ Physical Analysis: _____

Pesticides ✓ PID Reading: 6.0

PCBs ✓

Herbicides _____

Metals ✓

Comments: Sludge encountered stepped out 1ft for exploratory and re-GPS'd

Field QC / Photo ID

Duplicate Sample Taken Here: ✓ Dup-6 Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC _____

SVOC _____ Physical Analysis: _____

Pesticides _____ PID Reading: _____

PCBs _____

Herbicides _____

Metals _____

Comments: _____

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC _____

SVOC _____ Physical Analysis: _____

Pesticides _____ PID Reading: _____

PCBs _____

Herbicides _____

Metals _____

Comments: _____

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Samplers: MF JC Date Completed: 11/16/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/16/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Sunny / cold	Sampling Team:	MF, JC

Sample ID: 38SB5A Sample Collection Time: 0835

Sampling Device: Geoprobe Depth (top): ____
Depth Interval: 0.5 - 1.5 ft.

Sample Containers/Preservatives

VOC ____
SVOC ____
Pesticides ✓
PCBs ____
Herbicides ____
Metals ✓

Physical Analysis: ____
PID Reading: 0.0

Comments: found sludge so moved point just outside berm. re-GPS'd

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____
MS/MSD Samples Taken Here: ✓

Sample ID: ____ Sample Collection Time: ____

Sampling Device: ____ Depth (top): ____
Depth Interval: ____

Sample Containers/Preservatives

VOC ____
SVOC ____
Pesticides ____
PCBs ____
Herbicides ____
Metals ____

Physical Analysis: ____
PID Reading: ____

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____
MS/MSD Samples Taken Here: ____

Sample ID: ____ Sample Collection Time: ____

Sampling Device: ____ Depth (top): ____
Depth Interval: ____

Sample Containers/Preservatives

VOC ____
SVOC ____
Pesticides ____
PCBs ____
Herbicides ____
Metals ____

Physical Analysis: ____
PID Reading: ____

Comments: ____

Field QC / Photo ID

Duplicate Sample Taken Here: ____ Photo No: ____
MS/MSD Samples Taken Here: ____

Signature of Samplers: [signature] Date Completed: 11/16/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/16/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Sunny / cold	Sampling Team:	MF, JC

Sample ID: 385B6A Sample Collection Time: 0945

Sampling Device: Geoprobe Depth (top): _____

Depth Interval: 0 - 1 ft.

Sample Containers/Preservatives

VOC			
SVOC		Physical Analysis:	
Pesticides	✓	PID Reading:	0.0
PCBs	✓		
Herbicides			
Metals	✓		

Comments: moved this pt. to base of berm (re-GPS'd)

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC			
SVOC		Physical Analysis:	
Pesticides		PID Reading:	
PCBs			
Herbicides			
Metals			

Comments: _____

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC			
SVOC		Physical Analysis:	
Pesticides		PID Reading:	
PCBs			
Herbicides			
Metals			

Comments: _____

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Samplers: _____ Date Completed: 11/16/07

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	11/16/07
Site Name:	Radford Army Ammunition Plant	Client:	Radford Army Ammuniton Plant
URS Project No.:	21354887	Sampling Event:	RAAP 10 RFI CMS
Weather Conditions:	Sunny / cold	Sampling Team:	MF, JC

Sample ID: QSB4 A Sample Collection Time: 1010

Sampling Device: Geoprobe Depth (top): _____

Depth Interval: 0-1ft.

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	✓
PCBs	✓
Herbicides	
Metals	

Physical Analysis: _____

PID Reading: 0.0

Comments: Did not find sludge in 1st marked burning, offset 5ft. Sludge was ID'd and new GPS recovered. Took EQBK-4 @1050

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	
Comments:	

Physical Analysis: _____

PID Reading: _____

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Sample ID: _____ Sample Collection Time: _____

Sampling Device: _____ Depth (top): _____

Depth Interval: _____

Sample Containers/Preservatives

VOC	
SVOC	
Pesticides	
PCBs	
Herbicides	
Metals	
Comments:	

Physical Analysis: _____

PID Reading: _____

Field QC / Photo ID

Duplicate Sample Taken Here: _____ Photo No: _____

MS/MSD Samples Taken Here: _____

Signature of Samplers: [signature] Date Completed: 11/16/07

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APPENDIX C.4.2

MONITORING WELL DEVELOPMENT FORMS

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MONITORING WELL INSPECTION LOG

PROJECT NAME: RAAP 10 RFI/CMS

URS PROJECT NO. 11656351

FACILITY NAME: RFAAP - SWMU 35

MONITORING WELL: 35MW1

A. Inspected by (full name): Jim Carter

B. Date/Time of Inspection: 01.31.2008 0806

C. Inspection Observations:

1. Locking protective casing:
   GOOD - NEW
2. Concrete well Pad:
   GOOD - NEW
3. Lock:
   GOOD - NEW
4. Erosion:
   NONE
5. Exterior well identification number:
   NEEDS ID NUMBER

D. Inspection Comments:

MONITORING WELL INSPECTION LOG

E. Repair/remediation comments:

_____

_____

_____

_____

F. Repair/remediation Date: _____

Field Well Development Measurement Log

Project Information

Project Name: RAAP 10 RFI/CMS
Facility Name: RFAAP - SWMU 35
URS Project No.: 11656351.40002
Weather Conditions: sunny cold ≈20°F
Development Team: AMF, JC

Event: RAAP 10 Well Development
Date: 1/31/08
Facility: RAAP
Well ID: 35MW1

Purge Data

Purge Rate/Volume Units:
700
milliliters per minute
[X]

gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
0814	700 ml/min	0	cloudy	6.07	14.40	.827	0.00	138	1166
0816		14000		6.12	14.40	.820	0.00	132	60.3
0818		28000	clear	6.15	14.41	.804	0.00	124	28.2
0820		42000		6.16	14.41	.802	0.00	123	
0822		56000		6.17	14.42	.799	0.00	121	17.02
0824		70000		6.19	14.41	.796	0.00	116	
0826		84000		6.20	14.39	.795	0.00	115	15.35
0828		98000		6.22	14.42	.793	0.00	111	
0830		112000		6.22	14.43	.793	0.00	110	13.05
0832		126000		6.22	14.42	.793	0.00	109	8.19
0834		140000		6.23	14.44	.792	0.00	107	9.31
0836		154000		6.23	14.47	.790	0.00	106	
0838		168000		6.24	14.49	.788	0.00	105	6.68
0840		182000		6.24	14.48	.788	0.00	104	
0842		196000		6.24	14.50	.786	0.00	103	5.59
0844		210000	↓	6.25	14.50	.785	0.00	101	

Final Drawdown 20.3 ft.

purge volume total 25 gal.

Well Development Notes:

began purging @ 0805 @ 700 mL/min. waiting for depth turb. to come down before taking readings

Final pH (SU): 6.26
Final Temperature (°C): 14.51
Final Conductivity (µs): .784
Final DO: 0.60
Final Turbidity: 4.62 ntu
Final ORP: 100
Date Completed: 1/31/08
Well Locked At:
Signature of Samplers:

MONITORING WELL INSPECTION LOG

PROJECT NAME: RAAP 10 RFI/CMS

URS PROJECT NO. 11656351

FACILITY NAME: RFAAP - SWMU 35

MONITORING WELL: 35MW2

A. Inspected by (full name): Jim Carter

B. Date/Time of Inspection: 01.31.2008 0930

C. Inspection Observations:

1. Locking protective casing:
   GOOD - NEW
2. Concrete well Pad:
   GOOD - NEW
3. Lock:
   GOOD - NEW
4. Erosion:
   none
5. Exterior well identification number:
   Needs ID number

D. Inspection Comments:

MONITORING WELL INSPECTION LOG

E. Repair/remediation comments:

_____
_____
_____
_____

F. Repair/remediation Date: _____

Field Well Development Measurement Log

Project Information

Project Name: RAAP 10 RFI/CMS
Facility Name: RFAAP - SWMU 35
URS Project No.: 11656351
Weather Conditions: Sunny Cool ≈ 30° F
Development Team: MF & SE

Event: Well Development
Date: 1/31/08
Facility: RFAAP - SWMU 35
Well ID: 35 MW 2

Purge Data

Purge Rate/Volume Units:
1000
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
0938	1,000	0	murky	6.40	14.20	0.99	1.62	177	467
0954		2000		6.42	14.95	0.98	1.28	178	
0956		4000		6.45	15.49	0.98	1.04	178	338
0958		6000		6.46	15.59	0.99	0.95	177	
0959/1000		8,000		6.48	15.62	0.99	0.85	177	200
1002		10,000		6.48	15.51	0.99	0.79	175	
1004		12,000		6.49	15.37	0.99	0.67	173	102
1006		14,000		6.51	15.76	0.98	0.59	166	
1008		16,000	clear	6.52	15.72	0.98	0.53	161	61.8
1010		18,000		6.53	15.84	0.98	0.50	161	
1012		20,000		6.54	15.57	0.98	0.49	163	31.6
1014		22,000		6.55	15.32	0.97	0.44	164	
1016		24,000	murky	6.56	15.13	0.98	0.27	162	134
1018		26,000	again	6.56	15.00	0.98	0.23	161	
1020		28,000		6.56	15.28	0.97	0.18	164	514
1022		30,000		6.57	15.07	0.97	0.09	128	
1024		32,000		6.57	15.03	0.96	0.10	133	417
1026		34,000		Heavily sedimented let recharge					
1028		36,000							
1030		38,000							
1032		40,000		6.57	15.10	0.95	0.00	113	955
				waiting for turb. to come down					
1106		74,000		6.57	15.31	0.94	0.00	149	49.6
1108		76,000	clear	6.57	15.32	0.94	0.00	149	39.1
1110		78,000		6.57	15.27	0.93	0.00	149	
1112		80000		6.57	15.22	0.94	0.00	150	26.8
1114		82,000		6.57	15.32	0.94	0.00	150	
1116		84,000		6.57	15.33	0.93	0.00	151	20.9
1118		86,000							
1120		88,000							
1122		90,000							
1124		92,000							
1258		92,000		6.60	16.26	0.95	4.73	159	85.5
1300		94,000		6.60	16.27	0.95	4.37	156	80.4
1302		96,000		6.60	16.29	0.95	4.21	155	18.31
1304		98,000		6.60	16.30	0.95	4.04	153	15.90
1306		100,000		6.60	16.41	0.95	3.85	153	1058
1308		102,000		6.60	16.48	0.95	3.73	156	9.16
~~1310~~									
	stopped	purging well	at 1308						

Well Development Notes:

started purging @ 0940 waiting for mud to lessen before recording. At time 1012 started getting heavily sedimented and continually went up & down.

Final pH (SU)	6.60	Final Conductivity (µs):	095	Final Turbidity:	9.16 ntu
Final Temperature (°C)	16.48	Final DO:	3.60	Final ORP:	153
Well Locked At:	1320	Signature of Samplers:		Date Completed:	01/31/08

MONITORING WELL INSPECTION LOG

PROJECT NAME: RAAP 10 RFI/CMS

URS PROJECT NO. 11656351

FACILITY NAME: RFAAP - SWMU 35

MONITORING WELL: D2

A. Inspected by (full name): Jim Carter

B. Date/Time of Inspection: 02.08.2008

C. Inspection Observations:

1. Locking protective casing:
   GOOD
2. Concrete well Pad:
   GOOD
3. Lock:
   GOOD - NEW
4. Erosion:
   NONE
5. Exterior well identification number:
   Legible

D. Inspection Comments:

MONITORING WELL INSPECTION LOG

E. Repair/remediation comments:

_____
_____
_____
_____

F. Repair/remediation Date: _____

MONITORING WELL INSPECTION LOG

PROJECT NAME: RAAP 10 RFI/CMS

URS PROJECT NO. 11656351

FACILITY NAME: RFAAP - SWMU 35

MONITORING WELL: D4

A. Inspected by (full name): Jim Carter

B. Date/Time of Inspection: 02.08.2008 / 11:00

C. Inspection Observations:

1. Locking protective casing:
   GOOD
2. Concrete well Pad:
   GOOD
3. Lock:
   GOOD - NEW
4. Erosion:
   NONE
5. Exterior well identification number:
   LEGIBLE

D. Inspection Comments:

MONITORING WELL INSPECTION LOG

E. Repair/remediation comments:

_____

_____

_____

_____

F. Repair/remediation Date: _____

MONITORING WELL INSPECTION LOG

PROJECT NAME: RAAP 10 RFI /CMS

URS PROJECT NO. 11656351

FACILITY NAME: RFAAP - SWMU 37

MONITORING WELL: 37MW1

A. Inspected by (full name): Jim Carter

B. Date/Time of Inspection: 1140 02.01.2008

C. Inspection Observations:

1. Locking protective casing:
   GOOD - NEW
2. Concrete well Pad:
   GOOD - NEW
3. Lock:
   GOOD - NEW
4. Erosion:
   NONE
5. Exterior well identification number:
   NEEDS ID NUMBER

D. Inspection Comments:

MONITORING WELL INSPECTION LOG

E. Repair/remediation comments:

_____
_____
_____
_____

F. Repair/remediation Date: _____

Field Well Development Measurement Log

Project Information

Project Name:	RAAP 10 well development	Event:	well development
Facility Name:	RFAAP Sump 37	Date:	2/1/08
URS Project No.:	11656351	Facility	RFAAP
Weather Conditions:	Rainy, Cold	Well ID:	37 MW1
Development Team:	MF, JC		

Purge Data

Purge Rate/Volume Units:
600
milliliters per minute
[ ]

gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
1150	600ml/min	0	Cloudy	6.84	14.70	0.98	7.84	187	456
1155	↓	1200	brown	6.78	14.95	0.98	6.82	173	545
1200	↓	2,400	↓	6.78	15.47	0.98	6.36	174	404
1205	↓	3,600	↓	6.78	16.80	0.97	6.32	170	395
1210	↓	4,800	↓	6.79	17.21	0.97	6.47	183	271
1215	↓	6,000	less	6.79	16.25	0.97	6.38	203	191
1220	↓	7200	cloudy	6.79	16.00	0.97	6.29	210	121
1225	↓	8,400	↓	6.79	15.99	0.97	6.26	213	93.40
	↓			Generator ran out of gas					
	↓			Started pumping again @ 1256 waiting for turb.					
	↓								
1308	600ml/min	8,400	↓	6.80	15.96	0.97	7.96	190	139
1313	↓	9,600	↓	6.80	15.99	0.97	7.04	194	67.90
1318	↓	10,800	↓	6.80	16.08	0.97	6.74	197	39.40
1317 1323	↓	12,000	clear	6.80	16.12	0.97	6.64	198	32.60
1319 1328	↓	13200	↓	6.80	16.05	0.97	6.56	199	27.80
1321	↓	14,400	↓	6.80	16.09	0.97	6.52	200	27.80
1323	↓	15,600	↓	6.80	16.23	0.97	6.57	202	24.40
1325	↓	16,800	↓	All #'s Stable waiting for turb to go 210					
1327	↓	18,000	↓						19.70
1329	↓	19,200	↓						18.07
1331	↓	20,400	↓						15.98
1333	↓	21,600	↓						16.74
1335	↓	22,800	↓						16.53
1337	↓	24,000	↓						16.75
1339	↓	25,200	↓						
1341	↓	26,400	↓						15.88
1343	↓	27,600	↓						15.17
1345	↓	28,800	↓						15.54
1347	↓	30,000	↓						
1349	↓	31,200	↓						16.87
1351	↓	32,400	↓						11.93
1353	↓	33,600	↓						10.69
1355	↓	34,800	↓						10.16
1357	↓	36,000	↓						10.09
1359	↓	37,200	↓						9.85

Well Development Notes:

Began purging well @ 1140 with rate starting at 600 ml/min. Waiting until less muddy to record Drawdown is at a minimum when set to 132.1 Hz

Final pH (SU)	6.81	Final Conductivity (µs):	0.97	Final Turbidity:	9.89 ntu
Final Temperature (°C)	16.66	Final DO:	6.27	Final ORP:	195
Well Locked At:	1405	Signature of Samplers:		Date Completed:	2/1/08

MONITORING WELL INSPECTION LOG

PROJECT NAME: RAAP 10 RFI / CMS

URS PROJECT NO. 11656351

FACILITY NAME: RFAAP - SWMU 37

MONITORING WELL: 37MW2

A. Inspected by (full name): Jim Carter

B. Date/Time of Inspection: 01.31.2008 @ 1345

C. Inspection Observations:

1. Locking protective casing:
   GOOD - NEW
2. Concrete well Pad:
   GOOD - NEW
3. Lock:
   GOOD - NEW
4. Erosion:
   NONE
5. Exterior well identification number:
   NEEDS ID NUMBER

D. Inspection Comments:

MONITORING WELL INSPECTION LOG

E. Repair/remediation comments:

_____

_____

_____

_____

F. Repair/remediation Date: _____

Field Well Development Measurement Log

Project Information

Project Name: RAAP 10 RFI/CMS
Facility Name: RFAAP - SWMU 37
URS Project No.: 11656351
Weather Conditions: overcast, ~40°F
Development Team: JC/MF

Event: well Development
Date: 01.31.2008
Facility: RFAAP - SWMU 37
Well ID: 37MW2

Purge Data

Purge Rate/Volume Units:
500
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
1358	500	0	grey	6.79	13.04	1.59	0.64	-153	242
1400	↓	1000	↓	6.76	13.11	1.61	0.26	-138	
1402		2000		6.73	13.88	1.59	0.24	-129	
1404		3000		6.70	14.00	1.61	0.19	-119	
1406		4000		6.69	13.92	1.61	0.16	-117	428
1408		5000		6.66	14.09	1.60	0.08	-105	
1410		6000		6.65	14.26	1.61	0.05	-115	
1412		7000		6.65	14.15	1.61	0.00	-120	579
1414		8000		6.65	14.31	1.61	0.00	-117	
1416	↓	9000	↓	Cut	pump	allowed	recharge		5' of drawdown
TOO MUCH DRAW DOWN - DECISION MADE TO FINISH PURGE USING DISPOSABLE BAILER									

Well Development Notes:

Final pH (SU): 6.65
Final Temperature (°C): 14.31
Well Locked At: 1430
Final Conductivity (µs): 1.61
Final DO: 0.00
Signature of Samplers:
Final Turbidity: 579 ntu
Final ORP: -117
Date Completed: 1-31-08

MONITORING WELL INSPECTION LOG

PROJECT NAME: RAAP 10 RFI/CMS

URS PROJECT NO. 11656351

FACILITY NAME: RFAAP - SWMU 37

MONITORING WELL: 37MW3

A. Inspected by (full name): Jim Carter

B. Date/Time of Inspection: 01.31.2008 @ 1545

C. Inspection Observations:

1. Locking protective casing:
   GOOD - NEW
2. Concrete well Pad:
   GOOD - NEW
3. Lock:
   GOOD - NEW
4. Erosion:
   None
5. Exterior well identification number:
   Needs ID #'s

D. Inspection Comments:

MONITORING WELL INSPECTION LOG

E. Repair/remediation comments:

_____
_____
_____
_____

F. Repair/remediation Date: _____

Field Well Development Measurement Log

122.84 e

Project Information

Project Name:	RAAP 10 RFI	Event:	Well Development
Facility Name:	SWMU 37	Date:	01.31.2008
URS Project No.:	11656351	Facility	RFAAP - SWMU 37
Weather Conditions:	Overcast, cold ~30°, windy	Well ID:	37MW3
Development Team:	JC + MF		

Purge Data

Purge Rate/Volume Units:
1400
milliliters per mL
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
1606	2000	0	cloudy	6.48	13.70	2.06	3.38	75	167
Pump	stopped	working							
1614	1,400	2000	cloudy	6.54	13.93	2.10	2.83	113	—
1619		9,800		6.49	13.90	2.05	1.62	141	117
1624		17600		6.49	14.05	2.05	1.54	124	86.1
1629		10400		6.48	15.19	2.05	1.48	134	—
1634		13200		6.49	15.79	2.05	1.49	137	48.9
1639		16000		6.49	15.11	2.05	1.43	142	44.3
1644		18800		6.48	14.84	2.04	1.34	148	38.3
1649		21600		6.49	14.66	2.05	1.29	149	—
1654		24400		6.48	15.44	2.03	1.29	139	48.0
1659		27200		6.49	15.57	2.04	1.27	132	51.9
1704		30000		6.49	15.90	2.05	1.28	123	45.9
1709		32800		6.48	16.09	2.04	1.28	123	34.8
1714		35600		6.48	16.19	2.04	1.30	122	35.6
1719		38400		6.48	15.97	2.04	1.28	121	30.8
1724		41200		6.48	16.00	2.04	1.27	118	29.90
1729		44000		6.48	16.60	2.03	1.29	116	31.80
1734		46800		6.48	16.13	2.04	1.28	123	25.70
1739		49600		6.48	15.42	2.02	1.25	133	25.30
1744		52400		6.48	15.04	2.01	1.26	144	37.20
1749	↓	55200	↓	6.48	14.85	2.02	1.11	152	—
Too dark to	from bottom	continue. Pump was ~ 1/2' from bottom. Lifted to ~ 4'							
	waiting for	turb to drop after letting sit overnight							
2/1/08 ← 1000	1400	55200	clear	6.42	15.86	1.99	1.95	178	35.4
1005		58000		6.42	16.27	1.97	1.74	171	35.5
1010		60800		6.42	15.92	1.99	1.58	164	24.5
1015		63600		6.42	15.57	1.98	1.43	159	18.04
1020		66400		6.42	15.89	1.97	1.35	156	25.7
1025		69200		6.43	16.19	1.97	1.30	155	21.5
1030	↓	72000	↓	6.43	16.27	1.97	1.24	152	18.87

Well Development Notes:
started purging at 15:40 - purge at 2 L/min w.k ~ ~~100~~ 0.2 drawdown

Final pH (SU)	6.43	Final Conductivity (µs):	1.98	Final Turbidity:	18.8 ntu
Final Temperature (°C)	16.28	Final DO:	1.23	Final ORP:	150
				Date Completed:	2/1/08
Well Locked At:		Signature of Samplers:			

MONITORING WELL INSPECTION LOG

PROJECT NAME: RAAP 10 RFI/CMS

URS PROJECT NO. 11656351

FACILITY NAME: RFAAP - SWMU38

MONITORING WELL: 38MW1

A. Inspected by (full name): Jim Carter

B. Date/Time of Inspection: 02.05.2008 @ 10:30

C. Inspection Observations:

1. Locking protective casing:
   GOOD - NEW
2. Concrete well Pad:
   GOOD - NEW
3. Lock:
   GOOD - NEW
4. Erosion:
   NONE
5. Exterior well identification number:
   NONE - ID NUMBER NEEDED

D. Inspection Comments:

MONITORING WELL INSPECTION LOG

E. Repair/remediation comments:

_____

_____

_____

_____

F. Repair/remediation Date: _____

Field Well Development Measurement Log

Project Information

Project Name: RAAP 10 well developement
Facility Name: RFAAP - Sumu 38
URS Prpject No.: 11656351
Weather Conditions: Sunny / mild
Development Team: MF, JL

Event: sumu 38 well dev.
Date: 2/5/08
Facility: RFAAP Sumu 38
Well ID: 38 MW1

Purge Data

Purge Rate/Volume Units:
300
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
1045	300	0	orange	6.76	13.55	1.16	6.62	138	645
1050		600	murky	6.61	14.42	1.15	5.36	80	659
1055		1,200		6.62	15.15	1.15	5.31	98	455
1100		1,800		Pump Stopped working					
1105		2,400		6.63	15.22	1.16	5.27	126	687
1110		3,000		6.61	15.21	1.14	4.80	110	593
1115		3,600		6.61	15.65	1.14	4.88	110	661
1120		4,200		6.61	18.09	1.14	5.21	104	689
1125		4,800		6.63	18.37	1.15	5.43	128	671
1130		5,400		6.63	19.01	1.14	5.56	146	482
1135		6,000		6.63	18.47	1.15	5.59	157	259
1140		6,600		6.63	18.12	1.15	5.55	171	121
1145		7,200		6.63	17.88	1.15	5.54	173	64.3
1150		7,800	↓	6.63	17.71	1.15	5.50	170	46.40
1155		8,400	clear	6.62	17.32	1.15	5.52	163	36.6
1200		9,000		6.62	17.30	1.14	5.46	159	27.40
1205		9,600		6.62	17.25	1.14	5.45	152	19.96
1210		10,200		6.62	17.26	1.14	5.44	144	21.10
1212		10,800		6.61	17.22	1.14	5.45	144	18.36
1214		11,400		6.61	17.20	1.14	5.42	142	16.93
1216		12,000		6.61	17.04	1.14	5.42	139	15.44
1218		12,600		6.61	17.20	1.14	5.40	140	17.91
1220	↓	13,200	↓	6.62	17.08	1.14	5.42	140	16.66
STOPPED PURGING AT 1220									

Well Development Notes:

Started purging low flow ≈ 300 ml/min @ 10:30
waiting for turb to decrease a little before recording
very muddy

Final pH (SU): 6.61
Final Temperature (°C): 17.09
Final Conductivity (µs): 1.14
Final DO: 5.40
Final Turbidity: 15.22 ntu
Final ORP: 139
Date Completed: 2/5/08
Well Locked At: 1230
Signature of Samplers:

Bailed about 15 gal with bailer prior to purging
Starting water depth = 29.74
Ended up with 1/2 drum purge water ≈ 25-30 gal

MONITORING WELL INSPECTION LOG

PROJECT NAME: RAAP 10 RFI /CMS

URS PROJECT NO. 11656351

FACILITY NAME: RFAAP - SWMU 38

MONITORING WELL: 38MW2

A. Inspected by (full name): Jim Carter

B. Date/Time of Inspection: 02-05-2008 @ 0800

C. Inspection Observations:

1. Locking protective casing:
   GOOD - NEW
2. Concrete well Pad:
   GOOD - NEW
3. Lock:
   GOOD - NEW
4. Erosion:
   NONE
5. Exterior well identification number:
   NEEDS ID NUMBER

D. Inspection Comments:

MONITORING WELL INSPECTION LOG

E. Repair/remediation comments:

_____

_____

_____

_____

F. Repair/remediation Date: _____

Field Well Development Measurement Log

Project Information

Project Name: RAAP 16 RFI
Facility Name: SWMU 38
URS Project No.: 11656351
Weather Conditions: Foggy, ~50°F
Development Team: JC, MF

Event: well Development
Date: 02.05.2008
Facility: KFAAP SWMU ~~35~~ 38
Well ID: 38MW2

Purge Data

Purge Rate/Volume Units:
~300
milliliters per minute
[ ]

gallons per minute
[ ]

Time	Rate	Volume (35gal +)	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
0810	300	0	cloudy	6.75	15.66	0.781	5.01	176	482
0815		1,500		6.76	16.44	0.786	4.84	164	419
0820		3,000		6.77	16.941	0.786	4.70	166	349
0825		4,500		6.77	17.21	0.785	4.64	165	307
0830		6,000		6.77	17.58	0.781	4.63	162	260
0835		7,500		6.76	17.77	0.776	4.60	162	205
0840		9,000		6.75	17.98	0.769	4.58	164	158
0845		10,500		6.74	17.23	0.765	4.43	156	105
0850		12,000		6.73	17.14	0.758	4.36	167	56.0
0855		13,500		6.72	17.12	0.755	4.32	170	44.4
0900		15,000		6.72	16.72	0.750	4.23	173	35.9
0905		16,500		6.72	16.79	0.748	4.21	174	33.4
0910	↓	18,000	↓	6.71	16.69	0.746	4.20	180	29.3
0915	500	20,500	clear	6.71	16.34	0.744	4.15	176	26.7
0920		23,000		6.71	16.17	0.741	4.11	187	24.4
0925		25,500		6.71	16.19	0.739	4.08	189	22.2
0930		28,000		6.71	15.88	0.738	4.04	190	21.0
0935		30,500		6.71	15.76	0.737	4.02	193	18.89
0940		33,000		6.71	15.72	0.736	3.99	190	17.65
0945		35,500		6.71	15.70	0.735	3.98	186	15.29
0950	↓	38,000	↓	6.71	15.68	0.734	3.97	191	15.05

Filled one drum (~50-52 gal).
Stopped purging at 0955.

One DUP DUP-7 35,37,38 1 MS/MSD EQBK

DO 5-7 last

Fax Monterey to Matt

Well Development Notes:

~35 gallons purged prior to developing with Grundfos (using bailer). At flow rate of ~300 ml/min, drawdown was ~ 0.5 ft.

Final pH (SU): 6.71
Final Temperature (°C): 15.84
Well Locked At: 10.00

Final Conductivity (µs): 0.734
Final DO: 3.98

Final Turbidity: 15.20 ntu
Final ORP: 194
Date Completed:

Signature of Samplers:

MONITORING WELL INSPECTION LOG

PROJECT NAME: RAAP 10 RFI/CMS

URS PROJECT NO. 11656351

FACILITY NAME: RFAAP - SWMU 38

MONITORING WELL: 38MW3

A. Inspected by (full name): Jim Carter

B. Date/Time of Inspection: 02-04-2008 @ 1200

C. Inspection Observations:

1. Locking protective casing:
   GOOD - new
2. Concrete well Pad:
   Good - new
3. Lock:
   Good - new
4. Erosion:
   none
5. Exterior well identification number:
   Needs ID number

D. Inspection Comments:

MONITORING WELL INSPECTION LOG

E. Repair/remediation comments:

_____

_____

_____

_____

F. Repair/remediation Date: _____

Field Well Development Measurement Log

Project Information

Project Name: RAAP 10 Well Development
Facility Name: RFAAP Sump 38
URS Project No.: 11656351
Weather Conditions: Overcast mild
Development Team: MF, JC

Event: RAAP 10 well Dev.
Date: 8/4/08
Facility: RFAAP
Well ID: 38MW3

Purge Data

Purge Rate/Volume Units:
≈ 700 ml/min
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
1220	700	0	very	6.85	13.75	0.899	2.02	76	875
1225		1400	muddy	6.85	13.99	0.899	1.18	78	879
1230		2100		6.85	14.28	0.899	1.07	76	OR
1235		2800		6.84	14.20	.908	1.09	81	882
1240		3500		6.80	13.60	.915	1.29	94	731
1245		4200		6.81	13.91	.906	1.19	96	916
1250		4900		6.83	14.14	0.899	1.04	91	834
1255		5600		6.86	14.65	0.893	0.86	35	587
1300		6300		6.86	14.67	.900	1.03	49	
1305		7000		6.82	14.39	.921	1.45	73	790
1310		7700		6.77	14.21	.932	1.93	103	576
1315		8400		6.77	14.19	.929	1.92	113	402
1320		9100		6.78	14.20	.927	1.82	120	299
1325		9800		6.78	14.14	.926	1.73	125	247
1330		10500		Had to replace batteries in turb. meter					
1335		11200		6.78	14.19	.928	1.70	130	149
~~1340~~		11900		pulled	pump	up about 2 ft.			306
1340		12600		6.78	14.24	.919	1.59	132	528
1345 ~~1350~~		13300		6.80	14.73	.910	1.28	121	876
1350		14000		6.83	14.76	.919	1.35	106	919
1355		14700		6.82	14.77	.925	1.44	106	931
1400		15400		6.81	14.62	.932	1.61	111	707
1405		16100		6.81	14.67	.937	1.61	114	676
1410		16800		6.81	14.59	.934	1.58	115	622
1415		17500		6.80	14.77	.943	1.79	117	460
1420		18200		6.80	14.68	.943	1.76	122	425
1425		18900		6.80	14.65	.943	1.88	126	297
1430		19600		6.79	14.65	.946	1.95	130	305
1435		20300		6.79	14.58	.947	1.92	132	445
1440		21000		6.79	14.59	.947	2.55	133	216
1445		21700		6.79	14.56	.947	2.05	132	311
1450		22400		6.79	14.42	.951	2.02	132	351
1455		23100	↓	6.79	14.47	.951	1.98	130	313
1500		23800	Cloudy	6.78	14.35	.950	2.05	132	157
1505		24500		6.78	14.41	.952	2.10	134	140
1510		25200		6.78	14.33	.951	2.11	136	93.7
1515		25900		6.78	14.37	.953	2.14	138	97.1
1520		26600		6.78	14.35	.954	2.12	138	98.5
1525		27300		6.78	14.36	.955	2.13	139	100
1530		28000		6.78	14.45	.957	2.17	136	85
1535		28700		6.77	14.51	.956	2.24	135	91.9
1540		29400		All	Stable	waiting	on turb.		89.1
1545		30100							123
1550		30800							154
1555	↓	31500	↓						155

Time
1600 126
1605 89.3
1610 88.4
1615 77.4
1620 69.9
1625 65.8

Well Development Notes:

Began purging @ 1110 with rate at 1 L/min waiting for turb to decrease before reading.

Final pH (SU) _____ Final Conductivity (µs): _____ Final Turbidity: _____ ntu
Final Temperature (°C) _____ Final DO: _____ Final ORP: _____
Date Completed: _____
Well Locked At: _____ Signature of Samplers: _____

Field Well Development Measurement Log

Project Information

Project Name:	~~RFAAP~~ RAAP 10 RFI/CMS	Event:	RAAP 10 Well Development
Facility Name:	RFAAP - Sitemw38	Date:	02.04.2008
URS Project No.:	11656351	Facility	RFAAP
Weather Conditions:	Overcast mild	Well ID:	38 mw 3 cont
Development Team:	JC/MF		

Purge Data

Purge Rate/Volume Units:
milliliters per minute [ ]
gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
1630	700	32200	cloudy						57
1635	↓	32900	↓						47.3
1640		33600							40.7
1645		34300							35.20
1650		35000	clear						29.70
1655		35700							24.5
1700		36400							23.9
1705		37100							25.0
1710	↓	37800	↓						
Stopped purging at 1710									

Well Development Notes:

Final pH (SU)	6.72	Final Conductivity (µs):	.950	Final Turbidity:	22.1 ntu
Final Temperature (°C)	14.85	Final DO:	5.24	Final ORP:	146
				Date Completed:	
Well Locked At:		Signature of Samplers:			

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Field Well Development Measurement Log

Project Information

Project Name: ~~AP42CC~~ - SMU 37 DH
Facility Name: ~~AP42CC~~ RADFORD DH
URS Project No.: ~~11656367~~ 21354887 DH
Weather Conditions: CLEAR 75°
Development Team: MF DH

Event: DEVELOP
Date: 6-8-10
Facility: RADFORD
Well ID: 37MW4

Purge Data

Purge Rate/Volume Units:
milliliters per minute
600ml/m
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Temp (°C)	Cond (ms)	DO (mg/L)	ORP (mV)	Turbidity (ntu)
1100	~~100~~ml	2N7	CLOUDY	6.07	15.4	1.56	8.61	16	OR
1103	1000			6.02	15.5	1.57	7.74	19	800
1106				5.93	15.7	1.56	7.00	25	578
1109			5.93	~~6.07~~	15.9	1.55	6.67	26	782
1112				5.92	15.8	1.54	7.03	26	892 836
1115				5.94	15.8	1.54	6.09	24	482
1118				5.91	15.7	1.54	5.74	26	214
1121				5.90	15.6	1.54	5.53	27	99.2
1124				5.92	15.7	1.54	5.35	25	105
1127	600			5.92	15.9	1.53	5.76	26	154
1130				5.89	16.0	1.53	5.25	28	117
1133				5.93	16.4	1.53	5.09	22	136
1136			CLEAR	6.00	16.5	1.53	4.92	18	78.8
1139				5.82	16.1	1.53	5.01	23	44.6
1142	600	13		5.91	15.9	1.53	4.99	27	36.6
1145				5.92	16.3	1.53	4.77	25	66.7
1148				5.93	16.5	1.53	4.70	23	104
1151									95.4
1154					ALL ELSE STABLE				55.3
1157									39.9
1200					TAKE OUT FLOW CELL				34.2
1203					TO V TURB				18.13
1206									13.07
1209									17.83
1212									18.91
		35 Total							
		17 pre							
		18 after							
		+ Decon = 45 gal							

Setup STOP

Well Development Notes:

PRE PURGE 17 gal @ 3 gal/min TO ~~Hor~~ CLEAR OUT MOST SED

Final pH (SU)	5.93	Final Conductivity (µs):	1.53	Final Turbidity:	18.9/ ntu
Final Temperature (°C)	16.5	Final DO:	4.70	Final ORP:	23
				Date Completed:	6-8-10
Well Locked At:	1200	Signature of Samplers:			

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APPENDIX C.4.3

GROUNDWATER SAMPLING FORMS

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Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	02.07.2008
Facility Name:	RFAAP - SWMU 35	Client:	RFAAP
URS Project No.:	11656351.40002	Sampling Event:	RAAP 10 RFI/CMS GW Sampling
Weather Conditions:	Partly cloudy, 45°F	Sampling Team:	JC, MF
Monitoring Well ID:	35MW1	Depth to Water:	19.87'
		Total Well Depth:	~~33.85'~~ 33.88'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	[X] Grundfos pump	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10
Conductivity Meter: _____µs standard solution
DO Meter: _____
Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
~400 milliliters per minute [X]
gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1536	400	2,000	Cloudy	6.56	129	1.83	14.07	202	340
1538	↓	7800	↓	6.54	1.31	1.02	14.52	189	—
1540		3600		6.52	1.28	0.57	14.82	175	327
1542		4,400		6.51	1.20	0.41	15.13	156	—
1544		5,200		6.50	1.17	0.38	15.20	150	203
1546	↓	6,000		6.45	1.10	0.30	15.57	135	—
1548	300	6,800		6.43	1.08	0.25	15.81	128	122
1550		7,400		6.39	0.95	0.11	16.28	117	—
1552		8,000		6.37	0.91	0.06	16.50	115	44.0
1554		8,600		6.36	0.926	0.00	16.97	111	—
1556		9,200	↓	6.35	0.905	0.00	17.19	108	30.1
1558		9,800	Clear	6.35	0.881	0.00	17.18	105	—
1600		10,400		6.36	0.879	0.00	16.86	104	22.1
1602		11,000		6.36	0.867	0.00	16.83	100	—
1604		11,600		6.37	0.860	0.00	16.64	98	16.46
1606		12,200		6.37	0.853	0.00	16.58	93	11.47
1608		12,800		6.38	0.849	0.00	16.54	90	9.96
1610		13,400		6.38	0.845	0.00	16.47	87	8.92
1612	↓	14,000	↓	6.39	0.841	0.00	16.44	86	8.01
Stopped purging well at 1612									

Sampling Data

Monitoring Well ID: 35MW1
Sample Collection Time: 16:20

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos Pump	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No

Final pH (SU):	6.39	Final Conductivity (µs):	0.836	Final Turbidity:	6.19 ntu
Final Temperature (°C):	16.00	Final DO:	0.00	Final ORP:	83
				Date Completed:	02.07.2008

Well Locked At: 17:00
Signature of Samplers: Jan Cate

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP to RFI/CMS	Date:	02.07.2008
Facility Name:	RFAAP - SWMU35	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP 10 RFI/CMS GW Sampling
Weather Conditions:	Clear, 245°F, SW wind	Sampling Team:	JC/MF
Monitoring Well ID:	35MW2	Depth to Water:	21.32'
		Total Well Depth:	33.03'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	[X] Grundfos Pump	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 — DO Meter: _____

Conductivity Meter: _____µs standard solution — Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
Start = 500
End = 200
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1252	500	4,000	cloudy	6.30	1.01	4.36	13.92	241	215
1254	↓	5,000	↓	6.27	1.00	4.09	14.32	233	205
1256	↓	6,000	↓	6.27	0.98	3.89	15.28	228	173
1258	↓	7,000	↓	6.27	0.96	3.74	16.12	217	190
1300	↓	8,000	↓	6.27	0.97	3.68	16.46	210	164
1302	↓	9,000	↓	6.28	0.97	3.65	16.58	205	137
1304	↓	10,000	↓	6.29	0.98	3.65	16.75	201	124
1306	200	11,000	↓	6.30	0.98	3.62	16.99	195	87.5
1308	↓	11,400	↓	6.31	0.98	3.60	17.13	187	77.3
1310	↓	11,800	↓	6.32	0.99	3.59	17.19	183	—
1312	↓	12,200	↓	6.32	0.98	3.54	17.46	179	56.4
1314	↓	12,600	↓	6.34	0.99	3.48	17.21	170	40.6
1316	↓	13,000	↓	6.34	0.99	3.44	17.36	167	36.8
1318	↓	13,400	↓	6.34	0.98	3.43	17.38	164	—
1320	↓	13,800	↓	6.34	0.98	3.42	17.50	163	33.0
1322	↓	14,200	↓	6.35	0.98	3.43	17.52	161	—
1324	↓	14,600	↓	6.35	0.99	3.40	17.44	158	—
1326	↓	15,000	clear	6.35	0.99	3.38	17.45	157	25.4
1328	↓	15,400	↓	6.35	0.98	3.35	17.91	152	14.69
1330	↓	15,800	↓	6.36	0.98	3.36	17.84	150	14.96
1332	↓	16,200	↓	6.36	0.99	3.35	17.48	149	14.69
1334	↓	16,600	↓	6.36	0.99	3.31	17.38	149	14.91
1336	↓	17,000	↓	6.36	0.98	3.29	17.52	148	13.76
1338	↓	17,400	↓	6.36	0.98	3.30	17.49	149	12.76
1340	↓	17,800	↓	6.36	0.98	3.27	17.66	150	10.92
1342	↓	18,200	↓	6.37	0.99	3.28	17.62	151	7.50
1344	↓	18,600	↓	6.37	0.99	3.29	17.52	151	7.11
Stopped purging well at 1344.									

Sampling Data

Monitoring Well ID: 35MW2 — Sample Collection Time: 13:50

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos Pump	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [ ]No

Final pH (SU):	6.37	Final Conductivity (µs):	0.99	Final Turbidity:	6.85 ntu
Final Temperature (°C):	17.68	Final DO:	3.29	Final ORP:	151
				Date Completed:	02.07.2008

Well Locked At: 1420 — Signature of Samplers: JC Cate

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP10 RFI/CMS	Date:	02.08.2008
Facility Name:	RFAAP - SWMU35	Client:	RFAAP
URS Project No.:	11657351	Sampling Event:	RAAP10 RFI/CMS GW Sampling
Weather Conditions:	clear, ~50°F, light wind	Sampling Team:	JC & MF
Monitoring Well ID:	D2	Depth to Water:	23.51'
		Total Well Depth:	38.25'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	[X] Grundfos	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers:	[ ]4 [ ]7 [ ]10	DO Meter:	
Conductivity Meter:	µs standard solution	Turbidity Meter:	

Purge Data

Purge Rate/Volume Units:
milliliters per minute [ ]
gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
0914	500	0	clear	6.27	0.666	0.00	15.70	153	—
0916	↓	1,000	↓	6.27	0.665	0.00	15.77	152	3.08
0918		2,000		6.27	0.665	0.00	15.90	138	—
0920		3,000		6.29	0.664	0.00	16.25	108	2.77
0924		5,000		6.29	0.663	0.00	16.27	102	—
0926		6,000		6.29	0.663	0.00	16.26	100	3.43
0928		7,000		6.30	0.661	0.00	16.27	95	2.68
0930		8,000		6.29	0.662	0.00	16.35	92	3.04
0932		9,000		6.29	0.660	0.00	16.18	85	2.34
0934		10,000		6.29	0.659	0.00	16.17	82	4.07
0936		11,000		6.30	0.659	0.00	15.43	81	1.66
0938		12,000		6.30	0.661	0.00	15.31	78	—
0940		13,000		6.30	0.661	0.00	15.30	77	2.03
0942	↓	14,000	↓	6.30	0.662	0.00	15.35	77	2.18
STOPPED PURGING WELL AT 0942									

Sampling Data

Monitoring Well ID:	D2	Sample Collection Time:	0945

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos Pump	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [ ]No

Final pH (SU):	6.30	Final Conductivity (µs):	0.662	Final Turbidity:	2.39 ntu
Final Temperature (°C):	15.37	Final DO:	0.00	Final ORP:	75
				Date Completed:	02.08.2008

Well Locked At: 10:05 Signature of Samplers: Jim Cater

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	02.05.2008
Facility Name:	RFAAP - SWMU 35	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP 10 RFI/CMS GW Sampling
Weather Conditions:	clear, 25°F, southerly wind	Sampling Team:	JC & MF
Monitoring Well ID:	D4	Depth to Water:	22.90'
		Total Well Depth:	35.17'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	[X] Grundfos	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers:	[ ]4 [ ]7 [ ]10	DO Meter:	
Conductivity Meter:	µs standard solution	Turbidity Meter:	

Purge Data

Purge Rate/Volume Units:
400
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1116	400	5,000	Clear	6.33	0.462	3.49	13.84	177	—
1118	↓	5,800	↓	6.30	0.460	2.55	13.98	171	19.11
1120		6,600		6.30	0.460	2.37	13.98	168	16.46
1122		7,400		6.30	0.459	2.28	13.99	165	14.74
1124		8,200		6.29	0.458	2.19	14.06	160	1360
1126		9,000		6.29	0.457	2.13	14.07	160	—
1128		9,800		6.29	0.457	2.10	14.06	158	—
1138		13,800		6.28	0.456	1.98	14.24	157	—
1144		14,600		6.28	0.458	1.87	14.14	146	—
1146		15,400		6.28	0.458	1.86	14.12	146	—
1148		16,200		6.28	0.458	1.86	14.12	145	—
1150	↓	17,000	↓	6.28	0.457	1.86	14.12	145	—

→ turbidity meter stopped working

Sampling Data

Monitoring Well ID:	D4	Sample Collection Time:	1200

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos Pump	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [ ]No

Final pH (SU):	6.28	Final Conductivity (µs):	0.457	Final Turbidity:	— ntu
Final Temperature (°C):	14.13	Final DO:	1.86	Final ORP:	144
				Date Completed:	02.05.2008
Well Locked At:	12:30	Signature of Samplers:	Jim Cate		

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP10 RFI/CMS	Date:	02.11.2008
Facility Name:	RFAAP-SWMU 37	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP10 RFI/CMS GW Sampling
Weather Conditions:	clear, cold ~30°F	Sampling Team:	JC + MF
Monitoring Well ID:	37MW1	Depth to Water:	32.61'
		Total Well Depth:	42.38'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump: Grundfos	[X]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 DO Meter: _____

Conductivity Meter: _____µs standard solution Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
300
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1138	300		very cloudy	6.51	0.982	5.44	13.70	117	OR
1140				6.49	0.991	5.38	13.79	113	—
1142				6.51	0.980	6.94	13.86	115	985
1144				6.50	0.960	5.56	15.94	105	—
1146				6.49	0.950	5.57	17.12	106	876
1148	↓		↓	6.50	0.960	5.75	17.10	108	—
1150	Pump stopped at 1150								867
	Restarted at 1158								
1200	450		↓	6.56	0.99	6.16	17.30	168	OR
1205	500		↓	6.58	0.98	6.39	17.66	176	757
1208	↓		cloudy	6.60	0.98	6.42	17.72	188	298
1210			↓	6.61	0.98	6.42	17.75	191	203
1212				6.61	0.98	6.43	17.76	198	130
1214			↓	6.61	0.98	6.45	17.64	202	82.7
1216			clear	6.61	0.98	6.46	17.52	204	51.6
1218			↓	6.61	0.98	6.44	17.39	205	37.6
1220				6.62	0.98	6.40	17.58	203	34.7
1222				6.62	0.98	6.42	17.47	203	31.3
1224	Horiba died, reduced battery			6.62	0.97	6.39	17.66	203	25.9
1228	↓		↓	6.63	0.97	6.75	17.88	201	20.8
1230				6.63	0.97	6.75	18.04	199	17.82
1232				6.64	0.97	6.66	18.12	199	15.70
1234				6.64	0.97	6.56	18.17	198	16.53
1236				6.64	0.97	6.53	18.24	197	15.73
1238				6.64	0.97	6.51	18.25	198	13.55
1240				6.65	0.98	6.53	18.10	199	12.54
1242				6.65	0.97	6.46	18.22	201	10.94
1244	↓		↓	6.65	0.98	6.49	17.99	202	9.74

Sampling Data

Monitoring Well ID: 37MW1 Sample Collection Time: 12:50

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments: _____

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [ ]No

Final pH (SU):	6.66	Final Conductivity (µs):	0.97	Final Turbidity:	9.74 ntu
Final Temperature (°C):	18.05	Final DO:	6.34	Final ORP:	207
				Date Completed:	02.11.2008

Well Locked At: 1315 Signature of Samplers: Jim Carter

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP IO RFI/CMS	Date:	02.11.2008
Facility Name:	RFAAP - SWMU37	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP IO RFI/CMS GW Sampling
Weather Conditions:	overcast, ~40°F	Sampling Team:	JC & MF
Monitoring Well ID:	37MW2	Depth to Water:	27.86'
		Total Well Depth:	43.78'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump: Grundfos	[X]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 DO Meter: _____

Conductivity Meter: _____µs standard solution Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
200
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1358	200	0	cloudy	6.66	1.60	5.34	12.74	212	57.6
1400		400		6.55	1.60	4.38	12.77	199	53.7
1402		800		6.55	1.60	4.32	12.65	197	—
1404		1,200		6.55	1.63	4.08	12.40	191	49.3
1406		1,600		6.55	1.62	4.05	12.42	188	—
1408		2,000		6.55	1.62	3.95	12.46	183	38.9
1410		2,400		6.55	1.62	3.93	12.34	178	—
1412		2,800		6.55	1.62	3.90	12.42	173	—
1414		3,200		6.54	1.61	3.87	12.70	167	33.5
1416		3,600		6.54	1.62	3.87	12.63	163	—
1418		4,000		6.54	1.61	3.88	12.84	161	32.7
1420		4,400	↓	6.54	1.61	3.89	12.99	157	—
1422		4,800	clear	6.54	1.62	3.96	12.69	157	29.6
1426		5,200		6.53	1.66	4.16	11.65	149	—
1428		5,600	↓	6.57	1.61	3.89	14.01	128	—
1430		6,000	cloudy	6.52	1.61	3.99	13.84	110	45.2
1432		6,400	cloudy	6.51	1.61	3.98	13.98	105	—
1434		6,800		6.51	1.60	3.96	14.25	102	36.1
1436	↓	7,200	↓	6.51	1.61	3.92	15.49	94	—
Lost flow									
1450	200	7,200	cloudy	6.63	1.65	5.53	15.77	127	88.6
1452		7,600		6.55	1.63	4.33	16.12	115	—
1454		8,000		6.56	1.60	3.90	17.35	84	84.2
1456		8,400		6.54	1.59	4.11	17.89	78	75.7
1458		8,800		6.53	1.61	4.33	18.02	77	69.3
1500		9,200		6.53	1.60	4.35	18.43	75	56.1
1502		9,600		6.52	1.61	4.96	18.60	73	49.0
1504	↓	10,000	↓	6.53	1.67	4.48	20.16	65	46.9

Sampling Data

Monitoring Well ID: 37MW2 Sample Collection Time: 1530

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No

Final pH (SU):		Final Conductivity (µs):		Final Turbidity:	ntu
Final Temperature (°C):		Final DO:		Final ORP:	
				Date Completed:	

Well Locked At: _____ Signature of Samplers: _____

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	02.11.2008
Facility Name:	RFAAP - SWMU 37	Client:	RFAAP
URS Project No.:	116 56351	Sampling Event:	RAAP10 RFI/CMS GW Sampling
Weather Conditions:	Overcast, ~40°F	Sampling Team:	JC / MF
Monitoring Well ID:	37MW2	Depth to Water:	27.86'
		Total Well Depth:	43.78'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump: Grundfos	[X]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 — DO Meter: _____

Conductivity Meter: _____µs standard solution — Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
200
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1506	200	10,400	Cloudy	6.51	1.67	4.43	21.49	64	57.3
1508	↓	10,800	↓	6.52	1.67	4.43	21.84	74	63.6
1510		11,200		6.52	1.72	4.48	19.83	81	52.6
1512		11,600		6.52	1.75	4.53	18.94	82	51.6
1514		12,000		6.52	1.71	4.27	19.11	75	53.5
1516		12,400		6.52	1.71	4.19	19.04	74	54.8
1518		12,800		6.52	1.72	4.13	18.95	72	67.0
1520		13,200		6.52	1.72	4.06	18.79	73	61.3
1522		13,600		6.52	1.73	3.98	18.51	73	59.5
1524	↓	14,000	↓	6.52	1.73	3.98	18.58	73	62.5

Sampling Data

Monitoring Well ID: 37MW2 — Sample Collection Time: 1530

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No

Final pH (SU):	6.52	Final Conductivity (µs):	1.73	Final Turbidity:	62.50 ntu
Final Temperature (°C):	19.58	Final DO:	3.98	Final ORP:	73
				Date Completed:	02.11.2008

Well Locked At: 1550 — Signature of Samplers: Jim Cate

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	02.12.2008
Facility Name:	RFAAP - SWMU 37	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP 10 RFI/CMS GW Sampling
Weather Conditions:	overcast, cold 25°F	Sampling Team:	JC/MF
Monitoring Well ID:	37MW3	Depth to Water:	29.51'
		Total Well Depth:	42.83'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump: Grundfos	[X]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 DO Meter: _____

Conductivity Meter: _____µs standard solution Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
500
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
0810	500	0	cloudy	6.03	1.92	0.79	13.28	23	—
0812		1,000		6.08	1.83	0.79	14.39	75	OR
0814		2,000		6.10	1.81	0.88	14.68	81	—
0816		3,000		6.13	1.81	1.00	15.05	115	—
0818		4,000		6.16	1.81	0.99	15.27	118	197
0820		5,000		6.17	1.81	1.00	15.25	119	94
0822		6,000		6.18	1.81	0.97	15.29	120	70
0824		7,000		6.19	1.79	0.96	15.73	119	81
0826		8,000		6.21	1.84	0.90	13.73	125	54.5
0828		9,000		6.21	1.82	0.82	13.98	119	50.8
0830		10,000		6.21	1.80	0.80	14.74	111	93.3
0832		11,000		6.21	1.81	0.84	14.95	108	—
0834		12,000		6.23	1.81	0.90	15.69	96	—
0836		13,000		6.23	1.81	0.91	15.56	95	63.4
0838		14,000		6.24	1.81	0.92	15.63	98	55.3
0840		15,000		6.24	1.81	0.91	15.81	99	—
0842		16,000		6.25	1.80	0.94	16.00	102	31.5
0844		17,000	↓	6.25	1.81	0.94	16.18	106	—
0846		18,000	clear	6.25	1.80	0.96	16.31	108	31.0
0848		19,000		6.26	1.80	0.95	16.29	108	—
0850		20,000		6.26	1.80	0.98	16.47	110	22.3
0852		21,000		6.27	1.81	0.97	16.38	111	—
0854		22,000		6.27	1.81	0.95	16.21	114	28.5
0856		23,000		6.27	1.81	0.94	16.37	113	23.4
0858		24,000		6.27	1.80	0.94	16.43	113	20.9
0900		25,000		6.28	1.81	0.93	16.42	113	18.80
0902		26,000		6.28	1.81	0.93	16.39	113	16.98
0904	↓	27,000	↓	6.28	1.81	0.92	16.41	114	15.56

Sampling Data

Monitoring Well ID: 37MW3 Sample Collection Time: 0945

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No

Final pH (SU):	6.31	Final Conductivity (µs):	1.80	Final Turbidity:	18.28 ntu
Final Temperature (°C):	16.71	Final DO:	0.88	Final ORP:	117
				Date Completed:	02.12.2008

Well Locked At: 1015 Signature of Samplers: _____

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	02.12.2008
Facility Name:	RFAAP - SWMU 37	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP 10 RFI/CMS GW Sampling
Weather Conditions:	overcast, ~25°F	Sampling Team:	JR / MF
Monitoring Well ID:	37MW3	Depth to Water:	29.51'
		Total Well Depth:	42.83'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump: Grundfos	[X]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 — DO Meter: _____

Conductivity Meter: _____µs standard solution — Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
milliliters per minute [ ]
gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
0906	500	28,000	clear	6.28	1.81	0.91	16.50	115	14.33
0908	↓	29,000	↓	6.28	1.81	0.92	16.36	115	12.02
0910		30,000		6.29	1.80	0.90	16.47	116	11.94
0912		31,000		6.29	1.81	0.88	16.37	117	14.30
0914		32,000		6.29	1.81	0.89	16.40	117	19.90
0916		33,000		6.30	1.81	0.89	16.32	118	24.5
0918		34,000		6.30	1.81	0.88	16.53	118	25.6
0920		35,000		6.30	1.80	0.89	16.64	117	27.1
0922		36,000		6.30	1.81	0.87	16.68	116	25.2
0924		37,000		6.30	1.80	0.89	16.66	116	23.3
0926		38,000		6.30	1.81	0.88	16.32	116	21.7
0928	↓	39,000	↓	6.30	1.81	0.88	16.40	116	23.1

Sampling Data

Monitoring Well ID: 37MW3 — Sample Collection Time: 0945

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No

Final pH (SU):	6.31	Final Conductivity (µs):	1.80	Final Turbidity:	15.28 ntu
Final Temperature (°C):	16.71	Final DO:	0.88	Final ORP:	117
				Date Completed:	02.12.2008

Well Locked At: 1015 — Signature of Samplers: _____

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP10 RFI/CMS	Date:	02.12.2008
Facility Name:	RFAAP - SWMU 38	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP 10 RFI/CMS GW Sampling
Weather Conditions:	overcast, ~40°F	Sampling Team:	JC + MF
Monitoring Well ID:	38MW1	Depth to Water:	29.25'
		Total Well Depth:	42.16'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump: Grundfos	[X]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10
Conductivity Meter: _____µs standard solution
DO Meter: _____
Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
400
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1032	400	6000	cloudy	6.47	1.09	4.65	15.13	131	—
1034		6,800		6.48	1.09	4.59	15.36	133	—
1036		7,600		6.48	1.09	4.60	15.52	131	787
1038		8,400		6.48	1.09	4.61	15.72	130	—
1040		9,200		6.49	1.10	4.58	15.96	133	601
1042		10,000		6.49	1.10	4.62	16.08	135	454
1044		10,800		6.49	1.10	4.67	16.22	138	294
1046		11,600		6.49	1.10	4.79	16.17	135	194
1048		12,400		6.49	1.10	4.86	16.06	130	125
1050		13,200		6.49	1.10	4.77	16.20	126	88.6
1052		14,000		6.50	1.10	4.73	16.17	115	83.7
1054		14,800		6.50	1.10	4.72	16.18	109	66.3
1056		15,600	↓	6.50	1.10	4.72	16.28	109	56.4
1058		16,400	clear	6.50	1.10	4.72	16.33	106	46.7
1100		17,200		6.50	1.10	4.74	16.34	106	39.2
1102		18,000		6.50	1.10	4.77	16.33	103	34.2
1104		18,800		6.50	1.10	4.73	16.40	102	30.9
1106		19,600		6.50	1.10	4.79	16.47	103	25.5
1108		20,400		6.51	1.10	4.80	16.39	101	24.4
1110		21,200		6.51	1.10	4.78	16.46	99	24.7
1112		22,000		6.50	1.10	4.82	16.65	94	22.7
1114		22,800		6.51	1.10	4.85	16.62	97	20.5
1116		23,600		6.51	1.10	4.87	16.54	98	19.33
1118		24,400		6.51	1.10	4.85	16.50	100	18.49
1120		25,200		6.51	1.10	4.89	16.56	96	16.59
1122		26,000		6.51	1.10	4.90	16.57	99	15.74
1124		26,800		6.51	1.10	4.92	16.51	100	13.93
1126	√	27,600	↓	6.51	1.10	4.92	16.59	102	12.05

Sampling Data

Monitoring Well ID: 38MW1
Sample Collection Time: 1140

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No

Final pH (SU):	6.51	Final Conductivity (µs):	1.10	Final Turbidity:	8.97 ntu
Final Temperature (°C):	16.67	Final DO:	5.02	Final ORP:	104
				Date Completed:	02.12.2008

Well Locked At: 1210
Signature of Samplers: JC

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	02.12.2008
Facility Name:	RFAAP - SWMU 38	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP 10 RFI/CMS GW Sampling
Weather Conditions:	Overcast, ~40°F	Sampling Team:	JC / MF
Monitoring Well ID:	38MW1	Depth to Water:	29.25'
		Total Well Depth:	42.16'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump: Grundfos	[X]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers:	[ ]4 [ ]7 [ ]10	DO Meter:	
Conductivity Meter: _____µs standard solution		Turbidity Meter:	

Purge Data

Purge Rate/Volume Units:
milliliters per minute [ ]
gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1128	400	28,400	Clear	6.51	1.10	4.93	16.68	104	10.97
1130	↓	29,200	↓	6.51	1.10	4.98	16.65	103	9.81
1132	↓	30,000	↓	6.51	1.10	5.00	16.68	104	8.97
STOPPED PURGING WELL AT 1132									

Sampling Data

Monitoring Well ID: 38MW1 Sample Collection Time: 1140

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No

Final pH (SU):	6.51	Final Conductivity (µs):	1.10	Final Turbidity:	8.97 ntu
Final Temperature (°C):	16.67	Final DO:	5.02	Final ORP:	104
				Date Completed:	02.12.2008

Well Locked At: 1210 Signature of Samplers: [signature]

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	02.12.2008
Facility Name:	RFAAP - SWMU 38	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP 10 RFI/CMS GW Sampling
Weather Conditions:	Raining ~45°F	Sampling Team:	JC/MF
Monitoring Well ID:	38MW2	Depth to Water:	27.13'
		Total Well Depth:	38.42'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump: Grundfos	[X]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10
Conductivity Meter: _____µs standard solution
DO Meter:
Turbidity Meter:

Purge Data

Purge Rate/Volume Units:
500
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1300	500	3,000	cloudy	6.77	0.769	3.88	14.15	213	—
1302		4,000		6.76	0.766	3.79	14.46	210	—
1304		5,000		6.76	0.763	3.91	15.62	198	292
1306		6,000		6.74	0.761	3.92	15.70	198	—
1308		7,000		6.74	0.760	3.92	15.75	197	225
1310		8,000		6.73	0.757	4.00	15.82	197	—
1312		9,000		6.73	0.752	4.03	15.73	197	182
1314		10,000		6.72	0.747	4.02	15.81	197	—
1316		11,000		6.72	0.746	4.01	15.88	196	145
1318		12,000		6.71	0.744	4.01	16.00	196	—
1320		13,000		6.70	0.741	4.14	16.27	196	134
1322		14,000		6.70	0.735	4.15	16.12	199	92.4
1324		15,000		6.70	0.732	4.16	16.04	201	—
1326		16,000		6.69	0.730	4.15	16.03	203	78.7
1328		17,000		6.69	0.729	4.14	16.04	205	—
1330		18,000		6.69	0.727	4.12	16.01	207	65.0
1332		19,000		6.69	0.725	4.11	16.06	209	—
1334		20,000		6.68	0.723	4.12	16.03	211	50.6
1336		21,000		6.68	0.722	4.11	16.00	212	—
1338		22,000		6.68	0.720	4.10	15.99	214	46.6
1340		23,000		6.68	0.719	4.09	15.96	215	40.8
1342		24,000		6.68	0.718	4.09	15.97	215	35.1
1344		25,000		6.68	0.717	4.06	15.96	216	34.3
1346		26,000		6.68	0.716	4.03	16.02	216	—
1348		27,000	↓	6.67	0.715	4.05	16.01	217	30.3
1350		28,000	clear	6.68	0.714	4.02	16.01	217	—
1352		29,000		6.67	0.714	4.03	16.01	217	26.6
1354	↓	30,000	↓	6.67	0.713	4.01	16.05	217	—

Sampling Data

Monitoring Well ID: 38MW2
Sample Collection Time: 1440

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [ ]No

Final pH (SU):	6.67	Final Conductivity (µs):	0.708	Final Turbidity:	12.11 ntu
Final Temperature (°C):	16.02	Final DO:	3.94	Final ORP:	220
				Date Completed:	02.12.2008

Well Locked At: 15:10 Signature of Samplers:

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	02.12.2008
Facility Name:	RFAAP - SWMU 38	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP 10 RFI/CMS GW Sampling
Weather Conditions:	Raining, 45°F	Sampling Team:	JC/MF
Monitoring Well ID:	38MW2	Depth to Water:	27.13'
		Total Well Depth:	38.42'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump: Grundfos	[X]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers:	[ ]4 [ ]7 [ ]10	DO Meter:	
Conductivity Meter: _____ µs standard solution		Turbidity Meter:	

Purge Data

Purge Rate/Volume Units:
500 milliliters per minute [X]
gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1356	500	31,000	clear	6.68	0.712	4.00	16.03	216	23.6
1358		32,000		6.67	0.712	4.00	16.02	216	21.0
1400		33,000		6.67	0.712	4.00	16.03	216	18.88
1402		34,000		6.67	0.711	4.00	16.04	215	17.81
1404		35,000		6.67	0.710	4.00	16.06	215	16.25
1406		36,000		6.67	0.710	4.00	16.05	215	15.75
1408		37,000		6.67	0.710	4.01	16.02	214	15.42
1410		38,000		6.67	0.709	3.99	16.00	213	15.01
1412		39,000		6.67	0.708	3.96	16.00	213	13.83
1414		40,000		6.68	0.709	3.94	16.05	213	13.09
1416		41,000		6.68	0.708	3.90	16.02	212	12.88
1418		42,000		6.68	0.708	3.91	15.92	213	12.50
1420		43,000		6.67	0.709	3.91	15.95	216	12.51
1422		44,000		6.67	0.708	3.91	15.96	217	12.78
1424	↓	45,000	↓	6.68	0.708	3.92	15.96	217	12.18
Stopped purging well at MW4.									

Sampling Data

Monitoring Well ID:	38MW2	Sample Collection Time:	1440

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [ ]No

Final pH (SU):	6.67	Final Conductivity (µs):	0.708	Final Turbidity:	12.11 ntu
Final Temperature (°C):	16.02	Final DO:	3.94	Final ORP:	220
				Date Completed:	02.12.2008

Well Locked At: 15:10 Signature of Samplers:

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI / CMS	Date:	02.13.2008
Facility Name:	RFAAP - SWMU 38	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP 10 RFI/CMS GW Sampling
Weather Conditions:	Raining, ~40°F	Sampling Team:	JC/MF
Monitoring Well ID:	38MW3	Depth to Water:	24.95'
		Total Well Depth:	42.04'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump: Grundfos	[X]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 — DO Meter: _____

Conductivity Meter: _____µs standard solution — Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
400 milliliters per minute [X]
gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
0832	400	0	orange	6.40	0908	0.93	12.68	214	—
0834	↓	800	brown	6.33	0.907	2.12	13.28	205	775
0836		1600	↓	6.33	0.906	2.15	13.35	204	—
0838		2400		6.33	0.893	2.61	13.66	203	813
0840		3200		6.32	0.890	2.77	13.73	204	—
0842		4000		6.31	0.870	3.21	13.97	210	545
0844		4800		6.31	0.867	3.32	14.07	213	278
0846		5600		6.31	0866	3.40	14.14	216	205
0848		6400		6.31	0.861	3.52	14.22	216	98.0
0850		7200		6.32	0.861	3.56	14.20	216	70.8
0852		8000		6.32	0.856	3.64	14.24	214	52.7
0854		8800		6.32	0.854	3.67	14.26	213	48.3
0856		9600		6.33	0.850	3.73	14.21	210	—
0858		10400		6.33	0.849	3.74	14.26	207	41.8
0900		11200		6.34	0.849	3.74	14.26	205	36.2
0902		12000	↓	6.34	0.846	3.80	14.34	200	32.1
0904		12800	clear	6.34	0.846	3.82	14.31	199	28.2
0906		13600		6.35	0.845	3.83	14.29	197	—
0908		14400		6.35	0.843	3.84	14.32	196	28.3
0910		15200		6.36	0.843	3.85	14.31	196	—
0912		16000		6.36	0.842	3.89	14.35	195	23.4
0914		16800		6.36	0.840	3.87	14.45	195	24.9
0916		17600		6.36	0.840	3.93	14.41	194	23.6
0918		18400		6.37	0.841	3.91	14.42	194	24.0
0920		19200		6.37	0.840	3.93	14.50	193	22.1
0922		20000		6.38	0.841	3.96	14.45	193	27.4
0924		20800		6.38	0.841	3.96	14.42	192	23.8
0926	↓	21600	↓	6.38	0.840	3.96	14.54	191	—

Sampling Data

Monitoring Well ID: 38MW3 — Sample Collection Time: 10:10

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCl, pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [ ]No

Final pH (SU):	6.45	Final Conductivity (µs):	0.860	Final Turbidity:	25.5 ntu
Final Temperature (°C):	14.39	Final DO:	3.90	Final ORP:	182
				Date Completed:	02.13.2008

Well Locked At: 1030 — Signature of Samplers: JC

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI/CMS	Date:	02.13.2008
Facility Name:	RFAAP - SWMU 38	Client:	RFAAP
URS Project No.:	11656351	Sampling Event:	RAAP 10 RFI/CMS GW Sampling
Weather Conditions:	Raining ~40°	Sampling Team:	JC/MF
Monitoring Well ID:	38MW3	Depth to Water:	24.95'
		Total Well Depth:	42.04'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump: Grundfos	[X]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10
Conductivity Meter: _____µs standard solution
DO Meter: _____
Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
milliliters per minute [ ]
gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
0928	400	22400	clear	6.39	0.842	3.96	14.59	189	19.67
0930	↓	23200	↓	6.39	0.840	4.00	14.68	189	19.90
0932		24000		6.39	0.842	3.99	14.60	188	24.40
0934		24800		6.40	0.846	3.99	14.46	187	22.0
0936		25600		6.40	0.841	3.97	14.63	187	23.1
0938		26400		6.40	0.840	3.97	14.75	186	27.6
0940		27200							
0942		28000		6.41	0.843	3.96	14.74	185	26.0
0944		28800		All #'s good weather on two					
0946		29600							29.1
0948		30400							23.5
0950		31200		6.42	0.849	3.97	14.60	184	26.3
0955		33200		6.43	0.851	3.93	14.58	182	29.9
1000	↓	35200	↓	6.44	0.859	3.96	14.62	180	25.5
Stopped purging well at 1000.									

Sampling Data

Monitoring Well ID: 38MW3
Sample Collection Time: 10:10

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	Grundfos	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	X	(1 liter, amber glass, 4°C)	Metals (F)	X	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs	X	(1 liter, amber glass, 4°C)			
PAHs	X	(1 liter, amber glass, 4°C)			
Explosives	X	(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments:

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No

Final pH (SU):	6.45	Final Conductivity (µs):	0.860	Final Turbidity:	25.5 ntu
Final Temperature (°C):	14.39	Final DO:	3.90	Final ORP:	182
				Date Completed:	02.13.2008

Well Locked At: 1030 Signature of Samplers: JC

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Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI/CMS resample	Date:	6/24/08
Facility Name:	RFAAP	Client:	RFAAP
URS Project No.:	11655351	Sampling Event:	RFAAP 10 RFI/CMS GW resample
Weather Conditions:	sunny ~ 85°	Sampling Team:	MMF, BF
Monitoring Well ID:	37MW2 resample	Depth to Water:	28.11'
		Total Well Depth:	43.78'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[X]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	[ ]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [X]4 [ ]7 [ ]10 DO Meter: _____

Conductivity Meter: _____µs standard solution Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
200
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1305	200	0	clear	6.38	1.63	0.67	17.29	178	
1307		400		6.41	1.63	0.51	16.99	168	12.36
1309		800		6.43	1.62	0.44	17.01	160	
1311		1200		6.44	1.61	0.39	17.09	157	10.86
1313		1600		6.46	1.61	0.45	17.07	152	9.13
1315		2000		6.47	1.61	0.42	17.08	149	
1317		2400		6.48	1.61	0.50	17.09	147	6.08
1319		2800		6.50	1.61	0.39	16.97	144	2.58
1321		3200		6.51	1.61	0.40	16.85	140	
1323		3600		6.51	1.60	0.38	16.79	139	2.42
1325	↓	4000	↓	6.52	1.60	0.37	16.83	137	

Sampling Data

Monitoring Well ID: 37MW2 Resample * DUP-1 collected here

Sample Collection Time: 1330

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	Solinst 410
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:		Disposable Bailer:	

Sample Containers/Preservatives

VOCs		(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)		(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs		(1 liter, amber glass, 4°C)	Metals (F)		(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	X	(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs		(1 liter, amber glass, 4°C)			
PAHs		(1 liter, amber glass, 4°C)			
Explosives		(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments: _____

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [X]No

Final pH (SU):	6.53	Final Conductivity (µs):	1.60	Final Turbidity:	2.27 ntu
Final Temperature (°C):	16.90	Final DO:	0.36	Final ORP:	136
				Date Completed:	6/24/08

Well Locked At: 1430 Signature of Samplers: _____

Field Groundwater Sampling Log

Project Information

Project Name:	RAAP 10 RFI/CMS Resample	Date:	6/24/08
Facility Name:	RFAAP	Client:	RFAAP
URS Project No.:	11652351	Sampling Event:	RAAP 10 RFI/CMS Resample
Weather Conditions:	Sunny 85°	Sampling Team:	MF, BE
Monitoring Well ID:	38MW3 Resample	Depth to Water:	26.13'
		Total Well Depth:	42.44'

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[X]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	[ ]	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [X]4 [ ]7 [ ]10 DO Meter: _____

Conductivity Meter: _____µs standard solution Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units: 250 milliliters per minute [X] gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1452	250	0	cloudy	6.80	.726	0.14	15.16	113	
1454		500		6.73	.717	0.53	14.91	115	183
1456		1000		6.72	.708	0.84	14.58	115	2.13
1458		1500		6.73	.699	0.86	14.54	115	191
1500		2000		6.74	.697	0.82	14.54	114	
1502		2500		6.75	.696	0.89	14.53	114	179
1504		3000		6.75	.694	0.91	14.47	114	
1506		3500		6.75	.693	0.90	14.48	114	101
1508		4000	↓	6.72	.1086	0.81	14.69	115	
1510		4500	clear	6.72	.684	0.91	14.58	115	64.1
1512		5000		6.72	.681	0.89	14.53	115	46.6
1514		5500		6.73	.681	0.91	14.44	114	
1516		6000		6.73	.679	0.83	14.36	114	43.2
1518		6500		6.74	.679	0.72	14.28	114	40.2
1520		7000		6.74	.679	0.74	14.19	113	
1522		7500		6.75	.680	0.83	14.07	113	37.6
1524		8000		6.75	.680	0.85	14.11	113	
1526		8500		6.75	.682	0.81	14.13	112	35.4
1528		9000		6.76	.682	0.82	14.15	112	
1530		9500		6.77	.683	0.67	14.21	111	32.4
1532		10000		6.78	.683	0.74	14.24	111	
1534		10500		6.78	.684	0.62	14.36	111	30.1
1536		11000		6.79	.687	0.64	14.41	110	
1538		11500		6.79	.694	0.69	14.36	110	29.3
1540		12000		6.80	.690	0.64	14.37	109	
1542		12500		6.80	.692	0.73	14.42	109	25.1
1544		13000		6.81	.694	0.63	14.48	109	
1546	↓	13500	↓	6.82	.694	0.63	14.40	108	22.6

Sampling Data

Monitoring Well ID: 38MW3 Resample

*DUP-2 collected here

Sample Collection Time: _____ OVER →

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	Solinst 410
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:		Disposable Bailer:	

Sample Containers/Preservatives

VOCs	_____ (40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	X (1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	_____ (1 liter, amber glass, 4°C)	Metals (F)	X (1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	_____ (1 liter, amber glass, 4°C)	Sulfide	_____ (250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides	_____ (1 liter, amber glass, 4°C)		
PCBs	_____ (1 liter, amber glass, 4°C)		
PAHs	_____ (1 liter, amber glass, 4°C)		
Explosives	_____ (1 liter, amber glass, 4°C)		
Perchlorate	_____ (125 ml, plastic, 4°C)		
Dioxin/Furans	_____ (1 liter, amber glass, 4°C)		
Cyanide	_____ (250 ml, plastic, NaOH, pH>12, 4°C)		

Comments: _____

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No

Final pH (SU):	_____	Final Conductivity (µs):	_____	Final Turbidity:	_____ ntu
Final Temperature (°C):	_____	Final DO:	_____	Final ORP:	_____
				Date Completed:	_____

Well Locked At: _____ Signature of Samplers: _____

Field Groundwater Sampling Log

Project Information

Project Name: RAAP 10 RFI/CMS Resample
Facility Name: RFAAP
URS Project No.: 11654357
Weather Conditions: Sunny ~ 80°
Monitoring Well ID: 38MW3 Resample

Date: 6/24/08
Client: RFAAP
Sampling Event: RAAP 10 RFI/CMS Resample
Sampling Team: MF, BF
Depth to Water: 26.13'
Total Well Depth: 42.44'

Purge Equipment

Dedicated Bladder Pump: [ ]
Dedicated Submersible Pump: [ ]
Submersible Pump: [ ]
Peristaltic Pump: [X]
Dedicated Bailer: [ ]
Disposable Bailer: [ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [X]4 [ ]7 [ ]10
Conductivity Meter: _____ µs standard solution
DO Meter: _____
Turbidity Meter: _____

Purge Data

Purge Rate/Volume Units:
250
milliliters per minute
[X]
gallons per minute
[ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1548		14000	clear	6.82	.697	0.65	14.43	108	
1550		14500		6.82	.691	0.64	14.44	108	21.2
1552		15000		6.82	.693	0.62	14.39	107	
1554		15500		6.83	.697	0.71	14.28	107	21.8
1556		16000		6.83	.688	0.64	14.36	107	
1558		16500		6.83	.686	0.66	14.38	107	19.33
1600		17000		6.85	.687	0.66	14.27	107	18.21
1602		17500		6.84	.684	0.68	14.14	106	
1604		18000		6.85	.681	0.72	14.07	106	16.84
1606	↓	18500	↓	6.84	.674	0.75	14.22	106	16.85

Sampling Data

Monitoring Well ID: 38MW3 Resample
Sample Collection Time: 1615

Sampling Device:
Dedicated Bladder Pump: _____
Dedicated Submersible Pump: _____
Submersible Pump: _____
Peristaltic Pump: Solinst 410
Dedicated Bailer: _____
Disposable Bailer: _____

Sample Containers/Preservatives

VOCs _____ (40 ml, gl. Vial, HCL pH<2, 4°C)
SVOCs _____ (1 liter, amber glass, 4°C)
Pesticides _____ (1 liter, amber glass, 4°C)
Herbicides _____ (1 liter, amber glass, 4°C)
PCBs _____ (1 liter, amber glass, 4°C)
PAHs _____ (1 liter, amber glass, 4°C)
Explosives _____ (1 liter, amber glass, 4°C)
Perchlorate _____ (125 ml, plastic, 4°C)
Dioxin/Furans _____ (1 liter, amber glass, 4°C)
Cyanide _____ (250 ml, plastic, NaOH, pH>12, 4°C)
Comments: _____

Metals (UF) X (1 liter, plastic HNO_3, pH<2, 4°C)
Metals (F) X (1 liter, plastic HNO_3, pH<2, 4°C)
Sulfide _____ (250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)

Field Filtering of Metals with 0.45 µ Disposable Filter [X]Yes [ ]No
Final pH (SU): 6.85
Final Temperature (°C): 14.25
Final Conductivity (µs): .671
Final DO: 0.81
Final Turbidity: 15.43 ntu
Final ORP: 106
Date Completed: 6/24/08
Well Locked At: ~~1530~~ 1700
Signature of Samplers: [signature]

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Field Groundwater Sampling Log

6 pH

P1/2

Project Information

Project Name:	Summer-37	Date:	6-28-10
Facility Name:	RADFORD	Client:	RADFORD
URS Project No.:	~~41655360~~ 21135488? DIK	Sampling Event:	P2157 SAMPLE
Weather Conditions:	CLOUDY 80	Sampling Team:	MF VDH
Monitoring Well ID:	37MW4	Depth to Water:	30.31
		Total Well Depth:	47.72

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	[X] RENTED PUMP	Disposable Bailer:	[ ]

Equipment Calibration

AUTO CAL SOLUTION HORIBA U22

pH Meter Calibrated with Buffers: [✓]4 [ ]7 [ ]10 DO Meter: HORIBA U22

Conductivity Meter: _____ µs standard solution Turbidity Meter: OAKTON TD00

Purge Data

Purge Rate/Volume Units: milliliters per minute [ ] gallons per minute [ ]

avg 250 ml/m

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)	
1021	200	2N1	MUDDY	5.28	1.40	10.95	16.8	62	OR	
1024			GRAY	5.33	1.42	8.54	16.0	55	965	
1027				5.57	1.42	7.68	15.7	19	923	
1030				5.68	1.39	6.77	16.4	3	809	
1033				5.68	1.39	6.21	17.4	-2	622	▽31.41
1036	250	2gl	CLOUDY	6.69	1.39	6.04	17.7	-1	492	
1039				5.70	1.38	5.90	18.4	-3	365	▽31.45
1042	150			5.71	1.38	5.79	18.5	-4	301	
1045				5.72	1.39	5.80	18.5	-6	270	
1048	175			5.77	1.39	5.86	18.1	-14	241	▽31.37
1051				5.79	1.40	5.86	18.0	-18	175	
1054		2.5gl		5.81	1.39	5.88	17.9	-20	213	
1057	225			5.81	1.38	5.78	18.1	-21	325	▽31.47
1100		3.0		5.77	1.38	5.66	18.6	-15	337	
1103				—	—	—	—	—	—	→ KNOCK OUT TUBE
1106	275			5.73	1.39	6.96	18.9	-8	405	
1109				5.68	1.40	6.57	18.0	-2	328	▽31.59
1112				5.67	1.40	6.36	18.0	1	246	
1115	300			5.65	1.40	6.24	18.1	3	168	
1118				5.64	1.39	6.08	18.5	5	105	▽31.77
1121		3.5	CLEAR	5.62	1.40	6.06	18.5	8	85.1	
1124				5.62	1.40	6.00	18.2	9	67.8	
1127				5.61	1.40	6.00	18.3	10	54.1	▽31.89
1130	250			5.61	1.40	5.90	18.4	11	44.5	
1133				5.61	1.40	5.81	18.4	11	50.6	
1136				5.60	1.41	5.78	18.2	12	42.3	
1139		5.0		5.59	1.40	5.74	18.3	13	42.2	
1142									35.8	

FINAL STABLE PULL OFF HORIBA U READINGS

Sampling Data

Monitoring Well ID: 37MW4 Sample Collection Time: 1205

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	X	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X	(40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)		(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs		(1 liter, amber glass, 4°C)	Metals (F)		(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides		(1 liter, amber glass, 4°C)	Sulfide		(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides		(1 liter, amber glass, 4°C)			
PCBs		(1 liter, amber glass, 4°C)			
PAHs		(1 liter, amber glass, 4°C)			
Explosives		(1 liter, amber glass, 4°C)			
Perchlorate		(125 ml, plastic, 4°C)			
Dioxin/Furans		(1 liter, amber glass, 4°C)			
Cyanide		(250 ml, plastic, NaOH, pH>12, 4°C)			

Comments: MS/MSD + DUP1

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [ ]No

Final pH (SU):		Final Conductivity (µs):		Final Turbidity:	ntu
Final Temperature (°C):		Final DO:		Final ORP:	
				Date Completed:	

Well Locked At: 1215 Signature of Samplers:

Field Groundwater Sampling Log

P2/2

Project Information

Project Name:	SWM-37	Date:	6-16-10
Facility Name:	RADFORD	Client:	RADFORD
URS Project No.:	~~11655636.21354887~~ DN	Sampling Event:	FZMS7 SAMPLE
Weather Conditions:	CLOUDY 80°	Sampling Team:	MF JDM
Monitoring Well ID:	37MW4	Depth to Water:	30.31
		Total Well Depth:	42.72

Purge Equipment

Dedicated Bladder Pump:	[ ]	Peristaltic Pump:	[ ]
Dedicated Submersible Pump:	[ ]	Dedicated Bailer:	[ ]
Submersible Pump:	X RENTED PUMP	Disposable Bailer:	[ ]

Equipment Calibration

pH Meter Calibrated with Buffers: [ ]4 [ ]7 [ ]10 (AUTO CAL HORIBA 4/22)
Conductivity Meter: _____ µs standard solution
DO Meter: HORIBA
Turbidity Meter: ~~OAKTON 700~~

Purge Data

Purge Rate/Volume Units:
milliliters per minute [ ]
gallons per minute [ ]

Time	Rate	Volume	Appearance	pH (SU)	Cond (ms)	DO (mg/L)	Temp (°C)	ORP (mV)	Turbidity (ntu)
1145	400								33.4
1148									27.8
1151									22.6
1154									22.5
1157									20.6
									20.6

732.34

Sampling Data

Monitoring Well ID: 37MW4
Sample Collection Time: 1205

Sampling Device:

Dedicated Bladder Pump:		Peristaltic Pump:	
Dedicated Submersible Pump:		Dedicated Bailer:	
Submersible Pump:	X	Disposable Bailer:	

Sample Containers/Preservatives

VOCs	X (40 ml, gl. Vial, HCL pH<2, 4°C)	Metals (UF)	(1 liter, plastic HNO_3, pH<2, 4°C)
SVOCs	(1 liter, amber glass, 4°C)	Metals (F)	(1 liter, plastic HNO_3, pH<2, 4°C)
Pesticides	(1 liter, amber glass, 4°C)	Sulfide	(250 ml, plastic, ZnAC+NaOH, pH>9, 4°C)
Herbicides	(1 liter, amber glass, 4°C)		
PCBs	(1 liter, amber glass, 4°C)		
PAHs	(1 liter, amber glass, 4°C)		
Explosives	(1 liter, amber glass, 4°C)		
Perchlorate	(125 ml, plastic, 4°C)		
Dioxin/Furans	(1 liter, amber glass, 4°C)		
Cyanide	(250 ml, plastic, NaOH, pH>12, 4°C)		

Comments: MS MSD + DUP

Field Filtering of Metals with 0.45 µ Disposable Filter [ ]Yes [ ]No

Final pH (SU):	5.59	Final Conductivity (µs):	1.40	Final Turbidity:	20.6 ntu
Final Temperature (°C):	18.3	Final DO:	5.74	Final ORP:	13
				Date Completed:	6-18-10

Well Locked At: 1215 Signature of Samplers: Dyan Hamb

APPENDIX C.5

INVESTIGATION-DERIVED MATERIAL ANALYTICAL RESULTS

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35-37-38 IDM

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711446-01 File ID: 44601.D

Sampled: 11/16/07 10:00 Prepared: 11/30/07 08:00 Analyzed: 11/30/07 17:50

Solids: Preparation: 5030B MS TCLP Initial/Final: 5 g / 5 mL

QC Batch: 0714562 Sequence: 7120315 Calibration: 7K29004 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
71-43-2	Benzene, TCLP	100	0.10	0.10	0.012	U
56-23-5	Carbon Tetrachloride, TCLP	100	0.10	0.10	0.015	U
108-90-7	Chlorobenzene, TCLP	100	0.10	0.10	0.012	U
67-66-3	Chloroform, TCLP	100	0.10	0.10	0.0061	U
107-06-2	1,2-Dichloroethane, TCLP	100	0.10	0.10	0.015	U
75-35-4	1,1-Dichloroethene, TCLP	100	0.10	0.10	0.014	U
78-93-3	2-Butanone (MEK), TCLP	100	5.0	5.0	0.033	U
127-18-4	Tetrachloroethene, TCLP	100	0.10	0.10	0.015	U
79-01-6	Trichloroethene, TCLP	100	0.10	0.10	0.017	U
75-01-4	Vinyl Chloride, TCLP	100	0.10	0.10	0.017	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane, TCLP	40.0	43.7	109	79 - 124	
1,2-Dichloroethane-d4, TCLP	40.0	42.8	107	75 - 128	
Toluene-d8, TCLP	40.0	41.5	104	87 - 113	
4-Bromofluorobenzene, TCLP	40.0	37.2	93	70 - 121	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene, TCLP	313215	5.15	373317	5.15	
Chlorobenzene-d5, TCLP	301766	8.08	349733	8.08	
1,4-Dichlorobenzene-d4, TCLP	161442	10.38	208302	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35-37-38 IDM

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711446-01 File ID: 71144601.D

Sampled: 11/16/07 10:00 Prepared: 11/30/07 07:34 Analyzed: 12/10/07 13:47

Solids: Preparation: 3510C TCLP Liquid-Liqu Initial/Final: 500 mL / 5 mL

QC Batch: 0714374 Sequence: 7120740 Calibration: 7L10016 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
106-46-7	1,4-Dichlorobenzene, TCLP	1	0.0050	0.0050	0.0000074	U
121-14-2	2,4-Dinitrotoluene, TCLP	1	0.0050	0.0050	0.00011	U
118-74-1	Hexachlorobenzene, TCLP	1	0.0050	0.0050	0.0000058	U
87-68-3	Hexachlorobutadiene, TCLP	1	0.0050	0.0050	0.000062	U
67-72-1	Hexachloroethane, TCLP	1	0.0050	0.0050	0.000019	U
98-95-3	Nitrobenzene, TCLP	1	0.0050	0.0050	0.000013	U
110-86-1	Pyridine, TCLP	1	0.050	0.050	0.00019	U
87-86-5	Pentachlorophenol, TCLP	1	0.0050	0.0050	0.000094	U
88-06-2	2,4,6-Trichlorophenol, TCLP	1	0.0050	0.0050	0.000013	U
95-95-4	2,4,5-Trichlorophenol, TCLP	1	0.0050	0.0050	0.000054	U
95-48-7	2-Methylphenol, TCLP	1	0.0050	0.0050	0.000072	U
108-39-4	3-Methylphenol, TCLP	1	0.0050	0.0050	0.0000078	U
106-44-5	4-Methylphenol, TCLP	1	0.0050	0.0050	0.0000078	U
58-89-9	gamma-BHC (Lindane), TCLP	1	0.0050	0.0050	0.000028	U
72-20-8	Endrin, TCLP	1	0.0050	0.0050	0.00014	U
72-43-5	Methoxychlor, TCLP	1	0.0050	0.0050	0.000036	U
57-74-9	Technical Chlordane, TCLP	1	0.0050	0.0050	0.000062	U
76-44-8	Heptachlor, TCLP	1	0.0050	0.0050	0.000045	U
1024-57-3	Heptachlor Epoxide, TCLP	1	0.0050	0.0050	0.000038	U
8001-35-2	Toxaphene, TCLP	1	0.50	0.50	0.00015	U

System Monitoring Compound	ADDED (mg/L)	CONC (mg/L)	% REC.	QC Limits	Q
2-Fluorophenol, TCLP	0.200	0.131	65	30 - 120	
Phenol-d6, TCLP	0.200	0.103	52	20 - 109	
Nitrobenzene-d5, TCLP	0.101	0.0816	81	20 - 140	
2-Fluorobiphenyl, TCLP	0.100	0.0779	78	35 - 130	
2,4,6-Tribromophenol, TCLP	0.201	0.153	76	23 - 120	
o-Terphenyl, TCLP	0.101	0.0909	90	34 - 130	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4, TCLP	383192	7.62	228554	7.62	
Naphthalene-d8, TCLP	1214472	10.35	854253	10.35	
Acenaphthene-d10, TCLP	635548	14.46	436556	14.46	
Phenanthrene-d10, TCLP	867136	17.9	574582	17.9	
Chrysene-d12, TCLP	730779	21.51	446646	21.51	
Perylene-d12, TCLP	631064	23.2	365268	23.2	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35-37-38 IDM

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711446-01 File ID: 71144601.D

Sampled: 11/16/07 10:00 Prepared: 11/30/07 06:51 Analyzed: 12/07/07 12:25

Solids: Preparation: 8151A Extraction Initial/Final: 500 g / 5 mL

QC Batch: 0714302 Sequence: 7120742 Calibration: 7L05009 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
94-75-7	2,4-D, TCLP	1	0.10	0.10	0.0041	U
93-72-1	2,4,5-TP (Silvex), TCLP	1	0.10	0.10	0.0038	U

System Monitoring Compound	ADDED (mg/L)	CONC (mg/L)	% REC.	QC Limits	Q
2,4,5-T, TCLP	0.200	0.158	79	50 - 150	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Phenanthrene-d10, TCLP	6290937	17.98	4684888	17.98	

* Values outside of QC limits

00083

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35-37-38 IDM

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711446-02 File ID: data042-0

Sampled: 11/16/07 10:00 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 20:49

Solids: Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.97	119	57 - 139	

* Values outside of QC limits

00156

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35-37-38 IDM

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711446-02 File ID: data052-0

Sampled: 11/16/07 10:00 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 03:31

Solids: Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.83	114	50 - 150	

* Values outside of QC limits

: 00178

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35-37-38 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 11/16/07 10:00
Solids: 0.00
Laboratory ID: 0711446-01

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3010A TCLP Digestion
Prepared: 11/28/07 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0714540

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, TCLP	0.20	mg/L	1	0.20	0.056	U	11/30/07 11:47
7440-39-3	Barium, TCLP	0.15	mg/L	1	0.35	0.0010	J	11/30/07 11:46
7440-43-9	Cadmium, TCLP	0.020	mg/L	1	0.020	0.0045	U	11/30/07 11:47
7440-47-3	Chromium, TCLP	0.011	mg/L	1	0.050	0.0034	J	11/30/07 11:47
7439-92-1	Lead, TCLP	0.048	mg/L	1	0.10	0.030	J	11/30/07 11:47
7782-49-2	Selenium, TCLP	0.20	mg/L	1	0.20	0.064	U	11/30/07 11:47
7440-22-4	Silver, TCLP	0.010	mg/L	1	0.010	0.0029	U	11/30/07 11:47

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

35-37-38 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 11/16/07 10:00
Solids: 0.00
Laboratory ID: 0711446-01

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7470A TCLP Digestion
Prepared: 11/28/07 17:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0714531

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, TCLP	0.00020	mg/L	1	0.00020	0.000046	U	11/29/07 15:14

00238

INORGANIC ANALYSIS DATA SHEET
USEPA-9040B

35-37-38 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 10:00
Solids: 0.00
Laboratory ID: 0711446-03

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: Method-Specific Prepara
Prepared: 11/20/07 09:25
Initial/Final: 20 g / 20 mL
QC Batch: 0714162

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	pH	7.6	pH Units	1	0.1	0.1		11/20/07 13:00

00264

INORGANIC ANALYSIS DATA SHEET
USEPA-9095

35-37-38 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 10:00
Solids: 0.00
Laboratory ID: 0711446-03

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: General Inorganic Prep
Prepared: 11/27/07 09:35
Initial/Final: 100.34 g / 100.34 mL
QC Batch: 0714375

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Paint Filter Liquids Test	Pass	mL	1	1	1	U	11/27/07 09:35

00274

TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-03**	Sampled By:	M.Fisher; URS
Matrix:	Waste	Received:	06/17/10 08:45

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	MDL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Paint Filter Liquids Test	Pass	1	1	mL	1	USEPA-9095	06/22/10 14:09	GEH	1006159
pH	**7.6**	0.1	0.1	pH Units	1	USEPA-9045C	06/23/10 11:43	KRK	1006224

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-03**	Sampled By:	M.Fisher; URS
Matrix:	Waste	Received:	06/17/10 08:45

TCLP Metals by EPA 1311/6000/7000 Series Methods

Analyte	Analytical Result		RL	MDL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Arsenic	0.20	U	0.20	0.067	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
***Barium**	**1.1**		0.35	0.0036	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Cadmium	0.020	U	0.020	0.0047	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Chromium	0.050	U	0.050	0.0098	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Copper	0.010	U	0.010	0.0094	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Lead	0.050	U	0.050	0.033	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Mercury	0.00020	U	0.00020	0.000061	mg/L	1	USEPA-7470A	06/24/10 10:35	JMF	1006238
Nickel	**0.023**		0.020	0.0064	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Selenium	0.10	U	0.10	0.053	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Silver	0.010	U	0.010	0.0034	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Zinc	0.25	U	0.25	0.0087	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142

*See Statement of Data Qualifications

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-03**	Sampled By:	M.Fisher; URS
Matrix:	Waste	Received:	06/17/10 08:45
Unit:	mg/L	Prepared:	06/19/10 By: JDM
Dilution Factor:	100	Analyzed:	06/19/10 By: JDM
QC Batch:	1006109	Analytical Batch:	0F21009

TCLP Volatile Organics by EPA Method 1311/8260B

CAS Number	Analyte	Analytical Result	RL	MDL
71-43-2	Benzene	0.10U	0.10	0.018
56-23-5	Carbon Tetrachloride	0.10U	0.10	0.013
108-90-7	Chlorobenzene	0.10U	0.10	0.019
67-66-3	Chloroform	0.10U	0.10	0.017
107-06-2	1,2-Dichloroethane	0.10U	0.10	0.013
75-35-4	1,1-Dichloroethene	0.10U	0.10	0.013
78-93-3	2-Butanone (MEK)	5.0U	5.0	0.55
127-18-4	Tetrachloroethene	0.10U	0.10	0.016
79-01-6	Trichloroethene	0.10U	0.10	0.0092
75-01-4	Vinyl Chloride	0.10U	0.10	0.010

Surrogates:	***% Recovery***	***Control Limits***
Dibromofluoromethane	103	*79-124*
1,2-Dichloroethane-d4	111	*75-128*
Toluene-d8	91	*87-113*
4-Bromofluorobenzene	91	*70-121*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-03**	Sampled By:	M.Fisher; URS
Matrix:	Waste	Received:	06/17/10 08:45
Unit:	mg/L	Prepared:	06/24/10 By: JTS
Dilution Factor:	1	Analyzed:	07/01/10 By: JLB
QC Batch:	1006269	Analytical Batch:	0G01054

TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C

CAS Number	Analyte	Analytical Result	RL	MDL
106-46-7	1,4-Dichlorobenzene	0.0050U	0.0050	0.000015
121-14-2	2,4-Dinitrotoluene	0.0050U	0.0050	0.00021
118-74-1	Hexachlorobenzene	0.0050U	0.0050	0.000012
87-68-3	Hexachlorobutadiene	0.0050U	0.0050	0.00012
67-72-1	Hexachloroethane	0.0050U	0.0050	0.000038
98-95-3	Nitrobenzene	0.0050U	0.0050	0.000026
110-86-1	Pyridine	0.050U	0.050	0.00038
87-86-5	Pentachlorophenol	0.0050U	0.0050	0.00019
88-06-2	2,4,6-Trichlorophenol	0.0050U	0.0050	0.000027
95-95-4	2,4,5-Trichlorophenol	0.0050U	0.0050	0.00011
95-48-7	2-Methylphenol	0.0050U	0.0050	0.00014
108-39-4	3-Methylphenol	0.0050U	0.0050	0.000016
106-44-5	4-Methylphenol	0.0050U	0.0050	0.000016
58-89-9	gamma-BHC (Lindane)	0.0050U	0.0050	0.000057
72-20-8	Endrin	0.0050U	0.0050	0.00028
72-43-5	Methoxychlor	0.0050U	0.0050	0.000072
57-74-9	Technical Chlordane	0.0050U	0.0050	0.00012
76-44-8	Heptachlor	0.0050U	0.0050	0.000091
1024-57-3	Heptachlor Epoxide	0.0050U	0.0050	0.000076
8001-35-2	Toxaphene	0.50U	0.50	0.00029

Surrogates:	***% Recovery***	***Control Limits***
2-Fluorophenol	83	*30-120*
Phenol-d6	59	*20-109*
Nitrobenzene-d5	87	*20-140*
2-Fluorobiphenyl	76	*35-130*
2,4,6-Tribromophenol	75	*23-120*
o-Terphenyl	85	*34-130*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-03**	Sampled By:	M.Fisher; URS
Matrix:	Waste	Received:	06/17/10 08:45
Unit:	mg/L	Prepared:	06/24/10 By: BJH
Dilution Factor:	1	Analyzed:	06/28/10 By: JLB
QC Batch:	1006270	Analytical Batch:	0F29007

TCLP Chlorinated Herbicides by EPA Method 1311/8270C

CAS Number	Analyte	Analytical Result	RL	MDL
94-75-7	2,4-D	0.10U	0.10	0.0041
93-72-1	2,4,5-TP (Silvex)	0.10U	0.10	0.0038

Surrogates:	*% Recovery*	*Control Limits*
2,4,5-T	64	*50-150*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-04**	Sampled By:	M.Fisher; URS
Matrix:	Soil	Received:	06/17/10 08:45
Unit:	mg/kg dry wt.	Prepared:	06/24/10 By: BJH
Dilution Factor:	1	Analyzed:	06/28/10 By: JLB
QC Batch:	1006334	Analytical Batch:	0F29004
Percent Solids:	83		

Nitroaromatics & Nitramines by EPA Method 8330

CAS Number	Analyte	Analytical Result	RL	MDL
99-35-4	1,3,5-Trinitrobenzene	2.5U	2.5	0.24
99-65-0	1,3-Dinitrobenzene	2.5U	2.5	0.19
118-96-7	2,4,6-Trinitrotoluene	2.5U	2.5	0.22
121-14-2	2,4-Dinitrotoluene	2.5U	2.5	0.30
606-20-2	2,6-Dinitrotoluene	2.5U	2.5	0.39
35572-78-2	2-Amino-4,6-dinitrotoluene	2.5U	2.5	0.52
88-72-2	2-Nitrotoluene	2.5U	2.5	0.22
*99-08-1	3-Nitrotoluene	2.5U	2.5	0.28
1946-51-0	4-Amino-2,6-dinitrotoluene	2.5U	2.5	0.33
*99-99-0	4-Nitrotoluene	2.5U	2.5	0.22
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	2.5U	2.5	0.31
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	2.5U	2.5	0.39
98-95-3	Nitrobenzene	2.5U	2.5	0.23
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2.5U	2.5	0.23

Surrogates:	***% Recovery***	***Control Limits***
4-Nitroaniline	92	*57-139*

*See Statement of Data Qualifications

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-04**	Sampled By:	M.Fisher; URS
Matrix:	Soil	Received:	06/17/10 08:45
Unit:	mg/kg dry wt.	Prepared:	06/25/10 By: BJH
Dilution Factor:	1	Analyzed:	06/30/10 By: JLB
QC Batch:	1006337	Analytical Batch:	0F30030
Percent Solids:	83		

Nitroglycerine by EPA Method 8332

CAS Number	Analyte	Analytical Result	RL	MDL
55-63-0	Nitroglycerin	5.0U	5.0	0.18
78-11-5	Pentaerythritol Tetranitrate	5.0U	5.0	0.43

Surrogates:	*% Recovery*	*Control Limits*
1-Nitronaphthalene	101	*50-150*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-04**	Sampled By:	M.Fisher; URS
Matrix:	Soil	Received:	06/17/10 08:45

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	MDL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Percent Solids	**83**	0.1	0.1	%	1	USEPA-3550B	06/21/10 14:00	CLB	1006126

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INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

RAAP 10 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 02/13/08 16:30
Solids: 0.00
Laboratory ID: 0802295-01

SDG: 36440-52
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A TCLP Digestion
Prepared: 02/25/08 15:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0802160

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, TCLP	0.00020	mg/L	1	0.00020	0.000046	U	02/26/08 13:15

INORGANIC ANALYSIS DATA SHEET

USEPA-6010B

RAAP 10 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 02/13/08 16:30
Solids: 0.00
Laboratory ID: 0802295-01

SDG: 36440-52
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A TCLP Digestion
Prepared: 02/22/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0802080

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, TCLP	0.20	mg/L	1	0.20	0.056	U	02/28/08 10:43
7440-39-3	Barium, TCLP	0.11	mg/L	1	0.35	0.0010	J	02/28/08 10:42
7440-43-9	Cadmium, TCLP	0.020	mg/L	1	0.020	0.0045	U	02/28/08 10:43
7440-47-3	Chromium, TCLP	0.050	mg/L	1	0.050	0.0034	U	02/28/08 10:43
7439-92-1	Lead, TCLP	0.10	mg/L	1	0.10	0.030	U	02/28/08 10:43
7782-49-2	Selenium, TCLP	0.20	mg/L	1	0.20	0.064	U	02/28/08 10:43
7440-22-4	Silver, TCLP	0.010	mg/L	1	0.010	0.0029	U	02/28/08 10:42

INORGANIC ANALYSIS DATA SHEET
USEPA-410.4

RAAP 10 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 02/13/08 16:30
Solids: 0.00
Laboratory ID: 0802295-02

SDG: 36440-52
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 410.4 COD Digestion
Prepared: 02/27/08 10:50
Initial/Final: 2 mL / 2 mL
QC Batch: 0802298

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	Chemical Oxygen Demand	5.0	mg/L	1	5.0	2.2	U	02/27/08 15:45

INORGANIC ANALYSIS DATA SHEET

USEPA-9040B

RAAP 10 IDM

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 02/13/08 16:30
Solids: 0.00
Laboratory ID: 0802295-02

SDG: 36440-52
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: Method-Specific Preparation
Prepared: 02/18/08 15:34
Initial/Final: 20 mL / 20 mL
QC Batch: 0801817

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	pH	7.6	pH Units	1	0.1	0.1		02/18/08 15:50

TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Water**	Sampled:	06/16/10 12:35
Lab Sample ID:	**1006297-01**	Sampled By:	M. Fisher; URS
Matrix:	TCLP	Received:	06/17/10 08:45

TCLP Metals by EPA 1311/6000/7000 Series Methods

Analyte	Analytical Result		RL	MDL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Arsenic	0.20	U	0.20	0.067	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Barium	**0.091**	**J**	0.35	0.0036	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Cadmium	0.020	U	0.020	0.0047	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Chromium	0.050	U	0.050	0.0098	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Copper	0.010	U	0.010	0.0094	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Lead	0.050	U	0.050	0.033	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Mercury	0.00020	U	0.00020	0.000061	mg/L	1	USEPA-7470A	06/24/10 10:20	JMF	1006238
Nickel	0.010	U	0.010	0.0064	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Selenium	0.10	U	0.10	0.053	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Silver	0.010	U	0.010	0.0034	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Zinc	0.25	U	0.25	0.0087	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Water**	Sampled:	06/16/10 12:35
Lab Sample ID:	**1006297-02**	Sampled By:	M. Fisher; URS
Matrix:	Water	Received:	06/17/10 08:45

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	MDL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Chemical Oxygen Demand	**14**	6.0	3.7	mg/L	1	SM 5220 D 20th	06/26/10 11:23	CKD	1006373
***pH**	**7.7**	0.1	0.1	pH Units	1	USEPA-9040B	06/18/10 13:26	KRK	1006058

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-03**	Sampled By:	M.Fisher; URS
Matrix:	Waste	Received:	06/17/10 08:45

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	MDL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Paint Filter Liquids Test	Pass	1	1	mL	1	USEPA-9095	06/22/10 14:09	GEH	1006159
pH	**7.6**	0.1	0.1	pH Units	1	USEPA-9045C	06/23/10 11:43	KRK	1006224

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-03**	Sampled By:	M.Fisher; URS
Matrix:	Waste	Received:	06/17/10 08:45

TCLP Metals by EPA 1311/6000/7000 Series Methods

Analyte	Analytical Result		RL	MDL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Arsenic	0.20	U	0.20	0.067	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
***Barium**	**1.1**		0.35	0.0036	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Cadmium	0.020	U	0.020	0.0047	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Chromium	0.050	U	0.050	0.0098	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Copper	0.010	U	0.010	0.0094	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Lead	0.050	U	0.050	0.033	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Mercury	0.00020	U	0.00020	0.000061	mg/L	1	USEPA-7470A	06/24/10 10:35	JMF	1006238
Nickel	**0.023**		0.020	0.0064	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Selenium	0.10	U	0.10	0.053	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Silver	0.010	U	0.010	0.0034	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142
Zinc	0.25	U	0.25	0.0087	mg/L	1	USEPA-6010C	06/23/10 09:50	JMF	1006142

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-03**	Sampled By:	M.Fisher; URS
Matrix:	Waste	Received:	06/17/10 08:45
Unit:	mg/L	Prepared:	06/19/10 By: JDM
Dilution Factor:	100	Analyzed:	06/19/10 By: JDM
QC Batch:	1006109	Analytical Batch:	0F21009

TCLP Volatile Organics by EPA Method 1311/8260B

CAS Number	Analyte	Analytical Result	RL	MDL
71-43-2	Benzene	0.10U	0.10	0.018
56-23-5	Carbon Tetrachloride	0.10U	0.10	0.013
108-90-7	Chlorobenzene	0.10U	0.10	0.019
67-66-3	Chloroform	0.10U	0.10	0.017
107-06-2	1,2-Dichloroethane	0.10U	0.10	0.013
75-35-4	1,1-Dichloroethene	0.10U	0.10	0.013
78-93-3	2-Butanone (MEK)	5.0U	5.0	0.55
127-18-4	Tetrachloroethene	0.10U	0.10	0.016
79-01-6	Trichloroethene	0.10U	0.10	0.0092
75-01-4	Vinyl Chloride	0.10U	0.10	0.010

Surrogates:	*% Recovery*	*Control Limits*
Dibromofluoromethane	103	*79-124*
1,2-Dichloroethane-d4	111	*75-128*
Toluene-d8	91	*87-113*
4-Bromofluorobenzene	91	*70-121*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-03**	Sampled By:	M.Fisher; URS
Matrix:	Waste	Received:	06/17/10 08:45
Unit:	mg/L	Prepared:	06/24/10 By: JTS
Dilution Factor:	1	Analyzed:	07/01/10 By: JLB
QC Batch:	1006269	Analytical Batch:	0G01054

TCLP Semivolatile Organic Compounds by EPA Method 1311/8270C

CAS Number	Analyte	Analytical Result	RL	MDL
106-46-7	1,4-Dichlorobenzene	0.0050U	0.0050	0.000015
121-14-2	2,4-Dinitrotoluene	0.0050U	0.0050	0.00021
118-74-1	Hexachlorobenzene	0.0050U	0.0050	0.000012
87-68-3	Hexachlorobutadiene	0.0050U	0.0050	0.00012
67-72-1	Hexachloroethane	0.0050U	0.0050	0.000038
98-95-3	Nitrobenzene	0.0050U	0.0050	0.000026
110-86-1	Pyridine	0.050U	0.050	0.00038
87-86-5	Pentachlorophenol	0.0050U	0.0050	0.00019
88-06-2	2,4,6-Trichlorophenol	0.0050U	0.0050	0.000027
95-95-4	2,4,5-Trichlorophenol	0.0050U	0.0050	0.00011
95-48-7	2-Methylphenol	0.0050U	0.0050	0.00014
108-39-4	3-Methylphenol	0.0050U	0.0050	0.000016
106-44-5	4-Methylphenol	0.0050U	0.0050	0.000016
58-89-9	gamma-BHC (Lindane)	0.0050U	0.0050	0.000057
72-20-8	Endrin	0.0050U	0.0050	0.00028
72-43-5	Methoxychlor	0.0050U	0.0050	0.000072
57-74-9	Technical Chlordane	0.0050U	0.0050	0.00012
76-44-8	Heptachlor	0.0050U	0.0050	0.000091
1024-57-3	Heptachlor Epoxide	0.0050U	0.0050	0.000076
8001-35-2	Toxaphene	0.50U	0.50	0.00029

Surrogates:	*% Recovery*	*Control Limits*
2-Fluorophenol	83	*30-120*
Phenol-d6	59	*20-109*
Nitrobenzene-d5	87	*20-140*
2-Fluorobiphenyl	76	*35-130*
2,4,6-Tribromophenol	75	*23-120*
o-Terphenyl	85	*34-130*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-03**	Sampled By:	M.Fisher; URS
Matrix:	Waste	Received:	06/17/10 08:45
Unit:	mg/L	Prepared:	06/24/10 By: BJH
Dilution Factor:	1	Analyzed:	06/28/10 By: JLB
QC Batch:	1006270	Analytical Batch:	0F29007

TCLP Chlorinated Herbicides by EPA Method 1311/8270C

CAS Number	Analyte	Analytical Result	RL	MDL
94-75-7	2,4-D	0.10U	0.10	0.0041
93-72-1	2,4,5-TP (Silvex)	0.10U	0.10	0.0038

Surrogates:	*% Recovery*	*Control Limits*
2,4,5-T	64	*50-150*

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-04**	Sampled By:	M.Fisher; URS
Matrix:	Soil	Received:	06/17/10 08:45
Unit:	mg/kg dry wt.	Prepared:	06/24/10 By: BJH
Dilution Factor:	1	Analyzed:	06/28/10 By: JLB
QC Batch:	1006334	Analytical Batch:	0F29004
Percent Solids:	83		

Nitroaromatics & Nitramines by EPA Method 8330

CAS Number	Analyte	Analytical Result	RL	MDL
99-35-4	1,3,5-Trinitrobenzene	2.5U	2.5	0.24
99-65-0	1,3-Dinitrobenzene	2.5U	2.5	0.19
118-96-7	2,4,6-Trinitrotoluene	2.5U	2.5	0.22
121-14-2	2,4-Dinitrotoluene	2.5U	2.5	0.30
606-20-2	2,6-Dinitrotoluene	2.5U	2.5	0.39
35572-78-2	2-Amino-4,6-dinitrotoluene	2.5U	2.5	0.52
88-72-2	2-Nitrotoluene	2.5U	2.5	0.22
*99-08-1	3-Nitrotoluene	2.5U	2.5	0.28
1946-51-0	4-Amino-2,6-dinitrotoluene	2.5U	2.5	0.33
*99-99-0	4-Nitrotoluene	2.5U	2.5	0.22
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	2.5U	2.5	0.31
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	2.5U	2.5	0.39
98-95-3	Nitrobenzene	2.5U	2.5	0.23
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2.5U	2.5	0.23

Surrogates:	*% Recovery*	*Control Limits*
4-Nitroaniline	92	*57-139*

*See Statement of Data Qualifications

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-04**	Sampled By:	M.Fisher; URS
Matrix:	Soil	Received:	06/17/10 08:45
Unit:	mg/kg dry wt.	Prepared:	06/25/10 By: BJH
Dilution Factor:	1	Analyzed:	06/30/10 By: JLB
QC Batch:	1006337	Analytical Batch:	0F30030
Percent Solids:	83		

Nitroglycerine by EPA Method 8332

CAS Number	Analyte	Analytical Result	RL	MDL
55-63-0	Nitroglycerin	5.0U	5.0	0.18
78-11-5	Pentaerythritol Tetranitrate	5.0U	5.0	0.43

Surrogates:	*% Recovery*	*Control Limits*
1-Nitronaphthalene	101	*50-150*

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[illegible]

TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Soil**	Sampled:	06/16/10 12:37
Lab Sample ID:	**1006297-04**	Sampled By:	M.Fisher; URS
Matrix:	Soil	Received:	06/17/10 08:45

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	MDL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Percent Solids	**83**	0.1	0.1	%	1	USEPA-3550B	06/21/10 14:00	CLB	1006126

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[illegible]

TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Water**	Sampled:	06/16/10 12:35
Lab Sample ID:	**1006297-01**	Sampled By:	M. Fisher; URS
Matrix:	TCLP	Received:	06/17/10 08:45

TCLP Metals by EPA 1311/6000/7000 Series Methods

Analyte	Analytical Result		RL	MDL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Arsenic	0.20	U	0.20	0.067	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Barium	**0.091**	**J**	0.35	0.0036	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Cadmium	0.020	U	0.020	0.0047	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Chromium	0.050	U	0.050	0.0098	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Copper	0.010	U	0.010	0.0094	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Lead	0.050	U	0.050	0.033	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Mercury	0.00020	U	0.00020	0.000061	mg/L	1	USEPA-7470A	06/24/10 10:20	JMF	1006238
Nickel	0.010	U	0.010	0.0064	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Selenium	0.10	U	0.10	0.053	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Silver	0.010	U	0.010	0.0034	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141
Zinc	0.25	U	0.25	0.0087	mg/L	1	USEPA-6010C	06/23/10 10:45	JMF	1006141

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TRIMATRIX LABORATORIES

ANALYTICAL REPORT

Client:	**URS Corporation**	Work Order:	**1006297**
Project:	RFAAP RAAP 10	Description:	RF100610B
Client Sample ID:	**IDM Water**	Sampled:	06/16/10 12:35
Lab Sample ID:	**1006297-02**	Sampled By:	M. Fisher; URS
Matrix:	Water	Received:	06/17/10 08:45

Physical/Chemical Parameters by EPA/APHA/ASTM Methods

Analyte	Analytical Result	RL	MDL	Unit	Dilution Factor	Method	Date Time Analyzed	By	QC Batch
Chemical Oxygen Demand	**14**	6.0	3.7	mg/L	1	SM 5220 D 20th	06/26/10 11:23	CKD	1006373
***pH**	**7.7**	0.1	0.1	pH Units	1	USEPA-9040B	06/18/10 13:26	KRK	1006058

*See Statement of Data Qualifications

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APPENDIX C.6

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) RESULTS

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Table C.6-1
Summary of RFI TCLP Analytical Results
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS	TCLP Regulatory Level	Units	35COMP 11/14/2007		MDL	RL	37COMP 11/15/2007		MDL	RL	38COMP 11/15/2007		MDL	RL
				Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TCLP Metals															
Arsenic	7440-38-2	5	mg/L	<0.2	U	0.056	0.2	<0.2	U	0.056	0.2	<0.2	U	0.056	0.2
Barium	7440-39-3	100	mg/L	0.23	J	0.001	0.35	0.19	J	0.001	0.35	0.43		0.001	0.35
Cadmium	7440-43-9	1	mg/L	<0.02	U	0.0045	0.02	<0.02	U	0.0045	0.02	<0.02	U	0.0045	0.02
Chromium	7440-47-3	5	mg/L	<0.05	U	0.0034	0.05	<0.05	U	0.0034	0.05	0.0046	J	0.0034	0.05
Lead	7439-92-1	5	mg/L	<0.1	U	0.03	0.1	<0.1	U	0.03	0.1	<0.1	U	0.03	0.1
Mercury	7439-97-6	0.2	mg/L	<0.0002	U	0.000046	0.0002	<0.0002	U	0.000046	0.0002	<0.0002	U	0.000046	0.0002
Selenium	7782-49-2	1	mg/L	<0.2	U	0.064	0.2	<0.2	U	0.064	0.2	<0.2	U	0.064	0.2
Silver	7440-22-4	5	mg/L	0.0034	J	0.0029	0.01	0.0031	J	0.0029	0.01	<0.01	U	0.0029	0.01
TCLP VOCs															
1,1-Dichloroethene	75-35-4	0.7	mg/L	<0.1	U	0.014	0.1	<0.1	U	0.014	0.1	<0.1	U	0.014	0.1
1,2-Dichloroethane	107-06-2	0.5	mg/L	<0.1	U	0.015	0.1	<0.1	U	0.015	0.1	<0.1	U	0.015	0.1
2-Butanone (MEK)	78-93-3	200	mg/L	<5	U	0.033	5	<5	U	0.033	5	<5	U	0.033	5
Benzene	71-43-2	0.5	mg/L	<0.1	U	0.012	0.1	<0.1	U	0.012	0.1	<0.1	U	0.012	0.1
Carbon Tetrachloride	56-23-5	0.5	mg/L	<0.1	U	0.015	0.1	<0.1	U	0.015	0.1	<0.1	U	0.015	0.1
Chlorobenzene	108-90-7	100	mg/L	<0.1	U	0.012	0.1	<0.1	U	0.012	0.1	<0.1	U	0.012	0.1
Chloroform	67-66-3	6	mg/L	<0.1	U	0.0061	0.1	<0.1	U	0.0061	0.1	<0.1	U	0.0061	0.1
Tetrachloroethene	127-18-4	0.7	mg/L	<0.1	U	0.015	0.1	<0.1	U	0.015	0.1	<0.1	U	0.015	0.1
Trichloroethene	79-01-6	0.5	mg/L	<0.1	U	0.017	0.1	<0.1	U	0.017	0.1	<0.1	U	0.017	0.1
Vinyl Chloride	75-01-4	0.2	mg/L	<0.1	U	0.017	0.1	<0.1	U	0.017	0.1	<0.1	U	0.017	0.1
TCLP SVOCs/Pest/Herb															
1,4-Dichlorobenzene	106-46-7	7.5	mg/L	<0.005	U	0.0000074	0.005	<0.005	U	0.0000074	0.005	<0.005	U	0.0000074	0.005
2,4,5-TP (Silvex)	93-72-1	1	mg/L	<0.1	U	0.0038	0.1	<0.1	U	0.0038	0.1	<0.1	U	0.0038	0.1
2,4,5-Trichlorophenol	95-95-4	400	mg/L	<0.005	U	0.000054	0.005	<0.005	U	0.000054	0.005	<0.005	U	0.000054	0.005
2,4,6-Trichlorophenol	88-06-2	2	mg/L	<0.005	U	0.000013	0.005	<0.005	U	0.000013	0.005	<0.005	U	0.000013	0.005
2,4-D	94-75-7	10	mg/L	<0.1	U	0.0041	0.1	<0.1	U	0.0041	0.1	<0.1	U	0.0041	0.1
2,4-Dinitrotoluene	121-14-2	0.13	mg/L	<0.005	U	0.00011	0.005	<0.005	U	0.00011	0.005	<0.005	U	0.00011	0.005
2-Methylphenol	95-48-7	200	mg/L	<0.005	U	0.000072	0.005	<0.005	U	0.000072	0.005	<0.005	U	0.000072	0.005
3-Methylphenol	108-39-4	200	mg/L	<0.005	U	0.0000078	0.005	<0.005	U	0.0000078	0.005	<0.005	U	0.0000078	0.005
4-Methylphenol	106-44-5	200	mg/L	<0.005	U	0.0000078	0.005	<0.005	U	0.0000078	0.005	<0.005	U	0.0000078	0.005
Chlordane	57-74-9	0.03	mg/L	<0.005	U	0.000062	0.005	<0.005	U	0.000062	0.005	<0.005	U	0.000062	0.005
Endrin	72-20-8	0.02	mg/L	<0.005	U	0.00014	0.005	<0.005	U	0.00014	0.005	<0.005	U	0.00014	0.005
gamma-BHC (Lindane)	58-89-9	0.4	mg/L	<0.005	U	0.000028	0.005	<0.005	U	0.000028	0.005	<0.005	U	0.000028	0.005
Heptachlor	76-44-8	0.008	mg/L	<0.005	U	0.000045	0.005	<0.005	U	0.000045	0.005	<0.005	U	0.000045	0.005
Heptachlor Epoxide	1024-57-3	0.008	mg/L	<0.005	U	0.000038	0.005	<0.005	U	0.000038	0.005	<0.005	U	0.000038	0.005
Hexachlorobenzene	118-74-1	0.13	mg/L	<0.005	U	0.0000058	0.005	<0.005	U	0.0000058	0.005	<0.005	U	0.0000058	0.005
Hexachlorobutadiene	87-68-3	0.5	mg/L	<0.005	U	0.000062	0.005	<0.005	U	0.000062	0.005	<0.005	U	0.000062	0.005
Hexachloroethane	67-72-1	3	mg/L	<0.005	U	0.000019	0.005	<0.005	U	0.000019	0.005	<0.005	U	0.000019	0.005
Methoxychlor	72-43-5	10	mg/L	<0.005	U	0.000036	0.005	<0.005	U	0.000036	0.005	<0.005	U	0.000036	0.005
Nitrobenzene	98-95-3	2	mg/L	<0.005	U	0.000013	0.005	<0.005	U	0.000013	0.005	<0.005	U	0.000013	0.005
Pentachlorophenol	87-86-5	100	mg/L	<0.005	U	0.000094	0.005	<0.005	U	0.000094	0.005	<0.005	U	0.000094	0.005
Pyridine	110-86-1	1	mg/L	<0.05	U	0.00019	0.05	<0.05	U	0.00019	0.05	<0.05	U	0.00019	0.05
Toxaphene	8001-35-2	0.5	mg/L	<0.5	U	0.00015	0.5	<0.5	U	0.00015	0.5	<0.5	U	0.00015	0.5
pH															
pH	--	<2 or >12	S.U.	7.5		0.1	0.1	7.5		0.1	0.1	7.9		0.1	0.1

Notes:

CAS = Chemical Abstracts Service
mg/L = Milligram Per Liter
S.U. = Standard Units
TCLP = Toxicity Characteristic Leaching Procedure
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound

MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested

Data Qualifiers:
J = Analyte present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.

= Concentration Above TCLP Regulatory Level (40 CFR Part 261)

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SECTION - F

TCLP METALS
(ICP)

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Individual sample results relate only to the sample tested.

SAMPLE ID SUMMARY

USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-43

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35COMP	0711393-01
37COMP	0711394-01
38COMP	0711394-03
35-37-38 IDM	0711446-01

00197

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35COMP

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 11/14/07 11:35
Solids: 0.00
Laboratory ID: 0711393-01

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3010A TCLP Digestion
Prepared: 11/21/07 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0714192

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, TCLP	0.20	mg/L	1	0.20	0.056	U	11/27/07 14:00
7440-39-3	Barium, TCLP	0.23	mg/L	1	0.35	0.0010	J	11/27/07 13:59
7440-43-9	Cadmium, TCLP	0.020	mg/L	1	0.020	0.0045	U	11/27/07 14:00
7440-47-3	Chromium, TCLP	0.050	mg/L	1	0.050	0.0034	U	11/27/07 14:00
7439-92-1	Lead, TCLP	0.10	mg/L	1	0.10	0.030	U	11/27/07 14:00
7782-49-2	Selenium, TCLP	0.20	mg/L	1	0.20	0.064	U	11/27/07 14:00
7440-22-4	Silver, TCLP	0.0034	mg/L	1	0.010	0.0029	J	11/27/07 14:00

00198

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37COMP

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 11/15/07 10:20
Solids: 0.00
Laboratory ID: 0711394-01

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3010A TCLP Digestion
Prepared: 11/21/07 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0714192

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, TCLP	0.20	mg/L	1	0.20	0.056	U	11/27/07 14:05
7440-39-3	Barium, TCLP	0.19	mg/L	1	0.35	0.0010	J	11/27/07 14:04
7440-43-9	Cadmium, TCLP	0.020	mg/L	1	0.020	0.0045	U	11/27/07 14:05
7440-47-3	Chromium, TCLP	0.050	mg/L	1	0.050	0.0034	U	11/27/07 14:05
7439-92-1	Lead, TCLP	0.10	mg/L	1	0.10	0.030	U	11/27/07 14:05
7782-49-2	Selenium, TCLP	0.20	mg/L	1	0.20	0.064	U	11/27/07 14:05
7440-22-4	Silver, TCLP	0.0031	mg/L	1	0.010	0.0029	J	11/27/07 14:05

00199

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38COMP

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 11/15/07 14:10
Solids: 0.00
Laboratory ID: 0711394-03

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3010A TCLP Digestion
Prepared: 11/21/07 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0714192

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, TCLP	0.20	mg/L	1	0.20	0.056	U	11/27/07 14:10
7440-39-3	Barium, TCLP	0.43	mg/L	1	0.35	0.0010		11/27/07 14:09
7440-43-9	Cadmium, TCLP	0.020	mg/L	1	0.020	0.0045	U	11/27/07 14:10
7440-47-3	Chromium, TCLP	0.0046	mg/L	1	0.050	0.0034	J	11/27/07 14:10
7439-92-1	Lead, TCLP	0.10	mg/L	1	0.10	0.030	U	11/27/07 14:10
7782-49-2	Selenium, TCLP	0.20	mg/L	1	0.20	0.064	U	11/27/07 14:10
7440-22-4	Silver, TCLP	0.010	mg/L	1	0.010	0.0029	U	11/27/07 14:10

00206

SECTION - F

TCLP METALS
(CVAA MERCURY)

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SAMPLE ID SUMMARY
USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-43
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35COMP	0711393-01
37COMP	0711394-01
38COMP	0711394-03
35-37-38 IDM	0711446-01

00234

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

35COMP

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 11/14/07 11:35
Solids: 0.00
Laboratory ID: 0711393-01

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7470A TCLP Digestion
Prepared: 11/20/07 17:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0714187

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, TCLP	0.00020	mg/L	1	0.00020	0.000046	U	11/21/07 10:36

00235

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

37COMP

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 11/15/07 10:20
Solids: 0.00
Laboratory ID: 0711394-01

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7470A TCLP Digestion
Prepared: 11/20/07 17:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0714187

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, TCLP	0.00020	mg/L	1	0.00020	0.000046	U	11/21/07 10:41

00235

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

38COMP

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: TCLP
Sampled: 11/15/07 14:10
Solids: 0.00
Laboratory ID: 0711394-03

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7470A TCLP Digestion
Prepared: 11/20/07 17:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0714187

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, TCLP	0.00020	mg/L	1	0.00020	0.000046	U	11/21/07 10:46

00237

SECTION - B

GC/MS TCLP/ZHE
VOLATILE ORGANICS

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Individual sample results relate only to the sample tested.

SAMPLE ID SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-43

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35COMP	0711393-01
37COMP	0711394-01
38COMP	0711394-03
35-37-38 IDM	0711446-01

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35COMP

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711393-01 File ID: 39301.D

Sampled: 11/14/07 11:35 Prepared: 11/28/07 08:00 Analyzed: 11/28/07 15:10

Solids: Preparation: 5030B MS TCLP Initial/Final: 5 g / 5 mL

QC Batch: 0714562 Sequence: 7112914 Calibration: 7K29004 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
71-43-2	Benzene, TCLP	100	0.10	0.10	0.012	U
56-23-5	Carbon Tetrachloride, TCLP	100	0.10	0.10	0.015	U
108-90-7	Chlorobenzene, TCLP	100	0.10	0.10	0.012	U
67-66-3	Chloroform, TCLP	100	0.10	0.10	0.0061	U
107-06-2	1,2-Dichloroethane, TCLP	100	0.10	0.10	0.015	U
75-35-4	1,1-Dichloroethene, TCLP	100	0.10	0.10	0.014	U
78-93-3	2-Butanone (MEK), TCLP	100	5.0	5.0	0.033	U
127-18-4	Tetrachloroethene, TCLP	100	0.10	0.10	0.015	U
79-01-6	Trichloroethene, TCLP	100	0.10	0.10	0.017	U
75-01-4	Vinyl Chloride, TCLP	100	0.10	0.10	0.017	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane, TCLP	40.0	40.3	101	79 - 124	
1,2-Dichloroethane-d4, TCLP	40.0	42.1	105	75 - 128	
Toluene-d8, TCLP	40.0	40.6	102	87 - 113	
4-Bromofluorobenzene, TCLP	40.0	37.2	93	70 - 121	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene, TCLP	349958	5.15	388344	5.15	
Chlorobenzene-d5, TCLP	332096	8.08	359244	8.08	
1,4-Dichlorobenzene-d4, TCLP	175785	10.38	212482	10.38	

* Values outside of QC limits

00047

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

37COMP

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711394-01 File ID: 39401.D

Sampled: 11/15/07 10:20 Prepared: 11/28/07 08:00 Analyzed: 11/28/07 15:47

Solids: Preparation: 5030B MS TCLP Initial/Final: 5 g / 5 mL

QC Batch: 0714562 Sequence: 7112914 Calibration: 7K29004 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
71-43-2	Benzene, TCLP	100	0.10	0.10	0.012	U
56-23-5	Carbon Tetrachloride, TCLP	100	0.10	0.10	0.015	U
108-90-7	Chlorobenzene, TCLP	100	0.10	0.10	0.012	U
67-66-3	Chloroform, TCLP	100	0.10	0.10	0.0061	U
107-06-2	1,2-Dichloroethane, TCLP	100	0.10	0.10	0.015	U
75-35-4	1,1-Dichloroethene, TCLP	100	0.10	0.10	0.014	U
78-93-3	2-Butanone (MEK), TCLP	100	5.0	5.0	0.033	U
127-18-4	Tetrachloroethene, TCLP	100	0.10	0.10	0.015	U
79-01-6	Trichloroethene, TCLP	100	0.10	0.10	0.017	U
75-01-4	Vinyl Chloride, TCLP	100	0.10	0.10	0.017	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane, TCLP	40.0	39.6	99	79 - 124	
1,2-Dichloroethane-d4, TCLP	40.0	41.2	103	75 - 128	
Toluene-d8, TCLP	40.0	40.4	101	87 - 113	
4-Bromofluorobenzene, TCLP	40.0	38.2	95	70 - 121	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene, TCLP	358830	5.15	388344	5.15	
Chlorobenzene-d5, TCLP	329883	8.08	359244	8.08	
1,4-Dichlorobenzene-d4, TCLP	180258	10.38	212482	10.38	

* Values outside of QC limits

00048

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

38COMP

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711394-03 File ID: 39403.D

Sampled: 11/15/07 14:10 Prepared: 11/28/07 08:00 Analyzed: 11/28/07 16:24

Solids: Preparation: 5030B MS TCLP Initial/Final: 5 g / 5 mL

QC Batch: 0714562 Sequence: 7112914 Calibration: 7K29004 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
71-43-2	Benzene, TCLP	100	0.10	0.10	0.012	U
56-23-5	Carbon Tetrachloride, TCLP	100	0.10	0.10	0.015	U
108-90-7	Chlorobenzene, TCLP	100	0.10	0.10	0.012	U
67-66-3	Chloroform, TCLP	100	0.10	0.10	0.0061	U
107-06-2	1,2-Dichloroethane, TCLP	100	0.10	0.10	0.015	U
75-35-4	1,1-Dichloroethene, TCLP	100	0.10	0.10	0.014	U
78-93-3	2-Butanone (MEK), TCLP	100	5.0	5.0	0.033	U
127-18-4	Tetrachloroethene, TCLP	100	0.10	0.10	0.015	U
79-01-6	Trichloroethene, TCLP	100	0.10	0.10	0.017	U
75-01-4	Vinyl Chloride, TCLP	100	0.10	0.10	0.017	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane, TCLP	40.0	40.1	100	79 - 124	
1,2-Dichloroethane-d4, TCLP	40.0	42.2	105	75 - 128	
Toluene-d8, TCLP	40.0	41.0	103	87 - 113	
4-Bromofluorobenzene, TCLP	40.0	38.2	96	70 - 121	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene, TCLP	367168	5.15	388344	5.15	
Chlorobenzene-d5, TCLP	348473	8.08	359244	8.08	
1,4-Dichlorobenzene-d4, TCLP	186958	10.38	212482	10.38	

* Values outside of QC limits

00049

SECTION - C

GC/MS TCLP SEMIVOLATILE ORGANICS

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Individual sample results relate only to the sample tested.

SAMPLE ID SUMMARY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-43
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35COMP	0711393-01
37COMP	0711394-01
38COMP	0711394-03
35-37-38 IDM	0711446-01

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35COMP

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711393-01 File ID: 711393P1.D

Sampled: 11/14/07 11:35 Prepared: 11/21/07 13:32 Analyzed: 12/03/07 18:16

Solids: Preparation: 3510C TCLP Liquid-Liqu Initial/Final: 500 mL / 5 mL

QC Batch: 0713983 Sequence: 7120734 Calibration: 7L05011 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
106-46-7	1,4-Dichlorobenzene, TCLP	1	0.0050	0.0050	0.0000074	U
121-14-2	2,4-Dinitrotoluene, TCLP	1	0.0050	0.0050	0.00011	U
118-74-1	Hexachlorobenzene, TCLP	1	0.0050	0.0050	0.0000058	U
87-68-3	Hexachlorobutadiene, TCLP	1	0.0050	0.0050	0.000062	U
67-72-1	Hexachloroethane, TCLP	1	0.0050	0.0050	0.000019	U
98-95-3	Nitrobenzene, TCLP	1	0.0050	0.0050	0.000013	U
110-86-1	Pyridine, TCLP	1	0.050	0.050	0.00019	U
87-86-5	Pentachlorophenol, TCLP	1	0.0050	0.0050	0.000094	U
88-06-2	2,4,6-Trichlorophenol, TCLP	1	0.0050	0.0050	0.000013	U
95-95-4	2,4,5-Trichlorophenol, TCLP	1	0.0050	0.0050	0.000054	U
95-48-7	2-Methylphenol, TCLP	1	0.0050	0.0050	0.000072	U
108-39-4	3-Methylphenol, TCLP	1	0.0050	0.0050	0.0000078	U
106-44-5	4-Methylphenol, TCLP	1	0.0050	0.0050	0.0000078	U
58-89-9	gamma-BHC (Lindane), TCLP	1	0.0050	0.0050	0.000028	U
72-20-8	Endrin, TCLP	1	0.0050	0.0050	0.00014	U
72-43-5	Methoxychlor, TCLP	1	0.0050	0.0050	0.000036	U
57-74-9	Technical Chlordane, TCLP	1	0.0050	0.0050	0.000062	U
76-44-8	Heptachlor, TCLP	1	0.0050	0.0050	0.000045	U
1024-57-3	Heptachlor Epoxide, TCLP	1	0.0050	0.0050	0.000038	U
8001-35-2	Toxaphene, TCLP	1	0.50	0.50	0.00015	U

System Monitoring Compound	ADDED (mg/L)	CONC (mg/L)	% REC.	QC Limits	Q
2-Fluorophenol, TCLP	0.200	0.105	53	30 - 120	
Phenol-d6, TCLP	0.200	0.0914	46	20 - 109	
Nitrobenzene-d5, TCLP	0.101	0.104	103	20 - 140	
2-Fluorobiphenyl, TCLP	0.100	0.104	104	35 - 130	
2,4,6-Tribromophenol, TCLP	0.201	0.164	81	23 - 120	
o-Terphenyl, TCLP	0.101	0.113	111	34 - 130	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4, TCLP	544426	7.79	250557	7.79	*
Naphthalene-d8, TCLP	1689908	10.53	940430	10.53	
Acenaphthene-d10, TCLP	924373	14.66	489602	14.66	
Phenanthrene-d10, TCLP	1235990	18.06	666894	18.06	
Chrysene-d12, TCLP	1005412	21.63	512273	21.64	
Perylene-d12, TCLP	802994	23.38	350042	23.38	*

* Values outside of QC limits

00077

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35COMP

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711393-01 File ID: 711393H1.D

Sampled: 11/14/07 11:35 Prepared: 11/26/07 06:51 Analyzed: 12/03/07 21:43

Solids: Preparation: 8151A Extraction Initial/Final: 500 g / 5 mL

QC Batch: 0714302 Sequence: 7120555 Calibration: 7L05009 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
94-75-7	2,4-D, TCLP	1	0.10	0.10	0.0041	U
93-72-1	2,4,5-TP (Silvex), TCLP	1	0.10	0.10	0.0038	U

System Monitoring Compound	ADDED (mg/L)	CONC (mg/L)	% REC.	QC Limits	Q
2,4,5-T, TCLP	0.200	0.122	61	50 - 150	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Phenanthrene-d10, TCLP	7280206	18.06	6566028	18.06	

* Values outside of QC limits

00078

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

37COMP

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711394-01 File ID: 711394P1.D

Sampled: 11/15/07 10:20 Prepared: 11/21/07 13:32 Analyzed: 12/03/07 18:50

Solids: Preparation: 3510C TCLP Liquid-Liqu Initial/Final: 500 mL / 5 mL

QC Batch: 0713983 Sequence: 7120734 Calibration: 7L05011 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
106-46-7	1,4-Dichlorobenzene, TCLP	1	0.0050	0.0050	0.0000074	U
121-14-2	2,4-Dinitrotoluene, TCLP	1	0.0050	0.0050	0.00011	U
118-74-1	Hexachlorobenzene, TCLP	1	0.0050	0.0050	0.0000058	U
87-68-3	Hexachlorobutadiene, TCLP	1	0.0050	0.0050	0.000062	U
67-72-1	Hexachloroethane, TCLP	1	0.0050	0.0050	0.000019	U
98-95-3	Nitrobenzene, TCLP	1	0.0050	0.0050	0.000013	U
110-86-1	Pyridine, TCLP	1	0.050	0.050	0.00019	U
87-86-5	Pentachlorophenol, TCLP	1	0.0050	0.0050	0.000094	U
88-06-2	2,4,6-Trichlorophenol, TCLP	1	0.0050	0.0050	0.000013	U
95-95-4	2,4,5-Trichlorophenol, TCLP	1	0.0050	0.0050	0.000054	U
95-48-7	2-Methylphenol, TCLP	1	0.0050	0.0050	0.000072	U
108-39-4	3-Methylphenol, TCLP	1	0.0050	0.0050	0.0000078	U
106-44-5	4-Methylphenol, TCLP	1	0.0050	0.0050	0.0000078	U
58-89-9	gamma-BHC (Lindane), TCLP	1	0.0050	0.0050	0.000028	U
72-20-8	Endrin, TCLP	1	0.0050	0.0050	0.00014	U
72-43-5	Methoxychlor, TCLP	1	0.0050	0.0050	0.000036	U
57-74-9	Technical Chlordane, TCLP	1	0.0050	0.0050	0.000062	U
76-44-8	Heptachlor, TCLP	1	0.0050	0.0050	0.000045	U
1024-57-3	Heptachlor Epoxide, TCLP	1	0.0050	0.0050	0.000038	U
8001-35-2	Toxaphene, TCLP	1	0.50	0.50	0.00015	U

System Monitoring Compound	ADDED (mg/L)	CONC (mg/L)	% REC.	QC Limits	Q
2-Fluorophenol, TCLP	0.200	0.116	58	30 - 120	
Phenol-d6, TCLP	0.200	0.0966	48	20 - 109	
Nitrobenzene-d5, TCLP	0.101	0.102	101	20 - 140	
2-Fluorobiphenyl, TCLP	0.100	0.107	107	35 - 130	
2,4,6-Tribromophenol, TCLP	0.201	0.184	91	23 - 120	
o-Terphenyl, TCLP	0.101	0.112	111	34 - 130	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4, TCLP	529437	7.79	250557	7.79	*
Naphthalene-d8, TCLP	1632848	10.53	940430	10.53	
Acenaphthene-d10, TCLP	892387	14.66	489602	14.66	
Phenanthrene-d10, TCLP	1256775	18.06	666894	18.06	
Chrysene-d12, TCLP	1050538	21.64	512273	21.64	*
Perylene-d12, TCLP	846639	23.38	350042	23.38	*

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

37COMP

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711394-01 File ID: 711394H1.D

Sampled: 11/15/07 10:20 Prepared: 11/26/07 06:51 Analyzed: 12/03/07 22:18

Solids: Preparation: 8151A Extraction Initial/Final: 500 g / 5 mL

QC Batch: 0714302 Sequence: 7120555 Calibration: 7L05009 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
94-75-7	2,4-D, TCLP	1	0.10	0.10	0.0041	U
93-72-1	2,4,5-TP (Silvex), TCLP	1	0.10	0.10	0.0038	U

System Monitoring Compound	ADDED (mg/L)	CONC (mg/L)	% REC.	QC Limits	Q
2,4,5-T, TCLP	0.200	0.122	61	50 - 150	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Phenanthrene-d10, TCLP	7572419	18.06	6566028	18.06	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

38COMP

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711394-03 File ID: 711394P3.D

Sampled: 11/15/07 14:10 Prepared: 11/21/07 13:32 Analyzed: 12/03/07 19:25

Solids: Preparation: 3510C TCLP Liquid-Liqu Initial/Final: 500 mL / 5 mL

QC Batch: 0713983 Sequence: 7120734 Calibration: 7L05011 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
106-46-7	1,4-Dichlorobenzene, TCLP	1	0.0050	0.0050	0.0000074	U
121-14-2	2,4-Dinitrotoluene, TCLP	1	0.0050	0.0050	0.00011	U
118-74-1	Hexachlorobenzene, TCLP	1	0.0050	0.0050	0.0000058	U
87-68-3	Hexachlorobutadiene, TCLP	1	0.0050	0.0050	0.000062	U
67-72-1	Hexachloroethane, TCLP	1	0.0050	0.0050	0.000019	U
98-95-3	Nitrobenzene, TCLP	1	0.0050	0.0050	0.000013	U
110-86-1	Pyridine, TCLP	1	0.050	0.050	0.00019	U
87-86-5	Pentachlorophenol, TCLP	1	0.0050	0.0050	0.000094	U
88-06-2	2,4,6-Trichlorophenol, TCLP	1	0.0050	0.0050	0.000013	U
95-95-4	2,4,5-Trichlorophenol, TCLP	1	0.0050	0.0050	0.000054	U
95-48-7	2-Methylphenol, TCLP	1	0.0050	0.0050	0.000072	U
108-39-4	3-Methylphenol, TCLP	1	0.0050	0.0050	0.0000078	U
106-44-5	4-Methylphenol, TCLP	1	0.0050	0.0050	0.0000078	U
58-89-9	gamma-BHC (Lindane), TCLP	1	0.0050	0.0050	0.000028	U
72-20-8	Endrin, TCLP	1	0.0050	0.0050	0.00014	U
72-43-5	Methoxychlor, TCLP	1	0.0050	0.0050	0.000036	U
57-74-9	Technical Chlordane, TCLP	1	0.0050	0.0050	0.000062	U
76-44-8	Heptachlor, TCLP	1	0.0050	0.0050	0.000045	U
1024-57-3	Heptachlor Epoxide, TCLP	1	0.0050	0.0050	0.000038	U
8001-35-2	Toxaphene, TCLP	1	0.50	0.50	0.00015	U

System Monitoring Compound	ADDED (mg/L)	CONC (mg/L)	% REC.	QC Limits	Q
2-Fluorophenol, TCLP	0.200	0.142	71	30 - 120	
Phenol-d6, TCLP	0.200	0.114	57	20 - 109	
Nitrobenzene-d5, TCLP	0.101	0.106	105	20 - 140	
2-Fluorobiphenyl, TCLP	0.100	0.0984	98	35 - 130	
2,4,6-Tribromophenol, TCLP	0.201	0.218	108	23 - 120	
o-Terphenyl, TCLP	0.101	0.114	112	34 - 130	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4, TCLP	530571	7.79	250557	7.79	*
Naphthalene-d8, TCLP	1647757	10.53	940430	10.53	
Acenaphthene-d10, TCLP	897831	14.66	489602	14.66	
Phenanthrene-d10, TCLP	1233849	18.06	666894	18.06	
Chrysene-d12, TCLP	1021989	21.64	512273	21.64	
Perylene-d12, TCLP	850940	23.38	350042	23.38	*

* Values outside of QC limits

00081

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

38COMP

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-43 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: TCLP Laboratory ID: 0711394-03 File ID: 711394H3.D

Sampled: 11/15/07 14:10 Prepared: 11/26/07 06:51 Analyzed: 12/03/07 22:53

Solids: Preparation: 8151A Extraction Initial/Final: 500 g / 5 mL

QC Batch: 0714302 Sequence: 7120555 Calibration: 7L05009 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (mg/L)	MRL	MDL	Q
94-75-7	2,4-D, TCLP	1	0.10	0.10	0.0041	U
93-72-1	2,4,5-TP (Silvex), TCLP	1	0.10	0.10	0.0038	U

System Monitoring Compound	ADDED (mg/L)	CONC (mg/L)	% REC.	QC Limits	Q
2,4,5-T, TCLP	0.200	0.126	63	50 - 150	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Phenanthrene-d10, TCLP	7919705	18.06	6566028	18.06	

* Values outside of QC limits

00082

SECTION - G

WET CHEMISTRY
(pH)

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Individual sample results relate only to the sample tested.

SAMPLE ID SUMMARY

USEPA-9040B

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-43

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35COMP	0711393-02
37COMP	0711394-02
38COMP	0711394-04
35-37-38 IDM	0711446-03

00260

INORGANIC ANALYSIS DATA SHEET
USEPA-9040B

35COMP

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:35
Solids: 0.00
Laboratory ID: 0711393-02

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: Method-Specific Prepara
Prepared: 11/20/07 09:25
Initial/Final: 20 g / 20 mL
QC Batch: 0714162

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	pH	7.5	pH Units	1	0.1	0.1		11/20/07 13:00

00261

INORGANIC ANALYSIS DATA SHEET
USEPA-9040B

37COMP

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:20
Solids: 0.00
Laboratory ID: 0711394-02

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: Method-Specific Prepara
Prepared: 11/20/07 09:25
Initial/Final: 20 g / 20 mL
QC Batch: 0714162

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	pH	7.5	pH Units	1	0.1	0.1		11/20/07 13:00

00262

INORGANIC ANALYSIS DATA SHEET
USEPA-9040B

38COMP

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:10
Solids: 0.00
Laboratory ID: 0711394-04

SDG: 36440-43
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: Method-Specific Prepara
Prepared: 11/20/07 09:25
Initial/Final: 20 g / 20 mL
QC Batch: 0714162

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
	pH	7.9	pH Units	1	0.1	0.1		11/20/07 13:00

00263

APPENDIX D

STATISTICAL CALCULATIONS

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APPENDIX D.1

SWMU 35 STATISTICAL CALCULATIONS

Table D.1-1a	EPC Calculation Results - SWMU 35 Surface Soil - ProUCL 4.0 for Full Data Sets
Table D.1-1b	EPC Calculation Results - SWMU 35 Surface Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.1-1c	EPC Calculation Results - SWMU 35 Total Soil - ProUCL 4.0 for Full Data Sets
Table D.1-1d	EPC Calculation Results - SWMU 35 Total Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.1-2a	ProUCL 4.0 - Summary of Background vs. Site Means Comparison - SWMU 35 Surface Soil
Table D.1-2b	ProUCL 4.0 - Summary of Background vs. Site Means Comparison - SWMU 35 Total Soil
Table D.1-2c	Background Data Goodness of Fit - Surface Soil - ProUCL 4.0 for Full Data Sets
Table D.1-2d	Background Goodness of Fit - Surface Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.1-2e	Background Data Goodness of Fit - Total Soil - ProUCL 4.0 for Full Data Sets
Table D.1-2f	Background Goodness of Fit - Total Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.1-2g	Goodness of Fit - Surface Soil - ProUCL 4.0 for Full Data Sets
Table D.1-2h	Goodness of Fit - Surface Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.1-2i	Goodness of Fit - Total Soil - ProUCL 4.0 for Full Data Sets
Table D.1-2j	Goodness of Fit - Total Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.1-2k	Background Versus Site Means Comparison - Surface Soil - ProUCL 4.0
Table D.1-2l	Background Versus Site Means Comparison - Total Soil - ProUCL 4.0

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Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Full Data Sets

User Selected Options

From File	P:\09604-318 RFAAP SWMU 35 CaSO4 Lagoons\02_Deliverables\RFI Report\Draft to USACE - X 2008\Appendices\A
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	7

Raw Statistics		**Log-transformed Statistics**	
Minimum	17000	Minimum of Log Data	9.741
Maximum	25000	Maximum of Log Data	10.13
Mean	21500	Mean of log Data	9.969
Median	22000	SD of log Data	0.126
SD	2635		
Coefficient of Variation	0.123		
Skewness	-0.364		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.942	Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	23028	95% H-UCL	23231
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	25244
95% Adjusted-CLT UCL	22768	97.5% Chebyshev (MVUE) UCL	26862
95% Modified-t UCL	23012	99% Chebyshev (MVUE) UCL	30042

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	50.08	Data appear Normal at 5% Significance Level	
Theta Star	429.3		
nu star	1002		
Approximate Chi Square Value (.05)	929.2	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	22871
Adjusted Chi Square Value	917	95% Jackknife UCL	23028
		95% Standard Bootstrap UCL	22784
Anderson-Darling Test Statistic	0.352	95% Bootstrap-t UCL	22897
Anderson-Darling 5% Critical Value	0.724	95% Hall's Bootstrap UCL	22731
Kolmogorov-Smirnov Test Statistic	0.193	95% Percentile Bootstrap UCL	22900
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	22600
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	25132
		97.5% Chebyshev(Mean, Sd) UCL	26704
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	29792
95% Approximate Gamma UCL	23177		
95% Adjusted Gamma UCL	23484		

Potential UCL to Use		Use 95% Student's-t UCL	23028

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	9
Raw Statistics		**Log-transformed Statistics**	
Minimum	1.5	Minimum of Log Data	0.405
Maximum	10	Maximum of Log Data	2.303
Mean	5.03	Mean of log Data	1.416
Median	3.6	SD of log Data	0.677
SD	3.24		
Coefficient of Variation	0.644		
Skewness	0.609		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.862	Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	6.908	95% H-UCL	9.089
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9.889
95% Adjusted-CLT UCL	6.926	97.5% Chebyshev (MVUE) UCL	11.99
95% Modified-t UCL	6.941	99% Chebyshev (MVUE) UCL	16.1
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.932	Data appear Normal at 5% Significance Level	
Theta Star	2.603		
nu star	38.65		
Approximate Chi Square Value (.05)	25.41	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	6.715
Adjusted Chi Square Value	23.56	95% Jackknife UCL	6.908
		95% Standard Bootstrap UCL	6.624
Anderson-Darling Test Statistic	0.467	95% Bootstrap-t UCL	7.362
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	6.602
Kolmogorov-Smirnov Test Statistic	0.22	95% Percentile Bootstrap UCL	6.7
Kolmogorov-Smirnov 5% Critical Value	0.269	95% BCA Bootstrap UCL	6.83
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.497
		97.5% Chebyshev(Mean, Sd) UCL	11.43
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.23
95% Approximate Gamma UCL	7.651		
95% Adjusted Gamma UCL	8.252		
Potential UCL to Use		Use 95% Student's-t UCL	6.908

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	8
Raw Statistics		**Log-transformed Statistics**	
Minimum	82	Minimum of Log Data	4.407
Maximum	180	Maximum of Log Data	5.193
Mean	129	Mean of log Data	4.833
Median	130	SD of log Data	0.246
SD	30.94		
Coefficient of Variation	0.24		
Skewness	0.213		

Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.96	Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	146.9	95% H-UCL	151.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	173
95% Adjusted-CLT UCL	145.8	97.5% Chebyshev (MVUE) UCL	192.1
95% Modified-t UCL	147	99% Chebyshev (MVUE) UCL	229.4
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	13.31	Data appear Normal at 5% Significance Level	
Theta Star	9.694		
nu star	266.1		
Approximate Chi Square Value (.05)	229.4	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	145.1
Adjusted Chi Square Value	223.4	95% Jackknife UCL	146.9
		95% Standard Bootstrap UCL	143.9
Anderson-Darling Test Statistic	0.247	95% Bootstrap-t UCL	148.8
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	149.1
Kolmogorov-Smirnov Test Statistic	0.144	95% Percentile Bootstrap UCL	144
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	144.6
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	171.7
		97.5% Chebyshev(Mean, Sd) UCL	190.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	226.4
95% Approximate Gamma UCL	149.7		
95% Adjusted Gamma UCL	153.7		

Potential UCL to Use		Use 95% Student's-t UCL	146.9

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.59	Minimum of Log Data	-0.528
Maximum	1.1	Maximum of Log Data	0.0953
Mean	0.851	Mean of log Data	-0.179
Median	0.805	SD of log Data	0.201
SD	0.169		
Coefficient of Variation	0.199		
Skewness	0.252		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.944	Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.949	95% H-UCL	0.967
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.087
95% Adjusted-CLT UCL	0.944	97.5% Chebyshev (MVUE) UCL	1.19
95% Modified-t UCL	0.95	99% Chebyshev (MVUE) UCL	1.391

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	19.64	Data appear Normal at 5% Significance Level	
Theta Star	0.0433		
nu star	392.9		
Approximate Chi Square Value (.05)	347.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.939
Adjusted Chi Square Value	340.6	95% Jackknife UCL	0.949
		95% Standard Bootstrap UCL	0.934
Anderson-Darling Test Statistic	0.264	95% Bootstrap-t UCL	0.954
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	0.953
Kolmogorov-Smirnov Test Statistic	0.178	95% Percentile Bootstrap UCL	0.939
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	0.942
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.084
		97.5% Chebyshev(Mean, Sd) UCL	1.185
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.384
95% Approximate Gamma UCL	0.961		
95% Adjusted Gamma UCL	0.982		

Potential UCL to Use		Use 95% Student's-t UCL	0.949

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	1.2	Minimum of Log Data	0.182
Maximum	2.2	Maximum of Log Data	0.788
Mean	1.625	Mean of log Data	0.468
Median	1.6	SD of log Data	0.195
SD	0.321		
Coefficient of Variation	0.197		
Skewness	0.483		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.955	Shapiro Wilk Test Statistic	0.968
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.811	95% H-UCL	1.839
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.063
95% Adjusted-CLT UCL	1.808	97.5% Chebyshev (MVUE) UCL	2.253
95% Modified-t UCL	1.814	99% Chebyshev (MVUE) UCL	2.625

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	20.49	Data appear Normal at 5% Significance Level	
Theta Star	0.0793		
nu star	409.8		
Approximate Chi Square Value (.05)	363.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	1.792
Adjusted Chi Square Value	356.4	95% Jackknife UCL	1.811
		95% Standard Bootstrap UCL	1.783
Anderson-Darling Test Statistic	0.232	95% Bootstrap-t UCL	1.833
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	1.829
Kolmogorov-Smirnov Test Statistic	0.165	95% Percentile Bootstrap UCL	1.785
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	1.795
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.067
		97.5% Chebyshev(Mean, Sd) UCL	2.259
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.634
95% Approximate Gamma UCL	1.83		
95% Adjusted Gamma UCL	1.869		

Potential UCL to Use		Use 95% Student's-t UCL	1.811

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	5300	Minimum of Log Data	8.575
Maximum	87000	Maximum of Log Data	11.37
Mean	26160	Mean of log Data	9.72
Median	11500	SD of log Data	0.989
SD	26932		
Coefficient of Variation	1.029		
Skewness	1.503		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.789	Shapiro Wilk Test Statistic	0.896
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	41772	95% H-UCL	75036
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	61830
95% Adjusted-CLT UCL	44493	97.5% Chebyshev (MVUE) UCL	77570
95% Modified-t UCL	42446	99% Chebyshev (MVUE) UCL	108488
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.94	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	27832		
nu star	18.8		
Approximate Chi Square Value (.05)	9.97	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	40168
Adjusted Chi Square Value	8.874	95% Jackknife UCL	41772
		95% Standard Bootstrap UCL	39508
Anderson-Darling Test Statistic	0.634	95% Bootstrap-t UCL	54307
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	48972
Kolmogorov-Smirnov Test Statistic	0.275	95% Percentile Bootstrap UCL	40220
Kolmogorov-Smirnov 5% Critical Value	0.272	95% BCA Bootstrap UCL	44630
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	63283
		97.5% Chebyshev(Mean, Sd) UCL	79346
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	110898
95% Approximate Gamma UCL	49323		
95% Adjusted Gamma UCL	55419		
Potential UCL to Use		Use 95% Approximate Gamma UCL	49323

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	23	Minimum of Log Data	3.135
Maximum	160	Maximum of Log Data	5.075
Mean	81.4	Mean of log Data	4.152
Median	60.75	SD of log Data	0.765
SD	55.8		
Coefficient of Variation	0.686		
Skewness	0.361		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.835	Shapiro Wilk Test Statistic	0.861
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	113.7	95% H-UCL	167.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	172
95% Adjusted-CLT UCL	112.6	97.5% Chebyshev (MVUE) UCL	210.8
95% Modified-t UCL	114.1	99% Chebyshev (MVUE) UCL	287.1
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.587	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	51.28		
nu star	31.75		
Approximate Chi Square Value (.05)	19.87	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	110.4
Adjusted Chi Square Value	18.25	95% Jackknife UCL	113.7
		95% Standard Bootstrap UCL	109.2
Anderson-Darling Test Statistic	0.722	95% Bootstrap-t UCL	115.5
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	104.3
Kolmogorov-Smirnov Test Statistic	0.266	95% Percentile Bootstrap UCL	110
Kolmogorov-Smirnov 5% Critical Value	0.27	95% BCA Bootstrap UCL	110.8
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	158.3
		97.5% Chebyshev(Mean, Sd) UCL	191.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	257
95% Approximate Gamma UCL	130		
95% Adjusted Gamma UCL	141.6		
Potential UCL to Use		Use 95% Approximate Gamma UCL	130

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	5.1	Minimum of Log Data	1.629
Maximum	11.5	Maximum of Log Data	2.442
Mean	8.96	Mean of log Data	2.167
Median	9.5	SD of log Data	0.252
SD	1.984		
Coefficient of Variation	0.221		
Skewness	-0.879		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.931	Shapiro Wilk Test Statistic	0.877
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	10.11	95% H-UCL	10.59
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	12.11
95% Adjusted-CLT UCL	9.806	97.5% Chebyshev (MVUE) UCL	13.47
95% Modified-t UCL	10.08	99% Chebyshev (MVUE) UCL	16.13
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	13.6	Data appear Normal at 5% Significance Level	
Theta Star	0.659		
nu star	272		
Approximate Chi Square Value (.05)	234.8	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	9.992
Adjusted Chi Square Value	228.8	95% Jackknife UCL	10.11
		95% Standard Bootstrap UCL	9.916
Anderson-Darling Test Statistic	0.513	95% Bootstrap-t UCL	9.903
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	9.845
Kolmogorov-Smirnov Test Statistic	0.219	95% Percentile Bootstrap UCL	9.9
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	9.82
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.69
		97.5% Chebyshev(Mean, Sd) UCL	12.88
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	15.2
95% Approximate Gamma UCL	10.38		
95% Adjusted Gamma UCL	10.65		
Potential UCL to Use		Use 95% Student's-t UCL	10.11

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	12	Minimum of Log Data	2.485
Maximum	200	Maximum of Log Data	5.298
Mean	66.9	Mean of log Data	3.813
Median	54.25	SD of log Data	0.962
SD	60.46		
Coefficient of Variation	0.904		
Skewness	1.314		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.85	Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	102	95% H-UCL	189.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	161.7
95% Adjusted-CLT UCL	106.8	97.5% Chebyshev (MVUE) UCL	202.3
95% Modified-t UCL	103.3	99% Chebyshev (MVUE) UCL	282.2
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.064	Data appear Normal at 5% Significance Level	
Theta Star	62.87		
nu star	21.28		
Approximate Chi Square Value (.05)	11.8	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	98.35
Adjusted Chi Square Value	10.59	95% Jackknife UCL	102
		95% Standard Bootstrap UCL	96.15
Anderson-Darling Test Statistic	0.375	95% Bootstrap-t UCL	123.2
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	147.6
Kolmogorov-Smirnov Test Statistic	0.205	95% Percentile Bootstrap UCL	96.85
Kolmogorov-Smirnov 5% Critical Value	0.272	95% BCA Bootstrap UCL	105.1
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	150.2
		97.5% Chebyshev(Mean, Sd) UCL	186.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	257.1
95% Approximate Gamma UCL	120.6		
95% Adjusted Gamma UCL	134.4		
Potential UCL to Use		Use 95% Student's-t UCL	102

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	6

Raw Statistics		**Log-transformed Statistics**	
Minimum	19000	Minimum of Log Data	9.852
Maximum	31000	Maximum of Log Data	10.34
Mean	25700	Mean of log Data	10.15
Median	26000	SD of log Data	0.133
SD	3268		
Coefficient of Variation	0.127		
Skewness	-0.503		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.947	Shapiro Wilk Test Statistic	0.919
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	27594	95% H-UCL	27902
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	30432
95% Adjusted-CLT UCL	27224	97.5% Chebyshev (MVUE) UCL	32476
95% Modified-t UCL	27567	99% Chebyshev (MVUE) UCL	36492

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	45.54	Data appear Normal at 5% Significance Level	
Theta Star	564.3		
nu star	910.9		
Approximate Chi Square Value (.05)	841.8	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	27400
Adjusted Chi Square Value	830.3	95% Jackknife UCL	27594
		95% Standard Bootstrap UCL	27301
Anderson-Darling Test Statistic	0.381	95% Bootstrap-t UCL	27389
Anderson-Darling 5% Critical Value	0.724	95% Hall's Bootstrap UCL	27398
Kolmogorov-Smirnov Test Statistic	0.207	95% Percentile Bootstrap UCL	27300
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	27100
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	30204
		97.5% Chebyshev(Mean, Sd) UCL	32153
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	35982
95% Approximate Gamma UCL	27808		
95% Adjusted Gamma UCL	28195		

Potential UCL to Use		Use 95% Student's-t UCL	27594

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	25	Minimum of Log Data	3.219
Maximum	750	Maximum of Log Data	6.62
Mean	233.6	Mean of log Data	4.985
Median	155	SD of log Data	1.064
SD	235		
Coefficient of Variation	1.006		
Skewness	1.491		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.822	Shapiro Wilk Test Statistic	0.982
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	369.8	95% H-UCL	811
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	605.3
95% Adjusted-CLT UCL	393.2	97.5% Chebyshev (MVUE) UCL	764.2
95% Modified-t UCL	375.6	99% Chebyshev (MVUE) UCL	1076
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.911	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	256.3		
nu star	18.23		
Approximate Chi Square Value (.05)	9.555	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	355.8
Adjusted Chi Square Value	8.485	95% Jackknife UCL	369.8
		95% Standard Bootstrap UCL	349.5
Anderson-Darling Test Statistic	0.228	95% Bootstrap-t UCL	516.6
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	1043
Kolmogorov-Smirnov Test Statistic	0.139	95% Percentile Bootstrap UCL	355.5
Kolmogorov-Smirnov 5% Critical Value	0.273	95% BCA Bootstrap UCL	385.8
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	557.5
		97.5% Chebyshev(Mean, Sd) UCL	697.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	973
95% Approximate Gamma UCL	445.5		
95% Adjusted Gamma UCL	501.7		
Potential UCL to Use		Use 95% Approximate Gamma UCL	445.5

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	3300	Minimum of Log Data	8.102
Maximum	14000	Maximum of Log Data	9.547
Mean	6550	Mean of log Data	8.693
Median	5100	SD of log Data	0.434
SD	3346		
Coefficient of Variation	0.511		
Skewness	1.638		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.779	Shapiro Wilk Test Statistic	0.886
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	8490	95% H-UCL	8917
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	10419
95% Adjusted-CLT UCL	8876	97.5% Chebyshev (MVUE) UCL	12121
95% Modified-t UCL	8581	99% Chebyshev (MVUE) UCL	15464

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.904	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	1678		
nu star	78.07		
Approximate Chi Square Value (.05)	58.72	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	8291
Adjusted Chi Square Value	55.81	95% Jackknife UCL	8490
		95% Standard Bootstrap UCL	8244
Anderson-Darling Test Statistic	0.783	95% Bootstrap-t UCL	11610
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	18693
Kolmogorov-Smirnov Test Statistic	0.246	95% Percentile Bootstrap UCL	8395
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	8785
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11163
		97.5% Chebyshev(Mean, Sd) UCL	13159
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	17079
95% Approximate Gamma UCL	8709		
95% Adjusted Gamma UCL	9163		

Potential UCL to Use		Use 95% Approximate Gamma UCL	8709

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	9
Raw Statistics		**Log-transformed Statistics**	
Minimum	260	Minimum of Log Data	5.561
Maximum	675	Maximum of Log Data	6.515
Mean	513.5	Mean of log Data	6.201
Median	550	SD of log Data	0.314
SD	139.3		
Coefficient of Variation	0.271		
Skewness	-0.75		

Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.919	Shapiro Wilk Test Statistic	0.873
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	594.2	95% H-UCL	638.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	740.7
95% Adjusted-CLT UCL	574.8	97.5% Chebyshev (MVUE) UCL	838.1
95% Modified-t UCL	592.5	99% Chebyshev (MVUE) UCL	1029
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	8.899	Data appear Normal at 5% Significance Level	
Theta Star	57.7		
nu star	178		
Approximate Chi Square Value (.05)	148.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	585.9
Adjusted Chi Square Value	143.4	95% Jackknife UCL	594.2
		95% Standard Bootstrap UCL	581
Anderson-Darling Test Statistic	0.51	95% Bootstrap-t UCL	584.3
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	575.3
Kolmogorov-Smirnov Test Statistic	0.225	95% Percentile Bootstrap UCL	581.5
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	572.5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	705.5
		97.5% Chebyshev(Mean, Sd) UCL	788.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	951.7
95% Approximate Gamma UCL	617		
95% Adjusted Gamma UCL	637.4		
Potential UCL to Use		Use 95% Student's-t UCL	594.2

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.044	Minimum of Log Data	-3.124
Maximum	0.83	Maximum of Log Data	-0.186
Mean	0.276	Mean of log Data	-1.796
Median	0.1	SD of log Data	1.052
SD	0.292		
Coefficient of Variation	1.059		
Skewness	1.148		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.76	Shapiro Wilk Test Statistic	0.878
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.445	95% H-UCL	0.889
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.675
95% Adjusted-CLT UCL	0.464	97.5% Chebyshev (MVUE) UCL	0.851
95% Modified-t UCL	0.451	99% Chebyshev (MVUE) UCL	1.197

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.851	Data appear Lognormal at 5% Significance Level	
Theta Star	0.324		
nu star	17.01		
Approximate Chi Square Value (.05)	8.682	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.428
Adjusted Chi Square Value	7.669	95% Jackknife UCL	0.445
		95% Standard Bootstrap UCL	0.42
Anderson-Darling Test Statistic	0.837	95% Bootstrap-t UCL	0.518
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.396
Kolmogorov-Smirnov Test Statistic	0.32	95% Percentile Bootstrap UCL	0.427
Kolmogorov-Smirnov 5% Critical Value	0.273	95% BCA Bootstrap UCL	0.457
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.679
		97.5% Chebyshev(Mean, Sd) UCL	0.853
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.195
95% Approximate Gamma UCL	0.541		
95% Adjusted Gamma UCL	0.612		

Potential UCL to Use		Use 95% Chebyshev (MVUE) UCL	0.675

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	12	Minimum of Log Data	2.485
Maximum	45	Maximum of Log Data	3.807
Mean	26.05	Mean of log Data	3.171
Median	24	SD of log Data	0.45
SD	11.27		
Coefficient of Variation	0.433		
Skewness	0.376		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.921	Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	32.58	95% H-UCL	36.45
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	42.55
95% Adjusted-CLT UCL	32.36	97.5% Chebyshev (MVUE) UCL	49.66
95% Modified-t UCL	32.65	99% Chebyshev (MVUE) UCL	63.64
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4.127	Data appear Normal at 5% Significance Level	
Theta Star	6.313		
nu star	82.53		
Approximate Chi Square Value (.05)	62.59	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	31.91
Adjusted Chi Square Value	59.59	95% Jackknife UCL	32.58
		95% Standard Bootstrap UCL	31.65
Anderson-Darling Test Statistic	0.38	95% Bootstrap-t UCL	33.11
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	31.58
Kolmogorov-Smirnov Test Statistic	0.193	95% Percentile Bootstrap UCL	31.5
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	32.3
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	41.59
		97.5% Chebyshev(Mean, Sd) UCL	48.31
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	61.51
95% Approximate Gamma UCL	34.35		
95% Adjusted Gamma UCL	36.08		
Potential UCL to Use		Use 95% Student's-t UCL	32.58

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	6

Raw Statistics		**Log-transformed Statistics**	
Minimum	1300	Minimum of Log Data	7.17
Maximum	1700	Maximum of Log Data	7.438
Mean	1545	Mean of log Data	7.34
Median	1600	SD of log Data	0.0786
SD	116.5		
Coefficient of Variation	0.0754		
Skewness	-1.166		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.853	Shapiro Wilk Test Statistic	0.836
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1613	95% H-UCL	N/A
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1713
95% Adjusted-CLT UCL	1591	97.5% Chebyshev (MVUE) UCL	1785
95% Modified-t UCL	1610	99% Chebyshev (MVUE) UCL	1927

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	129.6	Data appear Normal at 5% Significance Level	
Theta Star	11.92		
nu star	2593		
Approximate Chi Square Value (.05)	2475	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	1606
Adjusted Chi Square Value	2456	95% Jackknife UCL	1613
		95% Standard Bootstrap UCL	1603
Anderson-Darling Test Statistic	0.87	95% Bootstrap-t UCL	1599
Anderson-Darling 5% Critical Value	0.724	95% Hall's Bootstrap UCL	1592
Kolmogorov-Smirnov Test Statistic	0.293	95% Percentile Bootstrap UCL	1595
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	1590
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1706
		97.5% Chebyshev(Mean, Sd) UCL	1775
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1912
95% Approximate Gamma UCL	1618		
95% Adjusted Gamma UCL	1631		

Potential UCL to Use		Use 95% Student's-t UCL	1613

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Selenium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	7

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.16	Minimum of Log Data	-1.833
Maximum	0.37	Maximum of Log Data	-0.994
Mean	0.266	Mean of log Data	-1.375
Median	0.293	SD of log Data	0.337
SD	0.0834		
Coefficient of Variation	0.314		
Skewness	-0.147		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.879	Shapiro Wilk Test Statistic	0.861
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.314	95% H-UCL	0.336
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.391
95% Adjusted-CLT UCL	0.308	97.5% Chebyshev (MVUE) UCL	0.445
95% Modified-t UCL	0.314	99% Chebyshev (MVUE) UCL	0.551

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	7.348	**Data appear Normal at 5% Significance Level**	
Theta Star	0.0361		
nu star	147		
Approximate Chi Square Value (.05)	119.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.309
Adjusted Chi Square Value	115.7	95% Jackknife UCL	0.314
		95% Standard Bootstrap UCL	0.305
Anderson-Darling Test Statistic	0.615	95% Bootstrap-t UCL	0.311
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	0.302
Kolmogorov-Smirnov Test Statistic	0.231	95% Percentile Bootstrap UCL	0.305
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	0.306
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.38
		97.5% Chebyshev(Mean, Sd) UCL	0.43
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.528
95% Approximate Gamma UCL	0.325		
95% Adjusted Gamma UCL	0.337		

Potential UCL to Use		Use 95% Student's-t UCL	0.314

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.067	Minimum of Log Data	-2.703
Maximum	25	Maximum of Log Data	3.219
Mean	5.571	Mean of log Data	0.0815
Median	1.455	SD of log Data	2.197
SD	8.684		
Coefficient of Variation	1.559		
Skewness	1.698		

Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.705	Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	10.6	95% H-UCL	893.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	28.44
95% Adjusted-CLT UCL	11.66	97.5% Chebyshev (MVUE) UCL	37.71
95% Modified-t UCL	10.85	99% Chebyshev (MVUE) UCL	55.91
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.348	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	16.01		
nu star	6.96		
Approximate Chi Square Value (.05)	2.149	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	10.09
Adjusted Chi Square Value	1.715	95% Jackknife UCL	10.6
		95% Standard Bootstrap UCL	9.804
Anderson-Darling Test Statistic	0.45	95% Bootstrap-t UCL	19.57
Anderson-Darling 5% Critical Value	0.795	95% Hall's Bootstrap UCL	22.72
Kolmogorov-Smirnov Test Statistic	0.185	95% Percentile Bootstrap UCL	10.17
Kolmogorov-Smirnov 5% Critical Value	0.284	95% BCA Bootstrap UCL	11.19
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	17.54
		97.5% Chebyshev(Mean, Sd) UCL	22.72
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	32.9
95% Approximate Gamma UCL	18.04		
95% Adjusted Gamma UCL	22.6		

Potential UCL to Use			
		Use 95% Adjusted Gamma UCL	22.6

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	31	Minimum of Log Data	3.434
Maximum	85	Maximum of Log Data	4.443
Mean	61.4	Mean of log Data	4.066
Median	56.5	SD of log Data	0.348
SD	19.69		
Coefficient of Variation	0.321		
Skewness	-0.103		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.901	Shapiro Wilk Test Statistic	0.905
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	72.81	95% H-UCL	78.44
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	91.42
95% Adjusted-CLT UCL	71.42	97.5% Chebyshev (MVUE) UCL	104.3
95% Modified-t UCL	72.78	99% Chebyshev (MVUE) UCL	129.7

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	6.981	**Data appear Normal at 5% Significance Level**	
Theta Star	8.795		
nu star	139.6		
Approximate Chi Square Value (.05)	113.3	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	71.64
Adjusted Chi Square Value	109.2	95% Jackknife UCL	72.81
		95% Standard Bootstrap UCL	71.13
Anderson-Darling Test Statistic	0.446	95% Bootstrap-t UCL	72.65
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	70.52
Kolmogorov-Smirnov Test Statistic	0.224	95% Percentile Bootstrap UCL	70.55
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	70.85
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	88.54
		97.5% Chebyshev(Mean, Sd) UCL	100.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	123.3
95% Approximate Gamma UCL	75.65		
95% Adjusted Gamma UCL	78.5		

Potential UCL to Use		Use 95% Student's-t UCL	72.81

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	8

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.059	Minimum of Log Data	-2.83
Maximum	0.235	Maximum of Log Data	-1.448
Mean	0.169	Mean of log Data	-1.843
Median	0.19	SD of log Data	0.426
SD	0.0557		
Coefficient of Variation	0.329		
Skewness	-0.94		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.904	Shapiro Wilk Test Statistic	0.817
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.202	95% H-UCL	0.234
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.274
95% Adjusted-CLT UCL	0.193	97.5% Chebyshev (MVUE) UCL	0.318
95% Modified-t UCL	0.201	99% Chebyshev (MVUE) UCL	0.405

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	5.328	Data appear Normal at 5% Significance Level	
Theta Star	0.0318		
nu star	106.6		
Approximate Chi Square Value (.05)	83.74	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.198
Adjusted Chi Square Value	80.23	95% Jackknife UCL	0.202
		95% Standard Bootstrap UCL	0.197
Anderson-Darling Test Statistic	0.706	95% Bootstrap-t UCL	0.197
Anderson-Darling 5% Critical Value	0.727	95% Hall's Bootstrap UCL	0.192
Kolmogorov-Smirnov Test Statistic	0.271	95% Percentile Bootstrap UCL	0.197
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	0.194
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.246
		97.5% Chebyshev(Mean, Sd) UCL	0.279
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.345
95% Approximate Gamma UCL	0.216		
95% Adjusted Gamma UCL	0.225		

Potential UCL to Use			
		Use 95% Student's-t UCL	0.202

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	21	Minimum of Log Data	3.045
Maximum	43.5	Maximum of Log Data	3.773
Mean	34.55	Mean of log Data	3.521
Median	36.5	SD of log Data	0.227
SD	7.143		
Coefficient of Variation	0.207		
Skewness	-0.682		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.936	Shapiro Wilk Test Statistic	0.901
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	38.69	95% H-UCL	40.08
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	45.49
95% Adjusted-CLT UCL	37.74	97.5% Chebyshev (MVUE) UCL	50.2
95% Modified-t UCL	38.61	99% Chebyshev (MVUE) UCL	59.45

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	16.26	**Data appear Normal at 5% Significance Level**	
Theta Star	2.125		
nu star	325.2		
Approximate Chi Square Value (.05)	284.4	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	38.27
Adjusted Chi Square Value	277.8	95% Jackknife UCL	38.69
		95% Standard Bootstrap UCL	38.09
Anderson-Darling Test Statistic	0.416	95% Bootstrap-t UCL	38.05
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	37.72
Kolmogorov-Smirnov Test Statistic	0.203	95% Percentile Bootstrap UCL	38.1
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	37.55
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	44.4
		97.5% Chebyshev(Mean, Sd) UCL	48.66
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	57.03
95% Approximate Gamma UCL	39.5		
95% Adjusted Gamma UCL	40.45		

Potential UCL to Use		Use 95% Student's-t UCL	38.69

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	60	Minimum of Log Data	4.094
Maximum	280	Maximum of Log Data	5.635
Mean	139.5	Mean of log Data	4.843
Median	125	SD of log Data	0.458
SD	65.77		
Coefficient of Variation	0.472		
Skewness	1.11		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.921	Shapiro Wilk Test Statistic	0.99
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	177.6	95% H-UCL	195.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	228.5
95% Adjusted-CLT UCL	181.5	97.5% Chebyshev (MVUE) UCL	267.1
95% Modified-t UCL	178.8	99% Chebyshev (MVUE) UCL	342.9

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.879	Data appear Normal at 5% Significance Level	
Theta Star	35.95		
nu star	77.57		
Approximate Chi Square Value (.05)	58.28	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	173.7
Adjusted Chi Square Value	55.39	95% Jackknife UCL	177.6
		95% Standard Bootstrap UCL	171.5
Anderson-Darling Test Statistic	0.177	95% Bootstrap-t UCL	194.1
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	221.3
Kolmogorov-Smirnov Test Statistic	0.15	95% Percentile Bootstrap UCL	172
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	178
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	230.1
		97.5% Chebyshev(Mean, Sd) UCL	269.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	346.4
95% Approximate Gamma UCL	185.6		
95% Adjusted Gamma UCL	195.3		

Potential UCL to Use		Use 95% Student's-t UCL	177.6

Table D.1-1a
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Aroclor 1254 (ug/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	32	Minimum of Log Data	3.466
Maximum	1700	Maximum of Log Data	7.438
Mean	449.5	Mean of log Data	5.672
Median	325	SD of log Data	1.058
SD	474.1		
Coefficient of Variation	1.055		
Skewness	2.375		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.718	Shapiro Wilk Test Statistic	0.943
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	724.3	95% H-UCL	1587
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1193
95% Adjusted-CLT UCL	816.4	97.5% Chebyshev (MVUE) UCL	1506
95% Modified-t UCL	743.1	99% Chebyshev (MVUE) UCL	2120
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.967	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	464.7		
nu star	19.34		
Approximate Chi Square Value (.05)	10.37	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	696.1
Adjusted Chi Square Value	9.247	95% Jackknife UCL	724.3
		95% Standard Bootstrap UCL	680.8
Anderson-Darling Test Statistic	0.367	95% Bootstrap-t UCL	1032
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	1732
Kolmogorov-Smirnov Test Statistic	0.188	95% Percentile Bootstrap UCL	714.2
Kolmogorov-Smirnov 5% Critical Value	0.272	95% BCA Bootstrap UCL	775.3
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1103
		97.5% Chebyshev(Mean, Sd) UCL	1386
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1941
95% Approximate Gamma UCL	838.6		
95% Adjusted Gamma UCL	940.3		
Potential UCL to Use		Use 95% Approximate Gamma UCL	838.6

Table D.1-1b
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	P:\09604-318 RFAAP SWMU 35 CaSO4 Lagoons\02_Deliverables\RFI Report\Draft to USACE - X 2008\Appendices\A
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony (mg/kg)

General Statistics

Number of Valid Data	10	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	1
		Percent Non-Detects	10.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.0365	Minimum Detected	-3.31
Maximum Detected	1.1	Maximum Detected	0.0953
Mean of Detected	0.294	Mean of Detected	-1.684
SD of Detected	0.329	SD of Detected	1.016
Minimum Non-Detect	0.042	Minimum Non-Detect	-3.17
Maximum Non-Detect	0.042	Maximum Non-Detect	-3.17

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough tp draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.736	Shapiro Wilk Test Statistic	0.987
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.266	Mean	-1.902
SD	0.322	SD	1.18
95% DL/2 (t) UCL	0.453	95% H-Stat (DL/2) UCL	1.215
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.223	Mean in Log Scale	-1.861
SD	0.358	SD in Log Scale	1.11
95% MLE (t) UCL	0.431	Mean in Original Scale	0.267
95% MLE (Tiku) UCL	0.43	SD in Original Scale	0.321
		95% Percentile Bootstrap UCL	0.447
		95% BCA Bootstrap UCL	0.517

Table D.1-1b
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.895
Theta Star	0.328
nu star	16.11
A-D Test Statistic	0.292
5% A-D Critical Value	0.739
K-S Test Statistic	0.739
5% K-S Critical Value	0.286
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	1.1
Mean	0.264
Median	0.18
SD	0.324
k star	0.28
Theta star	0.943
Nu star	5.6
AppChi2	1.439
95% Gamma Approximate UCL	1.028
95% Adjusted Gamma UCL	1.337

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Gamma Distributed at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.268
SD	0.304
SE of Mean	0.102
95% KM (t) UCL	0.455
95% KM (z) UCL	0.436
95% KM (jackknife) UCL	0.452
95% KM (bootstrap t) UCL	0.725
95% KM (BCA) UCL	0.454
95% KM (Percentile Bootstrap) UCL	0.446
95% KM (Chebyshev) UCL	0.713
97.5% KM (Chebyshev) UCL	0.905
99% KM (Chebyshev) UCL	1.284
Potential UCLs to Use	
95% KM (Chebyshev) UCL	0.713

Table D.1-1b
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Benzo(a)anthracene (ug/kg)

General Statistics

Number of Valid Data	10	Number of Detected Data	7
Number of Distinct Detected Data	7	Number of Non-Detect Data	3
		Percent Non-Detects	30.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	3.9	Minimum Detected	1.361
Maximum Detected	100	Maximum Detected	4.605
Mean of Detected	38.12	Mean of Detected	3.2
SD of Detected	33.3	SD of Detected	1.139
Minimum Non-Detect	240	Minimum Non-Detect	5.481
Maximum Non-Detect	530	Maximum Non-Detect	6.273

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	10
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

Warning: There are only 7 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough tp draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.917	Shapiro Wilk Test Statistic	0.952
5% Shapiro Wilk Critical Value	0.803	5% Shapiro Wilk Critical Value	0.803
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	80.19	Mean	3.778
SD	81.42	SD	1.329
95% DL/2 (t) UCL	127.4	95% H-Stat (DL/2) UCL	1019

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	3.2
		SD in Log Scale	0.93
		Mean in Original Scale	34.05
		SD in Original Scale	27.97
		95% Percentile Bootstrap UCL	47.74
		95% BCA Bootstrap UCL	54.55

Table D.1-1b
EPC Calculation Results - SWMU 35 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.825
Theta Star	46.23
nu star	11.55
A-D Test Statistic	0.169
5% A-D Critical Value	0.724
K-S Test Statistic	0.724
5% K-S Critical Value	0.318
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	3.9
Maximum	100
Mean	37.54
Median	36.18
SD	27.21
k star	1.305
Theta star	28.76
Nu star	26.1
AppChi2	15.46
95% Gamma Approximate UCL	63.39
95% Adjusted Gamma UCL	69.73

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Normal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	38.12
SD	30.83
SE of Mean	12.59
95% KM (t) UCL	61.2
95% KM (z) UCL	58.83
95% KM (jackknife) UCL	61.77
95% KM (bootstrap t) UCL	75.97
95% KM (BCA) UCL	59.14
95% KM (Percentile Bootstrap) UCL	58.63
95% KM (Chebyshev) UCL	92.99
97.5% KM (Chebyshev) UCL	116.7
99% KM (Chebyshev) UCL	163.4
Potential UCLs to Use	
95% KM (t) UCL	61.2
95% KM (Percentile Bootstrap) UCL	58.63

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Full Data Sets

User Selected Options

From File	P:\09604-318 RFAAP SWMU 35 CaSO4 Lagoons\02_Deliverables\RFI Report\Draft to USACE - X 2008\Appendices\A\
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	12

Raw Statistics		**Log-transformed Statistics**	
Minimum	12000	Minimum of Log Data	9.393
Maximum	25000	Maximum of Log Data	10.13
Mean	18455	Mean of log Data	9.802
Median	18000	SD of log Data	0.21
SD	3776		
Coefficient of Variation	0.205		
Skewness	0.0891		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.962	Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	19840	95% H-UCL	20043
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	22089
95% Adjusted-CLT UCL	19795	97.5% Chebyshev (MVUE) UCL	23658
95% Modified-t UCL	19842	99% Chebyshev (MVUE) UCL	26741

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	21.12	Data appear Normal at 5% Significance Level	
Theta Star	873.8		
nu star	929.2		
Approximate Chi Square Value (.05)	859.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	19779
Adjusted Chi Square Value	854.5	95% Jackknife UCL	19840
		95% Standard Bootstrap UCL	19759
Anderson-Darling Test Statistic	0.308	95% Bootstrap-t UCL	19861
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	19813
Kolmogorov-Smirnov Test Statistic	0.119	95% Percentile Bootstrap UCL	19727
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	19636
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	21964
		97.5% Chebyshev(Mean, Sd) UCL	23482
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	26465
95% Approximate Gamma UCL	19952		
95% Adjusted Gamma UCL	20069		

Potential UCL to Use		Use 95% Student's-t UCL	19840

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	17

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.82	Minimum of Log Data	-0.198
Maximum	10	Maximum of Log Data	2.303
Mean	3.176	Mean of log Data	0.844
Median	2	SD of log Data	0.773
SD	2.842		
Coefficient of Variation	0.895		
Skewness	1.521		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.759	Shapiro Wilk Test Statistic	0.919
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	4.218	95% H-UCL	4.591
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	5.482
95% Adjusted-CLT UCL	4.382	97.5% Chebyshev (MVUE) UCL	6.521
95% Modified-t UCL	4.251	99% Chebyshev (MVUE) UCL	8.561

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.544	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	2.057		
nu star	67.93		
Approximate Chi Square Value (.05)	49.96	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	4.172
Adjusted Chi Square Value	48.81	95% Jackknife UCL	4.218
		95% Standard Bootstrap UCL	4.133
Anderson-Darling Test Statistic	1.062	95% Bootstrap-t UCL	4.621
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	4.281
Kolmogorov-Smirnov Test Statistic	0.186	95% Percentile Bootstrap UCL	4.18
Kolmogorov-Smirnov 5% Critical Value	0.188	95% BCA Bootstrap UCL	4.38
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.817
		97.5% Chebyshev(Mean, Sd) UCL	6.959
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	9.204
95% Approximate Gamma UCL	4.318		
95% Adjusted Gamma UCL	4.42		

Potential UCL to Use		Use 95% Approximate Gamma UCL	4.318

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	14

Raw Statistics		**Log-transformed Statistics**	
Minimum	60	Minimum of Log Data	4.094
Maximum	180	Maximum of Log Data	5.193
Mean	116.5	Mean of log Data	4.726
Median	120	SD of log Data	0.26
SD	28.97		
Coefficient of Variation	0.249		
Skewness	0.238		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.965	Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	127.1	95% H-UCL	129.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	145.1
95% Adjusted-CLT UCL	127	97.5% Chebyshev (MVUE) UCL	157.4
95% Modified-t UCL	127.1	99% Chebyshev (MVUE) UCL	181.7

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	14.07	Data appear Normal at 5% Significance Level	
Theta Star	8.275		
nu star	619.2		
Approximate Chi Square Value (.05)	562.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	126.6
Adjusted Chi Square Value	558.4	95% Jackknife UCL	127.1
		95% Standard Bootstrap UCL	126.4
Anderson-Darling Test Statistic	0.391	95% Bootstrap-t UCL	127.4
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	127.7
Kolmogorov-Smirnov Test Statistic	0.158	95% Percentile Bootstrap UCL	126.7
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	126.9
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	143.4
		97.5% Chebyshev(Mean, Sd) UCL	155
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	177.9
95% Approximate Gamma UCL	128.2		
95% Adjusted Gamma UCL	129.1		

Potential UCL to Use		Use 95% Student's-t UCL	127.1

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.54	Minimum of Log Data	-0.616
Maximum	1.1	Maximum of Log Data	0.0953
Mean	0.759	Mean of log Data	-0.299
Median	0.76	SD of log Data	0.214
SD	0.169		
Coefficient of Variation	0.222		
Skewness	0.746		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.915	Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.821	95% H-UCL	0.825
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.91
95% Adjusted-CLT UCL	0.824	97.5% Chebyshev (MVUE) UCL	0.976
95% Modified-t UCL	0.821	99% Chebyshev (MVUE) UCL	1.105

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	19.47	**Data appear Normal at 5% Significance Level**	
Theta Star	0.039		
nu star	856.7		
Approximate Chi Square Value (.05)	789.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	0.818
Adjusted Chi Square Value	784.9	95% Jackknife UCL	0.821
		95% Standard Bootstrap UCL	0.817
Anderson-Darling Test Statistic	0.482	95% Bootstrap-t UCL	0.828
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	0.825
Kolmogorov-Smirnov Test Statistic	0.124	95% Percentile Bootstrap UCL	0.817
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	0.824
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.915
		97.5% Chebyshev(Mean, Sd) UCL	0.983
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.116
95% Approximate Gamma UCL	0.823		
95% Adjusted Gamma UCL	0.828		

Potential UCL to Use		Use 95% Student's-t UCL	0.821

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	11

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.97	Minimum of Log Data	-0.0305
Maximum	2.2	Maximum of Log Data	0.788
Mean	1.565	Mean of log Data	0.427
Median	1.55	SD of log Data	0.211
SD	0.324		
Coefficient of Variation	0.207		
Skewness	0.163		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.97	Shapiro Wilk Test Statistic	0.969
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.683	95% H-UCL	1.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.875
95% Adjusted-CLT UCL	1.681	97.5% Chebyshev (MVUE) UCL	2.009
95% Modified-t UCL	1.684	99% Chebyshev (MVUE) UCL	2.272

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	20.77	**Data appear Normal at 5% Significance Level**	
Theta Star	0.0753		
nu star	913.9		
Approximate Chi Square Value (.05)	844.8	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	1.678
Adjusted Chi Square Value	839.8	95% Jackknife UCL	1.683
		95% Standard Bootstrap UCL	1.675
Anderson-Darling Test Statistic	0.287	95% Bootstrap-t UCL	1.688
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	1.684
Kolmogorov-Smirnov Test Statistic	0.107	95% Percentile Bootstrap UCL	1.673
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	1.677
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.865
		97.5% Chebyshev(Mean, Sd) UCL	1.996
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.251
95% Approximate Gamma UCL	1.693		
95% Adjusted Gamma UCL	1.703		

Potential UCL to Use		Use 95% Student's-t UCL	1.683

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium (mg/kg)

General Statistics			
Number of Valid Observations	22	Number of Distinct Observations	22
Raw Statistics		**Log-transformed Statistics**	
Minimum	1500	Minimum of Log Data	7.313
Maximum	89000	Maximum of Log Data	11.4
Mean	20545	Mean of log Data	9.07
Median	6950	SD of log Data	1.352
SD	27676		
Coefficient of Variation	1.347		
Skewness	1.625		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.707	Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	30699	95% H-UCL	53343
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	50352
95% Adjusted-CLT UCL	32435	97.5% Chebyshev (MVUE) UCL	63408
95% Modified-t UCL	31039	99% Chebyshev (MVUE) UCL	89053
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.637	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	32267		
nu star	28.02		
Approximate Chi Square Value (.05)	16.94	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	30251
Adjusted Chi Square Value	16.3	95% Jackknife UCL	30699
		95% Standard Bootstrap UCL	30069
Anderson-Darling Test Statistic	1.104	95% Bootstrap-t UCL	34950
Anderson-Darling 5% Critical Value	0.787	95% Hall's Bootstrap UCL	31414
Kolmogorov-Smirnov Test Statistic	0.183	95% Percentile Bootstrap UCL	30645
Kolmogorov-Smirnov 5% Critical Value	0.193	95% BCA Bootstrap UCL	32723
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	46265
		97.5% Chebyshev(Mean, Sd) UCL	57394
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	79255
95% Approximate Gamma UCL	33978		
95% Adjusted Gamma UCL	35317		
Potential UCL to Use		Use 95% Approximate Gamma UCL	33978

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	20

Raw Statistics		**Log-transformed Statistics**	
Minimum	21	Minimum of Log Data	3.045
Maximum	160	Maximum of Log Data	5.075
Mean	53.36	Mean of log Data	3.723
Median	34	SD of log Data	0.67
SD	45.41		
Coefficient of Variation	0.851		
Skewness	1.58		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.683	Shapiro Wilk Test Statistic	0.809
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	70.02	95% H-UCL	70.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	85.12
95% Adjusted-CLT UCL	72.77	97.5% Chebyshev (MVUE) UCL	99.81
95% Modified-t UCL	70.57	99% Chebyshev (MVUE) UCL	128.7

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.863	Data do not follow a Discernable Distribution (0.05)	
Theta Star	28.64		
nu star	81.98		
Approximate Chi Square Value (.05)	62.11	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	69.29
Adjusted Chi Square Value	60.82	95% Jackknife UCL	70.02
		95% Standard Bootstrap UCL	68.66
Anderson-Darling Test Statistic	2.231	95% Bootstrap-t UCL	77.44
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	67.88
Kolmogorov-Smirnov Test Statistic	0.293	95% Percentile Bootstrap UCL	70.02
Kolmogorov-Smirnov 5% Critical Value	0.188	95% BCA Bootstrap UCL	72.93
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	95.56
		97.5% Chebyshev(Mean, Sd) UCL	113.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	149.7
95% Approximate Gamma UCL	70.43		
95% Adjusted Gamma UCL	71.92		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	95.56

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	17

Raw Statistics		**Log-transformed Statistics**	
Minimum	5.1	Minimum of Log Data	1.629
Maximum	12	Maximum of Log Data	2.485
Mean	9.091	Mean of log Data	2.19
Median	9.3	SD of log Data	0.201
SD	1.636		
Coefficient of Variation	0.18		
Skewness	-0.727		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.936	Shapiro Wilk Test Statistic	0.88
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	9.691	95% H-UCL	9.846
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	10.81
95% Adjusted-CLT UCL	9.607	97.5% Chebyshev (MVUE) UCL	11.55
95% Modified-t UCL	9.682	99% Chebyshev (MVUE) UCL	13

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	24.47	Data appear Normal at 5% Significance Level	
Theta Star	0.371		
nu star	1077		
Approximate Chi Square Value (.05)	1002	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	9.665
Adjusted Chi Square Value	996.3	95% Jackknife UCL	9.691
		95% Standard Bootstrap UCL	9.659
Anderson-Darling Test Statistic	0.913	95% Bootstrap-t UCL	9.655
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	9.628
Kolmogorov-Smirnov Test Statistic	0.206	95% Percentile Bootstrap UCL	9.636
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	9.623
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.61
		97.5% Chebyshev(Mean, Sd) UCL	11.27
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	12.56
95% Approximate Gamma UCL	9.773		
95% Adjusted Gamma UCL	9.826		

Potential UCL to Use		Use 95% Student's-t UCL	9.691

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	17

Raw Statistics		**Log-transformed Statistics**	
Minimum	10	Minimum of Log Data	2.303
Maximum	200	Maximum of Log Data	5.298
Mean	40.73	Mean of log Data	3.237
Median	17.75	SD of log Data	0.921
SD	47.88		
Coefficient of Variation	1.176		
Skewness	2.219		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.681	Shapiro Wilk Test Statistic	0.86
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	58.29	95% H-UCL	63.57
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	73.98
95% Adjusted-CLT UCL	62.68	97.5% Chebyshev (MVUE) UCL	89.59
95% Modified-t UCL	59.1	99% Chebyshev (MVUE) UCL	120.2

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.07	Data do not follow a Discernable Distribution (0.05)	
Theta Star	38.07		
nu star	47.07		
Approximate Chi Square Value (.05)	32.33	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	57.52
Adjusted Chi Square Value	31.41	95% Jackknife UCL	58.29
		95% Standard Bootstrap UCL	57.2
Anderson-Darling Test Statistic	1.644	95% Bootstrap-t UCL	72.15
Anderson-Darling 5% Critical Value	0.766	95% Hall's Bootstrap UCL	74.32
Kolmogorov-Smirnov Test Statistic	0.225	95% Percentile Bootstrap UCL	57.93
Kolmogorov-Smirnov 5% Critical Value	0.19	95% BCA Bootstrap UCL	64.39
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	85.22
		97.5% Chebyshev(Mean, Sd) UCL	104.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	142.3
95% Approximate Gamma UCL	59.3		
95% Adjusted Gamma UCL	61.03		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	85.22

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	12

Raw Statistics		**Log-transformed Statistics**	
Minimum	17000	Minimum of Log Data	9.741
Maximum	31000	Maximum of Log Data	10.34
Mean	24227	Mean of log Data	10.08
Median	24000	SD of log Data	0.15
SD	3518		
Coefficient of Variation	0.145		
Skewness	-0.135		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.985	Shapiro Wilk Test Statistic	0.973
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	25518	95% H-UCL	25664
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	27616
95% Adjusted-CLT UCL	25438	97.5% Chebyshev (MVUE) UCL	29080
95% Modified-t UCL	25514	99% Chebyshev (MVUE) UCL	31955

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	41.49	Data appear Normal at 5% Significance Level	
Theta Star	584		
nu star	1825		
Approximate Chi Square Value (.05)	1727	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	25461
Adjusted Chi Square Value	1720	95% Jackknife UCL	25518
		95% Standard Bootstrap UCL	25449
Anderson-Darling Test Statistic	0.237	95% Bootstrap-t UCL	25518
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	25460
Kolmogorov-Smirnov Test Statistic	0.116	95% Percentile Bootstrap UCL	25409
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	25364
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	27496
		97.5% Chebyshev(Mean, Sd) UCL	28911
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	31690
95% Approximate Gamma UCL	25605		
95% Adjusted Gamma UCL	25711		

Potential UCL to Use		Use 95% Student's-t UCL	25518

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead (mg/kg)

General Statistics			
Number of Valid Observations	22	Number of Distinct Observations	19
Raw Statistics		**Log-transformed Statistics**	
Minimum	9.6	Minimum of Log Data	2.262
Maximum	750	Maximum of Log Data	6.62
Mean	137.1	Mean of log Data	4.096
Median	58.5	SD of log Data	1.37
SD	186.2		
Coefficient of Variation	1.358		
Skewness	2.251		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.704	Shapiro Wilk Test Statistic	0.938
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	205.4	95% H-UCL	385.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	359.2
95% Adjusted-CLT UCL	222.7	97.5% Chebyshev (MVUE) UCL	452.9
95% Modified-t UCL	208.6	99% Chebyshev (MVUE) UCL	637
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.659	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	207.9		
nu star	29.02		
Approximate Chi Square Value (.05)	17.72	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	202.4
Adjusted Chi Square Value	17.06	95% Jackknife UCL	205.4
		95% Standard Bootstrap UCL	200.7
Anderson-Darling Test Statistic	0.639	95% Bootstrap-t UCL	258.2
Anderson-Darling 5% Critical Value	0.785	95% Hall's Bootstrap UCL	499.9
Kolmogorov-Smirnov Test Statistic	0.165	95% Percentile Bootstrap UCL	205
Kolmogorov-Smirnov 5% Critical Value	0.193	95% BCA Bootstrap UCL	225.6
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	310.1
		97.5% Chebyshev(Mean, Sd) UCL	385
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	532
95% Approximate Gamma UCL	224.5		
95% Adjusted Gamma UCL	233.1		
Potential UCL to Use		Use 95% Approximate Gamma UCL	224.5

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	19

Raw Statistics		**Log-transformed Statistics**	
Minimum	3300	Minimum of Log Data	8.102
Maximum	44000	Maximum of Log Data	10.69
Mean	8923	Mean of log Data	8.748
Median	4725	SD of log Data	0.711
SD	10901		
Coefficient of Variation	1.222		
Skewness	2.79		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.511	Shapiro Wilk Test Statistic	0.729
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	12922	95% H-UCL	11394
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	13667
95% Adjusted-CLT UCL	14223	97.5% Chebyshev (MVUE) UCL	16120
95% Modified-t UCL	13152	99% Chebyshev (MVUE) UCL	20939

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.396	Data do not follow a Discernable Distribution (0.05)	
Theta Star	6391		
nu star	61.43		
Approximate Chi Square Value (.05)	44.4	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	12745
Adjusted Chi Square Value	43.32	95% Jackknife UCL	12922
		95% Standard Bootstrap UCL	12726
Anderson-Darling Test Statistic	3.2	95% Bootstrap-t UCL	23374
Anderson-Darling 5% Critical Value	0.758	95% Hall's Bootstrap UCL	29604
Kolmogorov-Smirnov Test Statistic	0.317	95% Percentile Bootstrap UCL	12973
Kolmogorov-Smirnov 5% Critical Value	0.188	95% BCA Bootstrap UCL	14439
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	19053
		97.5% Chebyshev(Mean, Sd) UCL	23436
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	32046
95% Approximate Gamma UCL	12344		
95% Adjusted Gamma UCL	12652		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	19053

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	230	Minimum of Log Data	5.438
Maximum	675	Maximum of Log Data	6.515
Mean	432.5	Mean of log Data	6.02
Median	415	SD of log Data	0.327
SD	137.9		
Coefficient of Variation	0.319		
Skewness	0.273		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.94	Shapiro Wilk Test Statistic	0.951
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	483.1	95% H-UCL	495.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	566.7
95% Adjusted-CLT UCL	482.7	97.5% Chebyshev (MVUE) UCL	624.6
95% Modified-t UCL	483.4	99% Chebyshev (MVUE) UCL	738.4

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	8.797	**Data appear Normal at 5% Significance Level**	
Theta Star	49.16		
nu star	387.1		
Approximate Chi Square Value (.05)	342.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	480.9
Adjusted Chi Square Value	339.3	95% Jackknife UCL	483.1
		95% Standard Bootstrap UCL	480
Anderson-Darling Test Statistic	0.42	95% Bootstrap-t UCL	486.3
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	481.9
Kolmogorov-Smirnov Test Statistic	0.127	95% Percentile Bootstrap UCL	479.3
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	481.4
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	560.7
		97.5% Chebyshev(Mean, Sd) UCL	616.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	725
95% Approximate Gamma UCL	488.8		
95% Adjusted Gamma UCL	493.3		

Potential UCL to Use		Use 95% Student's-t UCL	483.1

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.021	Minimum of Log Data	-3.863
Maximum	0.83	Maximum of Log Data	-0.186
Mean	0.148	Mean of log Data	-2.62
Median	0.06	SD of log Data	1.092
SD	0.226		
Coefficient of Variation	1.528		
Skewness	2.289		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.582	Shapiro Wilk Test Statistic	0.873
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.231	95% H-UCL	0.25
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.274
95% Adjusted-CLT UCL	0.253	97.5% Chebyshev (MVUE) UCL	0.338
95% Modified-t UCL	0.235	99% Chebyshev (MVUE) UCL	0.464

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.749	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.198		
nu star	32.95		
Approximate Chi Square Value (.05)	20.83	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	0.227
Adjusted Chi Square Value	20.11	95% Jackknife UCL	0.231
		95% Standard Bootstrap UCL	0.227
Anderson-Darling Test Statistic	1.981	95% Bootstrap-t UCL	0.289
Anderson-Darling 5% Critical Value	0.779	95% Hall's Bootstrap UCL	0.226
Kolmogorov-Smirnov Test Statistic	0.301	95% Percentile Bootstrap UCL	0.231
Kolmogorov-Smirnov 5% Critical Value	0.192	95% BCA Bootstrap UCL	0.249
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.358
		97.5% Chebyshev(Mean, Sd) UCL	0.449
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.628
95% Approximate Gamma UCL	0.234		
95% Adjusted Gamma UCL	0.243		

Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	0.628

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel (mg/kg)

General Statistics			
Number of Valid Observations	22	Number of Distinct Observations	16
Raw Statistics		**Log-transformed Statistics**	
Minimum	11	Minimum of Log Data	2.398
Maximum	45	Maximum of Log Data	3.807
Mean	20.52	Mean of log Data	2.925
Median	15.75	SD of log Data	0.431
SD	9.991		
Coefficient of Variation	0.487		
Skewness	1.196		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.812	Shapiro Wilk Test Statistic	0.881
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	24.19	95% H-UCL	24.51
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	28.76
95% Adjusted-CLT UCL	24.61	97.5% Chebyshev (MVUE) UCL	32.39
95% Modified-t UCL	24.28	99% Chebyshev (MVUE) UCL	39.52
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4.663	Data do not follow a Discernable Distribution (0.05)	
Theta Star	4.401		
nu star	205.2		
Approximate Chi Square Value (.05)	173	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	24.03
Adjusted Chi Square Value	170.8	95% Jackknife UCL	24.19
		95% Standard Bootstrap UCL	23.99
Anderson-Darling Test Statistic	1.339	95% Bootstrap-t UCL	25.25
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	24.19
Kolmogorov-Smirnov Test Statistic	0.245	95% Percentile Bootstrap UCL	24.2
Kolmogorov-Smirnov 5% Critical Value	0.186	95% BCA Bootstrap UCL	24.59
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	29.81
		97.5% Chebyshev(Mean, Sd) UCL	33.83
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	41.72
95% Approximate Gamma UCL	24.34		
95% Adjusted Gamma UCL	24.65		
Potential UCL to Use		Use 95% Student's-t UCL	24.19
		or 95% Modified-t UCL	24.28

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	1300	Minimum of Log Data	7.17
Maximum	3100	Maximum of Log Data	8.039
Mean	1702	Mean of log Data	7.423
Median	1600	SD of log Data	0.176
SD	361.4		
Coefficient of Variation	0.212		
Skewness	2.941		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.694	Shapiro Wilk Test Statistic	0.816
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1835	95% H-UCL	1819
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1979
95% Adjusted-CLT UCL	1881	97.5% Chebyshev (MVUE) UCL	2099
95% Modified-t UCL	1843	99% Chebyshev (MVUE) UCL	2337

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	26.16	Data do not follow a Discernable Distribution (0.05)	
Theta Star	65.08		
nu star	1151		
Approximate Chi Square Value (.05)	1073	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	1829
Adjusted Chi Square Value	1067	95% Jackknife UCL	1835
		95% Standard Bootstrap UCL	1826
Anderson-Darling Test Statistic	1.371	95% Bootstrap-t UCL	1946
Anderson-Darling 5% Critical Value	0.741	95% Hall's Bootstrap UCL	2421
Kolmogorov-Smirnov Test Statistic	0.219	95% Percentile Bootstrap UCL	1839
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	1875
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2038
		97.5% Chebyshev(Mean, Sd) UCL	2183
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2469
95% Approximate Gamma UCL	1826		
95% Adjusted Gamma UCL	1835		

Potential UCL to Use		Use 95% Student's-t UCL	1835
		or 95% Modified-t UCL	1843

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver (mg/kg)

General Statistics			
Number of Valid Observations	22	Number of Distinct Observations	21
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.048	Minimum of Log Data	-3.037
Maximum	25	Maximum of Log Data	3.219
Mean	2.937	Mean of log Data	-0.776
Median	0.445	SD of log Data	1.998
SD	6.277		
Coefficient of Variation	2.138		
Skewness	2.83		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.525	Shapiro Wilk Test Statistic	0.895
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	5.239	95% H-UCL	20.16
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	9.046
95% Adjusted-CLT UCL	6.001	97.5% Chebyshev (MVUE) UCL	11.79
95% Modified-t UCL	5.374	99% Chebyshev (MVUE) UCL	17.18
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.342	Data do not follow a Discernable Distribution (0.05)	
Theta Star	8.585		
nu star	15.05		
Approximate Chi Square Value (.05)	7.296	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	5.138
Adjusted Chi Square Value	6.895	95% Jackknife UCL	5.239
		95% Standard Bootstrap UCL	5.153
Anderson-Darling Test Statistic	1.579	95% Bootstrap-t UCL	10.66
Anderson-Darling 5% Critical Value	0.834	95% Hall's Bootstrap UCL	13.44
Kolmogorov-Smirnov Test Statistic	0.21	95% Percentile Bootstrap UCL	5.261
Kolmogorov-Smirnov 5% Critical Value	0.2	95% BCA Bootstrap UCL	5.835
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	8.77
		97.5% Chebyshev(Mean, Sd) UCL	11.29
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.25
95% Approximate Gamma UCL	6.057		
95% Adjusted Gamma UCL	6.41		
Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	16.25

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium (mg/kg)

General Statistics			
Number of Valid Observations	22	Number of Distinct Observations	19
Raw Statistics		**Log-transformed Statistics**	
Minimum	31	Minimum of Log Data	3.434
Maximum	110	Maximum of Log Data	4.7
Mean	61.95	Mean of log Data	4.074
Median	54	SD of log Data	0.326
SD	21.41		
Coefficient of Variation	0.346		
Skewness	1.025		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.884	Shapiro Wilk Test Statistic	0.948
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	69.81	95% H-UCL	70.69
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	80.88
95% Adjusted-CLT UCL	70.53	97.5% Chebyshev (MVUE) UCL	89.12
95% Modified-t UCL	69.98	99% Chebyshev (MVUE) UCL	105.3
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	8.445	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	7.337		
nu star	371.6		
Approximate Chi Square Value (.05)	327.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	69.46
Adjusted Chi Square Value	324.8	95% Jackknife UCL	69.81
		95% Standard Bootstrap UCL	69.28
Anderson-Darling Test Statistic	0.724	95% Bootstrap-t UCL	71.44
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	70.56
Kolmogorov-Smirnov Test Statistic	0.179	95% Percentile Bootstrap UCL	69.2
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	70.93
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	81.85
		97.5% Chebyshev(Mean, Sd) UCL	90.46
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	107.4
95% Approximate Gamma UCL	70.21		
95% Adjusted Gamma UCL	70.87		
Potential UCL to Use		Use 95% Approximate Gamma UCL	70.21

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	13

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.059	Minimum of Log Data	-2.83
Maximum	0.235	Maximum of Log Data	-1.448
Mean	0.17	Mean of log Data	-1.808
Median	0.18	SD of log Data	0.293
SD	0.0391		
Coefficient of Variation	0.231		
Skewness	-1.05		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.932	Shapiro Wilk Test Statistic	0.798
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.184	95% H-UCL	0.192
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.218
95% Adjusted-CLT UCL	0.181	97.5% Chebyshev (MVUE) UCL	0.238
95% Modified-t UCL	0.184	99% Chebyshev (MVUE) UCL	0.279

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	12.78	Data appear Normal at 5% Significance Level	
Theta Star	0.0133		
nu star	562.1		
Approximate Chi Square Value (.05)	508.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	0.183
Adjusted Chi Square Value	504.3	95% Jackknife UCL	0.184
		95% Standard Bootstrap UCL	0.183
Anderson-Darling Test Statistic	1.002	95% Bootstrap-t UCL	0.183
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	0.182
Kolmogorov-Smirnov Test Statistic	0.173	95% Percentile Bootstrap UCL	0.183
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	0.181
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.206
		97.5% Chebyshev(Mean, Sd) UCL	0.222
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.253
95% Approximate Gamma UCL	0.188		
95% Adjusted Gamma UCL	0.189		

Potential UCL to Use		Use 95% Student's-t UCL	0.184

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium (mg/kg)

General Statistics

Number of Valid Observations	22	Number of Distinct Observations	13

Raw Statistics		**Log-transformed Statistics**	
Minimum	21	Minimum of Log Data	3.045
Maximum	43.5	Maximum of Log Data	3.773
Mean	34.7	Mean of log Data	3.533
Median	35	SD of log Data	0.175
SD	5.646		
Coefficient of Variation	0.163		
Skewness	-0.535		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.955	Shapiro Wilk Test Statistic	0.921
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	36.78	95% H-UCL	37.16
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	40.4
95% Adjusted-CLT UCL	36.54	97.5% Chebyshev (MVUE) UCL	42.86
95% Modified-t UCL	36.75	99% Chebyshev (MVUE) UCL	47.68

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	31.35	**Data appear Normal at 5% Significance Level**	
Theta Star	1.107		
nu star	1379		
Approximate Chi Square Value (.05)	1294	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	36.68
Adjusted Chi Square Value	1288	95% Jackknife UCL	36.78
		95% Standard Bootstrap UCL	36.58
Anderson-Darling Test Statistic	0.445	95% Bootstrap-t UCL	36.52
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	36.57
Kolmogorov-Smirnov Test Statistic	0.133	95% Percentile Bootstrap UCL	36.57
Kolmogorov-Smirnov 5% Critical Value	0.185	95% BCA Bootstrap UCL	36.5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	39.95
		97.5% Chebyshev(Mean, Sd) UCL	42.22
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	46.68
95% Approximate Gamma UCL	36.99		
95% Adjusted Gamma UCL	37.17		

Potential UCL to Use		Use 95% Student's-t UCL	36.78

Table D.1-1c
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc (mg/kg)

General Statistics			
Number of Valid Observations	22	Number of Distinct Observations	20
Raw Statistics		**Log-transformed Statistics**	
Minimum	41	Minimum of Log Data	3.714
Maximum	280	Maximum of Log Data	5.635
Mean	98.25	Mean of log Data	4.46
Median	76.5	SD of log Data	0.487
SD	58.37		
Coefficient of Variation	0.594		
Skewness	1.881		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.783	Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical Value	0.911	Shapiro Wilk Critical Value	0.911
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	119.7	95% H-UCL	120.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	142.3
95% Adjusted-CLT UCL	124.1	97.5% Chebyshev (MVUE) UCL	161.9
95% Modified-t UCL	120.5	99% Chebyshev (MVUE) UCL	200.6
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.56	Data appear Lognormal at 5% Significance Level	
Theta Star	27.6		
nu star	156.6		
Approximate Chi Square Value (.05)	128.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0386	95% CLT UCL	118.7
Adjusted Chi Square Value	126.8	95% Jackknife UCL	119.7
		95% Standard Bootstrap UCL	118.6
Anderson-Darling Test Statistic	0.983	95% Bootstrap-t UCL	129.3
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	135.9
Kolmogorov-Smirnov Test Statistic	0.22	95% Percentile Bootstrap UCL	119.3
Kolmogorov-Smirnov 5% Critical Value	0.186	95% BCA Bootstrap UCL	124.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	152.5
		97.5% Chebyshev(Mean, Sd) UCL	176
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	222.1
95% Approximate Gamma UCL	119.6		
95% Adjusted Gamma UCL	121.4		
Potential UCL to Use		Use 95% Student's-t UCL	119.7
		or 95% Modified-t UCL	120.5
		or 95% H-UCL	120.1

Table D.1-1d
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	P:\09604-318 RFAAP SWMU 35 CaSO4 Lagoons\02_Deliverables\RFI Report\Draft to USACE - X 2008\Appendices\A
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony (mg/kg)

General Statistics

Number of Valid Data	22	Number of Detected Data	16
Number of Distinct Detected Data	15	Number of Non-Detect Data	6
		Percent Non-Detects	27.27%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.0365	Minimum Detected	-3.31
Maximum Detected	1.1	Maximum Detected	0.0953
Mean of Detected	0.222	Mean of Detected	-1.926
SD of Detected	0.263	SD of Detected	0.895
Minimum Non-Detect	0.042	Minimum Non-Detect	-3.17
Maximum Non-Detect	0.042	Maximum Non-Detect	-3.17

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.656	Shapiro Wilk Test Statistic	0.972
5% Shapiro Wilk Critical Value	0.887	5% Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.167	Mean	-2.455
SD	0.24	SD	1.162
95% DL/2 (t) UCL	0.255	95% H-Stat (DL/2) UCL	0.224
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.103	Mean in Log Scale	-2.428
SD	0.303	SD in Log Scale	1.155
95% MLE (t) UCL	0.214	Mean in Original Scale	0.168
95% MLE (Tiku) UCL	0.22	SD in Original Scale	0.239
		95% Percentile Bootstrap UCL	0.254
		95% BCA Bootstrap UCL	0.292

Table D.1-1d
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	1.12
Theta Star	0.198
nu star	35.84
A-D Test Statistic	0.571
5% A-D Critical Value	0.758
K-S Test Statistic	0.758
5% K-S Critical Value	0.22
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	1.1
Mean	0.176
Median	0.11
SD	0.237
k star	0.314
Theta star	0.559
Nu star	13.83
AppChi2	6.457
95% Gamma Approximate UCL	0.376
95% Adjusted Gamma UCL	0.4

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Gamma Distributed at 5% Significance Level	

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.171
SD	0.232
SE of Mean	0.0511
95% KM (t) UCL	0.259
95% KM (z) UCL	0.256
95% KM (jackknife) UCL	0.257
95% KM (bootstrap t) UCL	0.347
95% KM (BCA) UCL	0.264
95% KM (Percentile Bootstrap) UCL	0.268
95% KM (Chebyshev) UCL	0.394
97.5% KM (Chebyshev) UCL	0.491
99% KM (Chebyshev) UCL	0.68
Potential UCLs to Use	
95% KM (Percentile Bootstrap) UCL	0.268

Table D.1-1d
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Selenium (mg/kg)

General Statistics

Number of Valid Data	22	Number of Detected Data	21
Number of Distinct Detected Data	14	Number of Non-Detect Data	1
		Percent Non-Detects	4.55%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.12	Minimum Detected	-2.12
Maximum Detected	0.37	Maximum Detected	-0.994
Mean of Detected	0.224	Mean of Detected	-1.564
SD of Detected	0.0827	SD of Detected	0.374
Minimum Non-Detect	0.089	Minimum Non-Detect	-2.419
Maximum Non-Detect	0.089	Maximum Non-Detect	-2.419

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.907	Shapiro Wilk Test Statistic	0.923
5% Shapiro Wilk Critical Value	0.908	5% Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.215	Mean	-1.634
SD	0.0893	SD	0.492
95% DL/2 (t) UCL	0.248	95% H-Stat (DL/2) UCL	0.263
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.216	Mean in Log Scale	-1.606
SD	0.087	SD in Log Scale	0.414
95% MLE (t) UCL	0.248	Mean in Original Scale	0.217
95% MLE (Tiku) UCL	0.247	SD in Original Scale	0.0861
		95% Percentile Bootstrap UCL	0.246
		95% BCA Bootstrap UCL	0.25

Table D.1-1d
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	6.665
Theta Star	0.0335
nu star	279.9
A-D Test Statistic	0.657
5% A-D Critical Value	0.744
K-S Test Statistic	0.744
5% K-S Critical Value	0.19
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0326
Maximum	0.37
Mean	0.215
Median	0.205
SD	0.0904
k star	4.063
Theta star	0.0529
Nu star	178.8
AppChi2	148.8
95% Gamma Approximate UCL	0.258
95% Adjusted Gamma UCL	0.262

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Gamma Distributed at 5% Significance Level	

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.219
SD	0.0818
SE of Mean	0.0179
95% KM (t) UCL	0.25
95% KM (z) UCL	0.248
95% KM (jackknife) UCL	0.249
95% KM (bootstrap t) UCL	0.253
95% KM (BCA) UCL	0.248
95% KM (Percentile Bootstrap) UCL	0.249
95% KM (Chebyshev) UCL	0.297
97.5% KM (Chebyshev) UCL	0.33
99% KM (Chebyshev) UCL	0.397
Potential UCLs to Use	
95% KM (BCA) UCL	0.248

Table D.1-1d
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Aroclor 1254 (ug/kg)

General Statistics

Number of Valid Data	22	Number of Detected Data	17
Number of Distinct Detected Data	17	Number of Non-Detect Data	5
		Percent Non-Detects	22.73%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	16	Minimum Detected	2.773
Maximum Detected	1700	Maximum Detected	7.438
Mean of Detected	288.5	Mean of Detected	4.859
SD of Detected	408.6	SD of Detected	1.394
Minimum Non-Detect	5	Minimum Non-Detect	1.609
Maximum Non-Detect	5.5	Maximum Non-Detect	1.705

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	5
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	17
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	22.73%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.652	Shapiro Wilk Test Statistic	0.943
5% Shapiro Wilk Critical Value	0.892	5% Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	223.5	Mean	3.974
SD	377.1	SD	2.067
95% DL/2 (t) UCL	361.9	95% H-Stat (DL/2) UCL	1758
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	155.3	Mean in Log Scale	4.133
SD	441.3	SD in Log Scale	1.837
95% MLE (t) UCL	317.2	Mean in Original Scale	224.1
95% MLE (Tiku) UCL	317.1	SD in Original Scale	376.7
		95% Percentile Bootstrap UCL	368.7
		95% BCA Bootstrap UCL	449.5

Table D.1-1d
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.652
Theta Star	442.3
nu star	22.17
A-D Test Statistic	0.42
5% A-D Critical Value	0.777
K-S Test Statistic	0.777
5% K-S Critical Value	0.217
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	1700
Mean	222.9
Median	87.75
SD	377.5
k star	0.137
Theta star	1621
Nu star	6.049
AppChi2	1.665
95% Gamma Approximate UCL	809.9
95% Adjusted Gamma UCL	898.9

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Gamma Distributed at 5% Significance Level	

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	226.5
SD	366.7
SE of Mean	80.58
95% KM (t) UCL	365.2
95% KM (z) UCL	359.1
95% KM (jackknife) UCL	363.5
95% KM (bootstrap t) UCL	516.5
95% KM (BCA) UCL	364.4
95% KM (Percentile Bootstrap) UCL	363.5
95% KM (Chebyshev) UCL	577.8
97.5% KM (Chebyshev) UCL	729.8
99% KM (Chebyshev) UCL	1028
Potential UCLs to Use	
95% KM (Chebyshev) UCL	577.8

Table D.1-1d
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Benzo(a)anthracene (ug/kg)

General Statistics

Number of Valid Data	22	Number of Detected Data	16
Number of Distinct Detected Data	16	Number of Non-Detect Data	6
		Percent Non-Detects	27.27%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.8	Minimum Detected	-0.223
Maximum Detected	100	Maximum Detected	4.605
Mean of Detected	18.89	Mean of Detected	2.036
SD of Detected	27.45	SD of Detected	1.409
Minimum Non-Detect	3.1	Minimum Non-Detect	1.131
Maximum Non-Detect	530	Maximum Non-Detect	6.273

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	22
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	0
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	100.00%

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.687	Shapiro Wilk Test Statistic	0.96
5% Shapiro Wilk Critical Value	0.887	5% Shapiro Wilk Critical Value	0.887
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	38.27	Mean	2.241
SD	66.16	SD	1.765
95% DL/2 (t) UCL	62.54	95% H-Stat (DL/2) UCL	232.4

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	1.754
		SD in Log Scale	1.345
		Mean in Original Scale	14.7
		SD in Original Scale	24.26
		95% Percentile Bootstrap UCL	23.57
		95% BCA Bootstrap UCL	26.97

Table D.1-1d
EPC Calculation Results - SWMU 35 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.589
Theta Star	32.1
nu star	18.83
A-D Test Statistic	0.739
5% A-D Critical Value	0.781
K-S Test Statistic	0.781
5% K-S Critical Value	0.224
Data follow Appr. Gamma Distribution at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	100
Mean	16.75
Median	6.15
SD	24.21
k star	0.234
Theta star	71.54
Nu star	10.3
AppChi2	4.131
95% Gamma Approximate UCL	41.76
95% Adjusted Gamma UCL	44.9

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data Follow Appr. Gamma Distribution at 5% Significance Level	

Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	16.16
SD	25.2
SE of Mean	5.971
95% KM (t) UCL	26.43
95% KM (z) UCL	25.98
95% KM (jackknife) UCL	26.42
95% KM (bootstrap t) UCL	35.88
95% KM (BCA) UCL	26.26
95% KM (Percentile Bootstrap) UCL	26.6
95% KM (Chebyshev) UCL	42.18
97.5% KM (Chebyshev) UCL	53.45
99% KM (Chebyshev) UCL	75.57
Potential UCLs to Use	
95% KM (Chebyshev) UCL	42.18

Table D.1-2a
PROUCL 4.0 - Summary of Background vs Site Means Comparison - SWMU 35 Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	Is Site Data Distribution Normal?	Is Background Data Distibution Normal?	Means Test for Comparison	Background Comparison Results (Y/N)
Aluminum	Yes	No	Mann-Whitney	**Y**
Antimony	No	--	--	--
Arsenic	Yes	No	Mann-Whitney	N
Barium	Yes	Yes	Mann-Whitney**	**Y**
Beryllium	Yes	No	Mann-Whitney	N
Cadmium	Yes	--	--	--
Calcium	No	No	Mann-Whitney	**Y**
Chromium	No	No	Mann-Whitney	**Y**
Cobalt	Yes	No	Mann-Whitney	N
Copper	Yes	No	Mann-Whitney	**Y**
Iron	Yes	No	Mann-Whitney	N
Lead	No	No	Mann-Whitney	**Y**
Magnesium	No	No	Mann-Whitney	**Y**
Manganese	Yes	No	Mann-Whitney	N
Mercury	No	--	--	--
Nickel	Yes	No	Mann-Whitney	**Y**
Potassium	Yes	No	Mann-Whitney	**Y**
Selenium	Yes	--	--	--
Silver	No	--	--	--
Sodium	Yes	--	--	--
Thallium	Yes	--	--	--
Vanadium	Yes	No	Mann-Whitney	N
Zinc	Yes	No	Mann-Whitney	**Y**

Notes:
** Data set(s) included non-detects therefore Mann-Whitney test used
-- = Insufficient Detections to Determine Distribution
N = Site <= Background
Y = Site > Background

Table D.1-2b
PROUCL 4.0 - Summary of Background vs Site Means Comparison - SWMU 35 Total Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	Is Site Data Distribution Normal?	Is Background Data Distibution Normal?	Means Test for Comparison	Background Comparison Results (Y/N)
Aluminum	Yes	No	Mann-Whitney	**Y**
Antimony	No	--	--	--
Arsenic	No	No	Mann-Whitney	N
Barium	Yes	No	Mann-Whitney	**Y**
Beryllium	Yes	No	Mann-Whitney	N
Cadmium	Yes	No	Mann-Whitney	**Y**
Calcium	No	No	Mann-Whitney	**Y**
Chromium	No	Yes	Mann-Whitney	**Y**
Cobalt	Yes	No	Mann-Whitney	N
Copper	No	No	Mann-Whitney	**Y**
Iron	Yes	Yes	Paired-t test	N
Lead	No	No	Mann-Whitney	**Y**
Magnesium	No	No	Mann-Whitney	**Y**
Manganese	Yes	No	Mann-Whitney	N
Mercury	No	No	Mann-Whitney	**Y**
Nickel	No	No	Mann-Whitney	**Y**
Potassium	No	No	Mann-Whitney	**Y**
Selenium	Yes	--	--	--
Silver	No	--	--	--
Sodium	No	--	--	--
Thallium	Yes	Yes	Mann-Whitney**	N
Vanadium	Yes	Yes	Paired-t test	N
Zinc	No	No	Mann-Whitney	**Y**

Notes:
** Data set(s) included non-detects therefore Mann-Whitney test used
-- = Insufficient Detections to Determine Distribution
N = Site <= Background
Y = Site > Background

Table D.1-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Chromium

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	27
Minimum	6.3
Maximum	53.3
Mean of Raw Data	21.09
Standard Deviation of Raw Data	10.5
Kstar	3.695
Mean of Log Transformed Data	2.922
Standard Deviation of Log Transformed Data	0.529

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.11
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.612
A-D Critical (0.95) Value	0.75
K-S Test Statistic	0.145
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.946
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.17
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.1-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	26
Minimum	7250
Maximum	63000
Mean of Raw Data	20108
Standard Deviation of Raw Data	11869
Kstar	3.069
Mean of Log Transformed Data	9.755
Standard Deviation of Log Transformed Data	0.57

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.846
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.139
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.612
A-D Critical (0.95) Value	0.752
K-S Test Statistic	0.151
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.153
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.1-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	26
Minimum	8.9
Maximum	225
Mean of Raw Data	26.96
Standard Deviation of Raw Data	41.34
Kstar	1.324
Mean of Log Transformed Data	2.913
Standard Deviation of Log Transformed Data	0.702

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.416
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.375
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	3.163
A-D Critical (0.95) Value	0.764
K-S Test Statistic	0.253
K-S Critical(0.95) Value	0.169

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.798
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.192
Lilliefors Critical (0.95) Value	0.167

Data not Lognormal at (0.05) Significance Level

Table D.1-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	27
Minimum	12.2
Maximum	101
Mean of Raw Data	33.89
Standard Deviation of Raw Data	17.78
Kstar	3.946
Mean of Log Transformed Data	3.405
Standard Deviation of Log Transformed Data	0.497

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.832
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.141
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.622
A-D Critical (0.95) Value	0.749
K-S Test Statistic	0.111
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.138
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.1-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	28
Minimum	7.1
Maximum	216
Mean of Raw Data	41.21
Standard Deviation of Raw Data	40.24
Kstar	1.654
Mean of Log Transformed Data	3.421
Standard Deviation of Log Transformed Data	0.761

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.665
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.203
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.54
A-D Critical (0.95) Value	0.76
K-S Test Statistic	0.105
K-S Critical(0.95) Value	0.168

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.975
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.1
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.1-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Calcium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Calcium Data	28	0	28	23	5	17.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	4.6	6.6	5.12	4.8	0.844
Statistics (Detects Only)	23	116	7340	1197	885	1440
Statistics (All: NDs treated as DL value)	28	4.6	7340	983.9	761.5	1380
Statistics (All: NDs treated as DL/2 value)	28	2.3	7340	983.5	761.5	1380
Statistics (Normal ROS Estimated Data)	28	-1605	7340	751.5	761.5	1625
Statistics (Gamma ROS Estimated Data)	28	0	7340	984.5	761.5	1380
Statistics (Lognormal ROS Estimated Data)	28	104.3	7340	1007	761.5	1364

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.506	1.368	794.6	6.72	0.84	0.125
Statistics (NDs = DL)	0.575	0.537	1712	5.81	2.128	0.366
Statistics (NDs = DL/2)	0.523	0.491	1879	5.686	2.383	0.419
Statistics (Gamma ROS Estimates)	0.178	0.183	5519	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.391	1.047	0.164

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.553	0.914	Data Not Normal
Lilliefors (Detects Only)	0.275	0.185	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.244	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.244	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.761	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.207	0.167	Data Not Normal

Table D.1-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.694	0.76	
Kolmogorov-Smirnov (Detects Only)	0.152	0.185	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.232	0.803	
Kolmogorov-Smirnov (NDs = DL)	0.192	0.174	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.47	0.808	
Kolmogorov-Smirnov (NDs = DL/2)	0.211	0.175	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	6.572	0.907	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.417	0.184	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.967	0.914	Data Appear Lognormal
Lilliefors (Detects Only)	0.0979	0.185	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.779	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.279	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.75	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.296	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.949	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.114	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cobalt Data	28	0	28	20	8	28.57%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	0.11	0.75	0.501	0.72	0.319
Statistics (Detects Only)	20	5.9	45.4	15.95	12.1	10.07
Statistics (All: NDs treated as DL value)	28	0.11	45.4	11.53	10.15	11.04
Statistics (All: NDs treated as DL/2 value)	28	0.055	45.4	11.46	10.15	11.11
Statistics (Normal ROS Estimated Data)	28	-10.02	45.4	9.494	10.15	13.45
Statistics (Gamma ROS Estimated Data)	28	3.774	45.4	13.39	10.15	9.473
Statistics (Lognormal ROS Estimated Data)	28	3.134	45.4	12.48	10.15	10.13

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	3.439	3.095	4.636	2.617	0.545	0.208
Statistics (NDs = DL)	0.701	0.65	16.45	1.583	1.793	1.132
Statistics (NDs = DL/2)	0.588	0.549	19.49	1.385	2.092	1.51
Statistics (Gamma ROS Estimates)	2.851	2.569	4.697	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.25	0.749	0.333

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.819	0.905	Data Not Normal
Lilliefors (Detects Only)	0.236	0.198	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.158	0.167	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.156	0.167	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.936	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.128	0.167	Data Appear Normal

Table D.1-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.596	0.747	
Kolmogorov-Smirnov (Detects Only)	0.167	0.195	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.122	0.79	
Kolmogorov-Smirnov (NDs = DL)	0.195	0.172	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.507	0.801	
Kolmogorov-Smirnov (NDs = DL/2)	0.221	0.174	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.785	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.155	0.167	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.96	0.905	Data Appear Lognormal
Lilliefors (Detects Only)	0.132	0.198	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.831	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.257	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.802	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.288	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.954	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.126	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Magnesium Data	28	0	28	25	3	10.71%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	4.7	5	4.833	4.8	0.153
Statistics (Detects Only)	25	158	20400	2498	913	4334
Statistics (All: NDs treated as DL value)	28	4.7	20400	2231	741	4161
Statistics (All: NDs treated as DL/2 value)	28	2.35	20400	2230	741	4161
Statistics (Normal ROS Estimated Data)	28	-5148	20400	1678	741	4743
Statistics (Gamma ROS Estimated Data)	28	0	20400	2230	741	4161
Statistics (Lognormal ROS Estimated Data)	28	56.13	20400	2236	741	4158

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.694	0.643	3600	6.951	1.272	0.183
Statistics (NDs = DL)	0.479	0.451	4657	6.375	2.075	0.325
Statistics (NDs = DL/2)	0.457	0.432	4879	6.301	2.257	0.358
Statistics (Gamma ROS Estimates)	0.198	0.201	11267	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.638	1.512	0.228

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.558	0.918	Data Not Normal
Lilliefors (Detects Only)	0.303	0.177	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.299	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.299	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.729	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.267	0.167	Data Not Normal

Table D.1-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.247	0.789	
Kolmogorov-Smirnov (Detects Only)	0.183	0.182	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	0.674	0.815	
Kolmogorov-Smirnov (NDs = DL)	0.131	0.175	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.681	0.82	
Kolmogorov-Smirnov (NDs = DL/2)	0.141	0.176	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.847	0.898	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.366	0.183	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.95	0.918	Data Appear Lognormal
Lilliefors (Detects Only)	0.107	0.177	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.889	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.195	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.856	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.22	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.973	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0849	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	75
Minimum	3620
Maximum	47900
Mean of Raw Data	14204
Standard Deviation of Raw Data	9433
Kstar	2.689
Mean of Log Transformed Data	9.371
Standard Deviation of Log Transformed Data	0.618

Normal Distribution Test Results

Lilliefors Test Statistic	0.15
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.604
A-D Critical (0.95) Value	0.76
K-S Test Statistic	0.0772
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0626
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.1-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	70
Minimum	6.3
Maximum	75.8
Mean of Raw Data	26.86
Standard Deviation of Raw Data	12.51
Kstar	4.382
Mean of Log Transformed Data	3.177
Standard Deviation of Log Transformed Data	0.501

Normal Distribution Test Results

Lilliefors Test Statistic	0.0734
Lilliefors Critical (0.95) Value	0.0997

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.591
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.0909
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.122
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.1-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	72
Minimum	7250
Maximum	67700
Mean of Raw Data	26963
Standard Deviation of Raw Data	11990
Kstar	4.441
Mean of Log Transformed Data	10.09
Standard Deviation of Log Transformed Data	0.508

Normal Distribution Test Results

Lilliefors Test Statistic	0.0648
Lilliefors Critical (0.95) Value	0.0997

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.831
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.082
K-S Critical(0.95) Value	0.101

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.115
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.1-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	70
Minimum	2.1
Maximum	256
Mean of Raw Data	22.04
Standard Deviation of Raw Data	39.85
Kstar	1.149
Mean of Log Transformed Data	2.615
Standard Deviation of Log Transformed Data	0.783

Normal Distribution Test Results

Lilliefors Test Statistic	0.344
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	7.671
A-D Critical (0.95) Value	0.777
K-S Test Statistic	0.245
K-S Critical(0.95) Value	0.103

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.147
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.1-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	78
Minimum	16.7
Maximum	2040
Mean of Raw Data	471.4
Standard Deviation of Raw Data	467.1
Kstar	1.087
Mean of Log Transformed Data	5.647
Standard Deviation of Log Transformed Data	1.118

Normal Distribution Test Results

Lilliefors Test Statistic	0.165
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.359
A-D Critical (0.95) Value	0.779
K-S Test Statistic	0.0515
K-S Critical(0.95) Value	0.103

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.093
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.1-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Samples	78
Number of Unique Samples	75
Minimum	12.2
Maximum	101
Mean of Raw Data	44.97
Standard Deviation of Raw Data	18.97
Kstar	5.086
Mean of Log Transformed Data	3.708
Standard Deviation of Log Transformed Data	0.466

Normal Distribution Test Results

Lilliefors Test Statistic	0.0902
Lilliefors Critical (0.95) Value	0.1

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.29
A-D Critical (0.95) Value	0.754
K-S Test Statistic	0.059
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0891
Lilliefors Critical (0.95) Value	0.1

Data appear Lognormal at (0.05) Significance Level

Table D.1-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	76
Minimum	4.7
Maximum	598
Mean of Raw Data	54.94
Standard Deviation of Raw Data	87.15
Kstar	1.05
Mean of Log Transformed Data	3.478
Standard Deviation of Log Transformed Data	0.93

Normal Distribution Test Results

Lilliefors Test Statistic	0.291
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	3.363
A-D Critical (0.95) Value	0.78
K-S Test Statistic	0.145
K-S Critical(0.95) Value	0.103

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0696
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Arsenic

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Arsenic Data	79	0	79	76	3	3.80%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.09	0.12	0.103	0.1	0.0153
Statistics (Detects Only)	76	1.2	35.9	4.989	3.2	5.36
Statistics (All: NDs treated as DL value)	79	0.09	35.9	4.804	3.1	5.339
Statistics (All: NDs treated as DL/2 value)	79	0.045	35.9	4.802	3.1	5.341
Statistics (Normal ROS Estimated Data)	79	-5.169	35.9	4.604	3.1	5.608
Statistics (Gamma ROS Estimated Data)	79	0	35.9	4.8	3.1	5.343
Statistics (Lognormal ROS Estimated Data)	79	0.728	35.9	4.828	3.1	5.32

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.819	1.759	2.742	1.308	0.692	0.529
Statistics (NDs = DL)	1.401	1.356	3.429	1.172	0.968	0.826
Statistics (NDs = DL/2)	1.323	1.281	3.631	1.146	1.067	0.932
Statistics (Gamma ROS Estimates)	0.568	0.555	8.454	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.246	0.748	0.6

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.282	0.102	Data Not Normal
Lilliefors (NDs = DL)	0.279	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.279	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.263	0.0997	Data Not Normal

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.409	0.766	
Kolmogorov-Smirnov (Detects Only)	0.213	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.469	0.772	
Kolmogorov-Smirnov (NDs = DL)	0.182	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.587	0.774	
Kolmogorov-Smirnov (NDs = DL/2)	0.176	0.103	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.23	0.812	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.332	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.151	0.102	Data Not Lognormal
Lilliefors (NDs = DL)	0.159	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.187	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.134	0.0997	Data Not Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Beryllium Data	71	0	71	32	39	54.93%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	39	0.022	0.03	0.0286	0.03	0.00265
Statistics (Detects Only)	32	0.61	1.6	1.017	0.975	0.272
Statistics (All: NDs treated as DL value)	71	0.022	1.6	0.474	0.03	0.527
Statistics (All: NDs treated as DL/2 value)	71	0.011	1.6	0.466	0.015	0.534
Statistics (Normal ROS Estimated Data)	71	-0.475	1.6	0.59	0.557	0.472
Statistics (Gamma ROS Estimated Data)	71	0.61	1.6	1.031	1.052	0.198
Statistics (Lognormal ROS Estimated Data)	71	0.233	1.6	0.721	0.617	0.335

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	14.61	14	0.0696	-0.0179	0.268	-15
Statistics (NDs = DL)	0.519	0.507	0.913	-1.962	1.784	-0.909
Statistics (NDs = DL/2)	0.414	0.406	1.125	-2.343	2.13	-0.909
Statistics (Gamma ROS Estimates)	26.7	25.58	0.0386	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.429	0.456	-1.063

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.953	0.93	Data Appear Normal
Lilliefors (Detects Only)	0.118	0.157	Data Appear Normal
Lilliefors (NDs = DL)	0.349	0.105	Data Not Normal
Lilliefors (NDs = DL/2)	0.35	0.105	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0495	0.105	Data Appear Normal

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.268	0.746	
Kolmogorov-Smirnov (Detects Only)	0.0843	0.155	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	8.979	0.815	
Kolmogorov-Smirnov (NDs = DL)	0.36	0.112	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	9.326	0.838	
Kolmogorov-Smirnov (NDs = DL/2)	0.361	0.113	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.819	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0939	0.105	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.967	0.93	Data Appear Lognormal
Lilliefors (Detects Only)	0.0849	0.157	Data Appear Lognormal
Lilliefors (NDs = DL)	0.356	0.105	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.358	0.105	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0725	0.105	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cadmium Data	79	0	79	13	66	83.54%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	66	0.02	0.05	0.0256	0.02	0.00861
Statistics (Detects Only)	13	0.57	2.5	1.152	1.1	0.585
Statistics (All: NDs treated as DL value)	79	0.02	2.5	0.211	0.02	0.479
Statistics (All: NDs treated as DL/2 value)	79	0.01	2.5	0.2	0.01	0.483
Statistics (Normal ROS Estimated Data)	79	-4.148	2.5	-1.016	-1.143	1.342
Statistics (Gamma ROS Estimated Data)	79	0.197	2.987	1.943	2.175	0.717
Statistics (Lognormal ROS Estimated Data)	79	0.0167	2.5	0.338	0.174	0.444

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	5.194	5.005	0.222	0.0424	0.448	10.55
Statistics (NDs = DL)	0.424	0.416	0.498	-3.093	1.437	-0.465
Statistics (NDs = DL/2)	0.329	0.325	0.609	-3.672	1.69	-0.46
Statistics (Gamma ROS Estimates)	5.206	5.016	0.373	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.649	1.046	-0.634

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.82	0.866	Data Not Normal
Lilliefors (Detects Only)	0.246	0.246	Data Not Normal
Lilliefors (NDs = DL)	0.467	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.477	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0689	0.0997	Data Appear Normal

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.512	0.736	
Kolmogorov-Smirnov (Detects Only)	0.181	0.237	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	17.17	0.836	
Kolmogorov-Smirnov (NDs = DL)	0.422	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	18.08	0.858	
Kolmogorov-Smirnov (NDs = DL/2)	0.448	0.109	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.804	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.164	0.101	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.934	0.866	Data Appear Lognormal
Lilliefors (Detects Only)	0.158	0.246	Data Appear Lognormal
Lilliefors (NDs = DL)	0.327	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.348	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0689	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Calcium Data	79	0	79	63	16	20.25%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	16	4.6	6.7	5.563	5.4	0.796
Statistics (Detects Only)	63	116	25700	1392	717	3322
Statistics (All: NDs treated as DL value)	79	4.6	25700	1111	534	3014
Statistics (All: NDs treated as DL/2 value)	79	2.3	25700	1111	534	3014
Statistics (Normal ROS Estimated Data)	79	-3726	25700	537.2	534	3423
Statistics (Gamma ROS Estimated Data)	79	0	25700	1110	534	3014
Statistics (Lognormal ROS Estimated Data)	79	60.37	25700	1129	534	3007

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.899	0.873	1548	6.588	0.949	0.144
Statistics (NDs = DL)	0.456	0.447	2437	5.599	2.149	0.384
Statistics (NDs = DL/2)	0.42	0.413	2643	5.459	2.409	0.441
Statistics (Gamma ROS Estimates)	0.131	0.135	8441	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.173	1.189	0.193

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.359	0.112	Data Not Normal
Lilliefors (NDs = DL)	0.357	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.357	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.289	0.0997	Data Not Normal

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.055	0.785	
Kolmogorov-Smirnov (Detects Only)	0.223	0.116	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.78	0.829	
Kolmogorov-Smirnov (NDs = DL)	0.146	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.129	0.837	
Kolmogorov-Smirnov (NDs = DL/2)	0.149	0.107	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	17.18	0.972	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.418	0.114	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.108	0.112	Data Appear Lognormal
Lilliefors (NDs = DL)	0.224	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.251	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0933	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cobalt Data	79	0	79	56	23	29.11%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	23	0.11	0.84	0.587	0.73	0.286
Statistics (Detects Only)	56	5.9	130	22.23	13.3	23.94
Statistics (All: NDs treated as DL value)	79	0.11	130	15.93	11.4	22.41
Statistics (All: NDs treated as DL/2 value)	79	0.055	130	15.84	11.4	22.47
Statistics (Normal ROS Estimated Data)	79	-40.83	130	8.784	11.4	29.44
Statistics (Gamma ROS Estimated Data)	79	0	130	17.57	11.9	21.54
Statistics (Lognormal ROS Estimated Data)	79	1.86	130	16.76	11.4	21.87

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.78	1.721	12.49	2.795	0.701	0.251
Statistics (NDs = DL)	0.61	0.595	26.11	1.758	1.787	1.017
Statistics (NDs = DL/2)	0.523	0.511	30.31	1.556	2.08	1.337
Statistics (Gamma ROS Estimates)	0.504	0.494	34.83	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.331	0.947	0.406

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.263	0.118	Data Not Normal
Lilliefors (NDs = DL)	0.24	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.241	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.17	0.0997	Data Not Normal

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	3.203	0.765	
Kolmogorov-Smirnov (Detects Only)	0.162	0.121	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.127	0.807	
Kolmogorov-Smirnov (NDs = DL)	0.155	0.105	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.851	0.816	
Kolmogorov-Smirnov (NDs = DL/2)	0.171	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	9.036	0.818	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.36	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.13	0.118	Data Not Lognormal
Lilliefors (NDs = DL)	0.213	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.251	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0915	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Magnesium Data	79	0	79	72	7	8.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	3.8	5	4.686	4.8	0.402
Statistics (Detects Only)	72	139	58100	6394	1270	12925
Statistics (All: NDs treated as DL value)	79	3.8	58100	5828	1080	12466
Statistics (All: NDs treated as DL/2 value)	79	1.9	58100	5827	1080	12466
Statistics (Normal ROS Estimated Data)	79	-1911	58100	4438	1080	13862
Statistics (Gamma ROS Estimated Data)	79	0	58100	5827	1080	12466
Statistics (Lognormal ROS Estimated Data)	79	28.2	58100	5832	1080	12464

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.484	0.474	13216	7.443	1.571	0.211
Statistics (NDs = DL)	0.379	0.373	15366	6.92	2.257	0.326
Statistics (NDs = DL/2)	0.368	0.363	15828	6.859	2.409	0.351
Statistics (Gamma ROS Estimates)	0.198	0.199	29431	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	7.129	1.812	0.254

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.323	0.104	Data Not Normal
Lilliefors (NDs = DL)	0.321	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.29	0.0997	Data Not Normal

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.255	0.821	
Kolmogorov-Smirnov (Detects Only)	0.17	0.111	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.668	0.847	
Kolmogorov-Smirnov (NDs = DL)	0.136	0.108	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.542	0.849	
Kolmogorov-Smirnov (NDs = DL/2)	0.129	0.108	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	7.068	0.912	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.298	0.111	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0868	0.104	Data Appear Lognormal
Lilliefors (NDs = DL)	0.135	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.157	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0546	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Mercury Data	79	0	79	18	61	77.22%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	61	0.019	0.06	0.0484	0.06	0.0158
Statistics (Detects Only)	18	0.038	1.2	0.187	0.125	0.259
Statistics (All: NDs treated as DL value)	79	0.019	1.2	0.0799	0.06	0.135
Statistics (All: NDs treated as DL/2 value)	79	0.0095	1.2	0.0612	0.03	0.139
Statistics (Normal ROS Estimated Data)	79	-1.214	1.2	-0.361	-0.372	0.403
Statistics (Gamma ROS Estimated Data)	79	0.038	1.2	0.173	0.156	0.138
Statistics (Lognormal ROS Estimated Data)	79	0.0007952	1.2	0.0541	0.0171	0.141

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.552	1.501	0.12	-2.035	0.727	-0.358
Statistics (NDs = DL)	1.645	1.591	0.0485	-2.861	0.681	-0.238
Statistics (NDs = DL/2)	0.962	0.934	0.0636	-3.396	0.902	-0.266
Statistics (Gamma ROS Estimates)	3.073	2.965	0.0563	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-4.029	1.44	-0.357

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.442	0.897	Data Not Normal
Lilliefors (Detects Only)	0.384	0.209	Data Not Normal
Lilliefors (NDs = DL)	0.356	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.361	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.067	0.0997	Data Appear Normal

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.702	0.756	
Kolmogorov-Smirnov (Detects Only)	0.274	0.207	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	6.715	0.768	
Kolmogorov-Smirnov (NDs = DL)	0.33	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	8.44	0.784	
Kolmogorov-Smirnov (NDs = DL/2)	0.377	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.725	0.759	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0728	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.871	0.897	Data Not Lognormal
Lilliefors (Detects Only)	0.193	0.209	Data Appear Lognormal
Lilliefors (NDs = DL)	0.269	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.062	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Potassium Data	79	0	79	67	12	15.19%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	201	271	223.1	217	20.78
Statistics (Detects Only)	67	123	10900	1690	694	2232
Statistics (All: NDs treated as DL value)	79	123	10900	1467	618	2120
Statistics (All: NDs treated as DL/2 value)	79	100.5	10900	1450	618	2131
Statistics (Normal ROS Estimated Data)	79	-1878	10900	1235	618	2322
Statistics (Gamma ROS Estimated Data)	79	0	10900	1433	618	2142
Statistics (Lognormal ROS Estimated Data)	79	104.7	10900	1456	618	2127

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.92	0.893	1837	6.798	1.115	0.164
Statistics (NDs = DL)	0.837	0.814	1752	6.586	1.143	0.174
Statistics (NDs = DL/2)	0.75	0.73	1933	6.481	1.273	0.196
Statistics (Gamma ROS Estimates)	0.163	0.165	8778	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.525	1.216	0.186

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.247	0.108	Data Not Normal
Lilliefors (NDs = DL)	0.263	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.263	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.21	0.0997	Data Not Normal

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.945	0.784	
Kolmogorov-Smirnov (Detects Only)	0.153	0.112	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.288	0.789	
Kolmogorov-Smirnov (NDs = DL)	0.171	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.192	0.793	
Kolmogorov-Smirnov (NDs = DL/2)	0.147	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	14.88	0.944	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.392	0.113	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0982	0.108	Data Appear Lognormal
Lilliefors (NDs = DL)	0.106	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.0732	0.0997	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0941	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Thallium Data	79	0	79	15	64	81.01%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	64	0.13	0.45	0.189	0.15	0.0931
Statistics (Detects Only)	15	1.3	5	2.527	2.2	0.932
Statistics (All: NDs treated as DL value)	79	0.13	5	0.633	0.16	1.007
Statistics (All: NDs treated as DL/2 value)	79	0.065	5	0.556	0.08	1.039
Statistics (Normal ROS Estimated Data)	79	-4.787	5	-0.573	-0.722	1.972
Statistics (Gamma ROS Estimated Data)	79	1.3	5	2.489	2.468	0.399
Statistics (Lognormal ROS Estimated Data)	79	0.155	5	0.998	0.707	0.884

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	8.698	8.377	0.29	0.868	0.352	0.405
Statistics (NDs = DL)	0.753	0.733	0.841	-1.253	1.097	-0.876
Statistics (NDs = DL/2)	0.515	0.504	1.08	-1.814	1.358	-0.748
Statistics (Gamma ROS Estimates)	44.1	42.44	0.0564	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.291	0.738	-2.538

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.893	0.881	Data Appear Normal
Lilliefors (Detects Only)	0.17	0.229	Data Appear Normal
Lilliefors (NDs = DL)	0.382	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.435	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0779	0.0997	Data Appear Normal

Table D.1-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.367	0.738	
Kolmogorov-Smirnov (Detects Only)	0.145	0.222	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	12.86	0.793	
Kolmogorov-Smirnov (NDs = DL)	0.361	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	14.62	0.817	
Kolmogorov-Smirnov (NDs = DL/2)	0.371	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.13	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.319	0.1	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.959	0.881	Data Appear Lognormal
Lilliefors (Detects Only)	0.134	0.229	Data Appear Lognormal
Lilliefors (NDs = DL)	0.334	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.34	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0779	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	7
Minimum	17000
Maximum	25000
Mean of Raw Data	21500
Standard Deviation of Raw Data	2635
Kstar	50.08
Mean of Log Transformed Data	9.969
Standard Deviation of Log Transformed Data	0.126

Normal Distribution Test Results

Correlation Coefficient R	0.977
Shapiro Wilk Test Statistic	0.942
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.175
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.969
A-D Test Statistic	0.352
A-D Critical (0.95) Value	0.724
K-S Test Statistic	0.193
K-S Critical(0.95) Value	0.266

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.971
Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.194
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	1.5
Maximum	10
Mean of Raw Data	5.03
Standard Deviation of Raw Data	3.24
Kstar	1.932
Mean of Log Transformed Data	1.416
Standard Deviation of Log Transformed Data	0.677

Normal Distribution Test Results

Correlation Coefficient R	0.941
Shapiro Wilk Test Statistic	0.862
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.271
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.953
A-D Test Statistic	0.467
A-D Critical (0.95) Value	0.733
K-S Test Statistic	0.22
K-S Critical(0.95) Value	0.269

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.971
Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.179
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	8
Minimum	82
Maximum	180
Mean of Raw Data	129
Standard Deviation of Raw Data	30.94
Kstar	13.31
Mean of Log Transformed Data	4.833
Standard Deviation of Log Transformed Data	0.246

Normal Distribution Test Results

Correlation Coefficient R	0.983
Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.161
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.982
A-D Test Statistic	0.247
A-D Critical (0.95) Value	0.725
K-S Test Statistic	0.144
K-S Critical(0.95) Value	0.266

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.983
Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.156
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	0.59
Maximum	1.1
Mean of Raw Data	0.851
Standard Deviation of Raw Data	0.169
Kstar	19.64
Mean of Log Transformed Data	-0.179
Standard Deviation of Log Transformed Data	0.201

Normal Distribution Test Results

Correlation Coefficient R	0.978
Shapiro Wilk Test Statistic	0.944
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.196
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.977
A-D Test Statistic	0.264
A-D Critical (0.95) Value	0.725
K-S Test Statistic	0.178
K-S Critical(0.95) Value	0.266

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.982
Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.162
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	1.2
Maximum	2.2
Mean of Raw Data	1.625
Standard Deviation of Raw Data	0.321
Kstar	20.49
Mean of Log Transformed Data	0.468
Standard Deviation of Log Transformed Data	0.195

Normal Distribution Test Results

Correlation Coefficient R	0.982
Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.158
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.989
A-D Test Statistic	0.232
A-D Critical (0.95) Value	0.725
K-S Test Statistic	0.165
K-S Critical(0.95) Value	0.266

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.989
Shapiro Wilk Test Statistic	0.968
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.15
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	5300
Maximum	87000
Mean of Raw Data	26160
Standard Deviation of Raw Data	26932
Kstar	0.94
Mean of Log Transformed Data	9.72
Standard Deviation of Log Transformed Data	0.989

Normal Distribution Test Results

Correlation Coefficient R	0.887
Shapiro Wilk Test Statistic	0.789
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.3
Lilliefors Critical (0.95) Value	0.28

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.987
A-D Test Statistic	0.634
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.275
K-S Critical(0.95) Value	0.272

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.956
Shapiro Wilk Test Statistic	0.896
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.23
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	23
Maximum	160
Mean of Raw Data	81.4
Standard Deviation of Raw Data	55.8
Kstar	1.587
Mean of Log Transformed Data	4.152
Standard Deviation of Log Transformed Data	0.765

Normal Distribution Test Results

Correlation Coefficient R	0.929
Shapiro Wilk Test Statistic	0.835
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.276
Lilliefors Critical (0.95) Value	0.28

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.924
A-D Test Statistic	0.722
A-D Critical (0.95) Value	0.735
K-S Test Statistic	0.266
K-S Critical(0.95) Value	0.27

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.942
Shapiro Wilk Test Statistic	0.861
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.238
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	5.1
Maximum	11.5
Mean of Raw Data	8.96
Standard Deviation of Raw Data	1.984
Kstar	13.6
Mean of Log Transformed Data	2.167
Standard Deviation of Log Transformed Data	0.252

Normal Distribution Test Results

Correlation Coefficient R	0.965
Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.188
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.94
A-D Test Statistic	0.513
A-D Critical (0.95) Value	0.725
K-S Test Statistic	0.219
K-S Critical(0.95) Value	0.266

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.934
Shapiro Wilk Test Statistic	0.877
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.231
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	12
Maximum	200
Mean of Raw Data	66.9
Standard Deviation of Raw Data	60.46
Kstar	1.064
Mean of Log Transformed Data	3.813
Standard Deviation of Log Transformed Data	0.962

Normal Distribution Test Results

Correlation Coefficient R	0.922
Shapiro Wilk Test Statistic	0.85
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.195
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.991
A-D Test Statistic	0.375
A-D Critical (0.95) Value	0.741
K-S Test Statistic	0.205
K-S Critical(0.95) Value	0.272

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.188
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	6
Minimum	19000
Maximum	31000
Mean of Raw Data	25700
Standard Deviation of Raw Data	3268
Kstar	45.54
Mean of Log Transformed Data	10.15
Standard Deviation of Log Transformed Data	0.133

Normal Distribution Test Results

Correlation Coefficient R	0.964
Shapiro Wilk Test Statistic	0.947
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.201
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.961
A-D Test Statistic	0.381
A-D Critical (0.95) Value	0.724
K-S Test Statistic	0.207
K-S Critical(0.95) Value	0.266

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.948
Shapiro Wilk Test Statistic	0.919
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.224
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	25
Maximum	750
Mean of Raw Data	233.6
Standard Deviation of Raw Data	235
Kstar	0.911
Mean of Log Transformed Data	4.985
Standard Deviation of Log Transformed Data	1.064

Normal Distribution Test Results

Correlation Coefficient R	0.906
Shapiro Wilk Test Statistic	0.822
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.238
Lilliefors Critical (0.95) Value	0.28

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.991
A-D Test Statistic	0.228
A-D Critical (0.95) Value	0.745
K-S Test Statistic	0.139
K-S Critical(0.95) Value	0.273

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.994
Shapiro Wilk Test Statistic	0.982
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.101
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	3300
Maximum	14000
Mean of Raw Data	6550
Standard Deviation of Raw Data	3346
Kstar	3.904
Mean of Log Transformed Data	8.693
Standard Deviation of Log Transformed Data	0.434

Normal Distribution Test Results

Correlation Coefficient R	0.877
Shapiro Wilk Test Statistic	0.779
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.265
Lilliefors Critical (0.95) Value	0.28

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.94
A-D Test Statistic	0.783
A-D Critical (0.95) Value	0.729
K-S Test Statistic	0.246
K-S Critical(0.95) Value	0.267

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.937
Shapiro Wilk Test Statistic	0.886
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.224
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	260
Maximum	675
Mean of Raw Data	513.5
Standard Deviation of Raw Data	139.3
Kstar	8.899
Mean of Log Transformed Data	6.201
Standard Deviation of Log Transformed Data	0.314

Normal Distribution Test Results

Correlation Coefficient R	0.965
Shapiro Wilk Test Statistic	0.919
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.209
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.93
A-D Test Statistic	0.51
A-D Critical (0.95) Value	0.725
K-S Test Statistic	0.225
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.937
Shapiro Wilk Test Statistic	0.873
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.216
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	0.044
Maximum	0.83
Mean of Raw Data	0.276
Standard Deviation of Raw Data	0.292
Kstar	0.851
Mean of Log Transformed Data	-1.796
Standard Deviation of Log Transformed Data	1.052

Normal Distribution Test Results

Correlation Coefficient R	0.877
Shapiro Wilk Test Statistic	0.76
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.326
Lilliefors Critical (0.95) Value	0.28

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.955
A-D Test Statistic	0.837
A-D Critical (0.95) Value	0.746
K-S Test Statistic	0.32
K-S Critical(0.95) Value	0.273

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.946
Shapiro Wilk Test Statistic	0.878
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.285
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	12
Maximum	45
Mean of Raw Data	26.05
Standard Deviation of Raw Data	11.27
Kstar	4.127
Mean of Log Transformed Data	3.171
Standard Deviation of Log Transformed Data	0.45

Normal Distribution Test Results

Correlation Coefficient R	0.968
Shapiro Wilk Test Statistic	0.921
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.189
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.972
A-D Test Statistic	0.38
A-D Critical (0.95) Value	0.729
K-S Test Statistic	0.193
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.975
Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.185
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	6
Minimum	1300
Maximum	1700
Mean of Raw Data	1545
Standard Deviation of Raw Data	116.5
Kstar	129.6
Mean of Log Transformed Data	7.34
Standard Deviation of Log Transformed Data	0.0786

Normal Distribution Test Results

Correlation Coefficient R	0.916
Shapiro Wilk Test Statistic	0.853
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.282
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.908
A-D Test Statistic	0.87
A-D Critical (0.95) Value	0.724
K-S Test Statistic	0.293
K-S Critical(0.95) Value	0.266

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.906
Shapiro Wilk Test Statistic	0.836
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.284
Lilliefors Critical (0.95) Value	0.28

Data not Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Selenium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	7
Minimum	0.16
Maximum	0.37
Mean of Raw Data	0.266
Standard Deviation of Raw Data	0.0834
Kstar	7.348
Mean of Log Transformed Data	-1.375
Standard Deviation of Log Transformed Data	0.337

Normal Distribution Test Results

Correlation Coefficient R	0.953
Shapiro Wilk Test Statistic	0.879
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.192
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.938
A-D Test Statistic	0.615
A-D Critical (0.95) Value	0.725
K-S Test Statistic	0.231
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.943
Shapiro Wilk Test Statistic	0.861
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.239
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	0.067
Maximum	25
Mean of Raw Data	5.571
Standard Deviation of Raw Data	8.684
Kstar	0.348
Mean of Log Transformed Data	0.0815
Standard Deviation of Log Transformed Data	2.197

Normal Distribution Test Results

Correlation Coefficient R	0.838
Shapiro Wilk Test Statistic	0.705
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.351
Lilliefors Critical (0.95) Value	0.28

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.981
A-D Test Statistic	0.45
A-D Critical (0.95) Value	0.795
K-S Test Statistic	0.185
K-S Critical(0.95) Value	0.284

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.142
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	31
Maximum	85
Mean of Raw Data	61.4
Standard Deviation of Raw Data	19.69
Kstar	6.981
Mean of Log Transformed Data	4.066
Standard Deviation of Log Transformed Data	0.348

Normal Distribution Test Results

Correlation Coefficient R	0.96
Shapiro Wilk Test Statistic	0.901
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.214
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.938
A-D Test Statistic	0.446
A-D Critical (0.95) Value	0.725
K-S Test Statistic	0.224
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.959
Shapiro Wilk Test Statistic	0.905
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.208
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	8
Minimum	0.059
Maximum	0.235
Mean of Raw Data	0.169
Standard Deviation of Raw Data	0.0557
Kstar	5.328
Mean of Log Transformed Data	-1.843
Standard Deviation of Log Transformed Data	0.426

Normal Distribution Test Results

Correlation Coefficient R	0.952
Shapiro Wilk Test Statistic	0.904
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.244
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.902
A-D Test Statistic	0.706
A-D Critical (0.95) Value	0.727
K-S Test Statistic	0.271
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.899
Shapiro Wilk Test Statistic	0.817
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.267
Lilliefors Critical (0.95) Value	0.28

Data not Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	21
Maximum	43.5
Mean of Raw Data	34.55
Standard Deviation of Raw Data	7.143
Kstar	16.26
Mean of Log Transformed Data	3.521
Standard Deviation of Log Transformed Data	0.227

Normal Distribution Test Results

Correlation Coefficient R	0.971
Shapiro Wilk Test Statistic	0.936
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.185
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.95
A-D Test Statistic	0.416
A-D Critical (0.95) Value	0.725
K-S Test Statistic	0.203
K-S Critical(0.95) Value	0.266

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.949
Shapiro Wilk Test Statistic	0.901
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.197
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	60
Maximum	280
Mean of Raw Data	139.5
Standard Deviation of Raw Data	65.77
Kstar	3.879
Mean of Log Transformed Data	4.843
Standard Deviation of Log Transformed Data	0.458

Normal Distribution Test Results

Correlation Coefficient R	0.957
Shapiro Wilk Test Statistic	0.921
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.177
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.99
A-D Test Statistic	0.177
A-D Critical (0.95) Value	0.729
K-S Test Statistic	0.15
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.994
Shapiro Wilk Test Statistic	0.99
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.122
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.1-2h
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Antimony

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	10	0	10	9	1	10.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	9	0.0365	1.1	0.294	0.2	0.329
Statistics (All: NDs treated as DL value)	10	0.0365	1.1	0.268	0.18	0.32
Statistics (All: NDs treated as DL/2 value)	10	0.021	1.1	0.266	0.18	0.322
Statistics (Normal ROS Estimated Data)	10	-0.184	1.1	0.246	0.18	0.345
Statistics (Gamma ROS Estimated Data)	10	1E-09	1.1	0.264	0.18	0.324
Statistics (Lognormal ROS Estimated Data)	10	0.0316	1.1	0.267	0.18	0.321

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.231	0.928	0.238	-1.684	1.016	-0.603
Statistics (NDs = DL)	1.103	0.839	0.243	-1.833	1.067	-0.582
Statistics (NDs = DL/2)	0.998	0.765	0.267	-1.902	1.18	-0.62
Statistics (Gamma ROS Estimates)	0.305	0.28	0.867	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.861	1.11	-0.596

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.846	0.836	0.842	0.894

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.736	0.829	Data Not Normal
Lilliefors (Detects Only)	0.267	0.295	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.717	0.842	Data Not Normal
Lilliefors (NDs = DL)	0.272	0.28	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.729	0.842	Data Not Normal
Lilliefors (NDs = DL/2)	0.269	0.28	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.828	0.842	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.241	0.28	Data Appear Normal

Table D.1-2h
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.971	0.971	0.976	0.991

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.292	0.739	
Kolmogorov-Smirnov (Detects Only)	0.183	0.286	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.323	0.746	
Kolmogorov-Smirnov (NDs = DL)	0.168	0.273	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.235	0.748	
Kolmogorov-Smirnov (NDs = DL/2)	0.154	0.274	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.335	0.813	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.326	0.288	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.991	0.988	0.993	0.989

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.987	0.829	Data Appear Lognormal
Lilliefors (Detects Only)	0.118	0.295	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.97	0.842	Data Appear Lognormal
Lilliefors (NDs = DL)	0.12	0.28	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.986	0.842	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.123	0.28	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.972	0.842	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.11	0.28	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	12
Minimum	12000
Maximum	25000
Mean of Raw Data	18455
Standard Deviation of Raw Data	3776
Kstar	21.12
Mean of Log Transformed Data	9.802
Standard Deviation of Log Transformed Data	0.21

Normal Distribution Test Results

Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.962
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.108
Lilliefors Critical (0.95) Value	0.189

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.983
A-D Test Statistic	0.308
A-D Critical (0.95) Value	0.741
K-S Test Statistic	0.119
K-S Critical(0.95) Value	0.185

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.985
Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.116
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	17
Minimum	0.82
Maximum	10
Mean of Raw Data	3.176
Standard Deviation of Raw Data	2.842
Kstar	1.544
Mean of Log Transformed Data	0.844
Standard Deviation of Log Transformed Data	0.773

Normal Distribution Test Results

Correlation Coefficient R	0.874
Shapiro Wilk Test Statistic	0.759
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.248
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.964
A-D Test Statistic	1.062
A-D Critical (0.95) Value	0.757
K-S Test Statistic	0.186
K-S Critical(0.95) Value	0.188

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.966
Shapiro Wilk Test Statistic	0.919
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.169
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	14
Minimum	60
Maximum	180
Mean of Raw Data	116.5
Standard Deviation of Raw Data	28.97
Kstar	14.07
Mean of Log Transformed Data	4.726
Standard Deviation of Log Transformed Data	0.26

Normal Distribution Test Results

Correlation Coefficient R	0.981
Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.138
Lilliefors Critical (0.95) Value	0.189

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.98
A-D Test Statistic	0.391
A-D Critical (0.95) Value	0.742
K-S Test Statistic	0.158
K-S Critical(0.95) Value	0.185

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.978
Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.161
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	18
Minimum	0.54
Maximum	1.1
Mean of Raw Data	0.759
Standard Deviation of Raw Data	0.169
Kstar	19.47
Mean of Log Transformed Data	-0.299
Standard Deviation of Log Transformed Data	0.214

Normal Distribution Test Results

Correlation Coefficient R	0.962
Shapiro Wilk Test Statistic	0.915
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.153
Lilliefors Critical (0.95) Value	0.189

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.976
A-D Test Statistic	0.482
A-D Critical (0.95) Value	0.741
K-S Test Statistic	0.124
K-S Critical(0.95) Value	0.185

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.979
Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.113
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	11
Minimum	0.97
Maximum	2.2
Mean of Raw Data	1.565
Standard Deviation of Raw Data	0.324
Kstar	20.77
Mean of Log Transformed Data	0.427
Standard Deviation of Log Transformed Data	0.211

Normal Distribution Test Results

Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.97
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.103
Lilliefors Critical (0.95) Value	0.189

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.987
A-D Test Statistic	0.287
A-D Critical (0.95) Value	0.741
K-S Test Statistic	0.107
K-S Critical(0.95) Value	0.185

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.986
Shapiro Wilk Test Statistic	0.969
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.103
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	22
Minimum	1500
Maximum	89000
Mean of Raw Data	20545
Standard Deviation of Raw Data	27676
Kstar	0.637
Mean of Log Transformed Data	9.07
Standard Deviation of Log Transformed Data	1.352

Normal Distribution Test Results

Correlation Coefficient R	0.844
Shapiro Wilk Test Statistic	0.707
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.303
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.967
A-D Test Statistic	1.104
A-D Critical (0.95) Value	0.787
K-S Test Statistic	0.183
K-S Critical(0.95) Value	0.193

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.969
Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.111
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	20
Minimum	21
Maximum	160
Mean of Raw Data	53.36
Standard Deviation of Raw Data	45.41
Kstar	1.863
Mean of Log Transformed Data	3.723
Standard Deviation of Log Transformed Data	0.67

Normal Distribution Test Results

Correlation Coefficient R	0.83
Shapiro Wilk Test Statistic	0.683
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.343
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.927
A-D Test Statistic	2.231
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.293
K-S Critical(0.95) Value	0.188

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.906
Shapiro Wilk Test Statistic	0.809
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.248
Lilliefors Critical (0.95) Value	0.189

Data not Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	17
Minimum	5.1
Maximum	12
Mean of Raw Data	9.091
Standard Deviation of Raw Data	1.636
Kstar	24.47
Mean of Log Transformed Data	2.19
Standard Deviation of Log Transformed Data	0.201

Normal Distribution Test Results

Correlation Coefficient R	0.965
Shapiro Wilk Test Statistic	0.936
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.178
Lilliefors Critical (0.95) Value	0.189

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.95
A-D Test Statistic	0.913
A-D Critical (0.95) Value	0.741
K-S Test Statistic	0.206
K-S Critical(0.95) Value	0.185

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.934
Shapiro Wilk Test Statistic	0.88
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.221
Lilliefors Critical (0.95) Value	0.189

Data not Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	17
Minimum	10
Maximum	200
Mean of Raw Data	40.73
Standard Deviation of Raw Data	47.88
Kstar	1.07
Mean of Log Transformed Data	3.237
Standard Deviation of Log Transformed Data	0.921

Normal Distribution Test Results

Correlation Coefficient R	0.819
Shapiro Wilk Test Statistic	0.681
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.287
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.969
A-D Test Statistic	1.644
A-D Critical (0.95) Value	0.766
K-S Test Statistic	0.225
K-S Critical(0.95) Value	0.19

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.933
Shapiro Wilk Test Statistic	0.86
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.192
Lilliefors Critical (0.95) Value	0.189

Data not Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	12
Minimum	17000
Maximum	31000
Mean of Raw Data	24227
Standard Deviation of Raw Data	3518
Kstar	41.49
Mean of Log Transformed Data	10.08
Standard Deviation of Log Transformed Data	0.15

Normal Distribution Test Results

Correlation Coefficient R	0.993
Shapiro Wilk Test Statistic	0.985
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.102
Lilliefors Critical (0.95) Value	0.189

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.989
A-D Test Statistic	0.237
A-D Critical (0.95) Value	0.743
K-S Test Statistic	0.116
K-S Critical(0.95) Value	0.185

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.973
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.118
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	19
Minimum	9.6
Maximum	750
Mean of Raw Data	137.1
Standard Deviation of Raw Data	186.2
Kstar	0.659
Mean of Log Transformed Data	4.096
Standard Deviation of Log Transformed Data	1.37

Normal Distribution Test Results

Correlation Coefficient R	0.834
Shapiro Wilk Test Statistic	0.704
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.247
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.987
A-D Test Statistic	0.639
A-D Critical (0.95) Value	0.785
K-S Test Statistic	0.165
K-S Critical(0.95) Value	0.193

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.976
Shapiro Wilk Test Statistic	0.938
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.139
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	19
Minimum	3300
Maximum	44000
Mean of Raw Data	8923
Standard Deviation of Raw Data	10901
Kstar	1.396
Mean of Log Transformed Data	8.748
Standard Deviation of Log Transformed Data	0.711

Normal Distribution Test Results

Correlation Coefficient R	0.706
Shapiro Wilk Test Statistic	0.511
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.346
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.871
A-D Test Statistic	3.2
A-D Critical (0.95) Value	0.758
K-S Test Statistic	0.317
K-S Critical(0.95) Value	0.188

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.852
Shapiro Wilk Test Statistic	0.729
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.288
Lilliefors Critical (0.95) Value	0.189

Data not Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	18
Minimum	230
Maximum	675
Mean of Raw Data	432.5
Standard Deviation of Raw Data	137.9
Kstar	8.797
Mean of Log Transformed Data	6.02
Standard Deviation of Log Transformed Data	0.327

Normal Distribution Test Results

Correlation Coefficient R	0.977
Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.135
Lilliefors Critical (0.95) Value	0.189

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.977
A-D Test Statistic	0.42
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.127
K-S Critical(0.95) Value	0.185

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.982
Shapiro Wilk Test Statistic	0.951
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.113
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	18
Minimum	0.021
Maximum	0.83
Mean of Raw Data	0.148
Standard Deviation of Raw Data	0.226
Kstar	0.749
Mean of Log Transformed Data	-2.62
Standard Deviation of Log Transformed Data	1.092

Normal Distribution Test Results

Correlation Coefficient R	0.758
Shapiro Wilk Test Statistic	0.582
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.402
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.937
A-D Test Statistic	1.981
A-D Critical (0.95) Value	0.779
K-S Test Statistic	0.301
K-S Critical(0.95) Value	0.192

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.939
Shapiro Wilk Test Statistic	0.873
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.204
Lilliefors Critical (0.95) Value	0.189

Data not Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	16
Minimum	11
Maximum	45
Mean of Raw Data	20.52
Standard Deviation of Raw Data	9.991
Kstar	4.663
Mean of Log Transformed Data	2.925
Standard Deviation of Log Transformed Data	0.431

Normal Distribution Test Results

Correlation Coefficient R	0.904
Shapiro Wilk Test Statistic	0.812
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.274
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.955
A-D Test Statistic	1.339
A-D Critical (0.95) Value	0.746
K-S Test Statistic	0.245
K-S Critical(0.95) Value	0.186

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.944
Shapiro Wilk Test Statistic	0.881
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.221
Lilliefors Critical (0.95) Value	0.189

Data not Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	10
Minimum	1300
Maximum	3100
Mean of Raw Data	1702
Standard Deviation of Raw Data	361.4
Kstar	26.16
Mean of Log Transformed Data	7.423
Standard Deviation of Log Transformed Data	0.176

Normal Distribution Test Results

Correlation Coefficient R	0.817
Shapiro Wilk Test Statistic	0.694
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.257
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.852
A-D Test Statistic	1.371
A-D Critical (0.95) Value	0.741
K-S Test Statistic	0.219
K-S Critical(0.95) Value	0.185

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.891
Shapiro Wilk Test Statistic	0.816
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.204
Lilliefors Critical (0.95) Value	0.189

Data not Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	21
Minimum	0.048
Maximum	25
Mean of Raw Data	2.937
Standard Deviation of Raw Data	6.277
Kstar	0.342
Mean of Log Transformed Data	-0.776
Standard Deviation of Log Transformed Data	1.998

Normal Distribution Test Results

Correlation Coefficient R	0.714
Shapiro Wilk Test Statistic	0.525
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.365
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.975
A-D Test Statistic	1.579
A-D Critical (0.95) Value	0.834
K-S Test Statistic	0.21
K-S Critical(0.95) Value	0.2

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.953
Shapiro Wilk Test Statistic	0.895
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.204
Lilliefors Critical (0.95) Value	0.189

Data not Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	19
Minimum	31
Maximum	110
Mean of Raw Data	61.95
Standard Deviation of Raw Data	21.41
Kstar	8.445
Mean of Log Transformed Data	4.074
Standard Deviation of Log Transformed Data	0.326

Normal Distribution Test Results

Correlation Coefficient R	0.942
Shapiro Wilk Test Statistic	0.884
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.218
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.968
A-D Test Statistic	0.724
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.179
K-S Critical(0.95) Value	0.185

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.948
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.157
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	13
Minimum	0.059
Maximum	0.235
Mean of Raw Data	0.17
Standard Deviation of Raw Data	0.0391
Kstar	12.78
Mean of Log Transformed Data	-1.808
Standard Deviation of Log Transformed Data	0.293

Normal Distribution Test Results

Correlation Coefficient R	0.96
Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.149
Lilliefors Critical (0.95) Value	0.189

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.932
A-D Test Statistic	1.002
A-D Critical (0.95) Value	0.742
K-S Test Statistic	0.173
K-S Critical(0.95) Value	0.185

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.882
Shapiro Wilk Test Statistic	0.798
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.199
Lilliefors Critical (0.95) Value	0.189

Data not Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	13
Minimum	21
Maximum	43.5
Mean of Raw Data	34.7
Standard Deviation of Raw Data	5.646
Kstar	31.35
Mean of Log Transformed Data	3.533
Standard Deviation of Log Transformed Data	0.175

Normal Distribution Test Results

Correlation Coefficient R	0.977
Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.112
Lilliefors Critical (0.95) Value	0.189

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.965
A-D Test Statistic	0.445
A-D Critical (0.95) Value	0.742
K-S Test Statistic	0.133
K-S Critical(0.95) Value	0.185

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.957
Shapiro Wilk Test Statistic	0.921
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.142
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Observations	22
Number of Distinct Observations	20
Minimum	41
Maximum	280
Mean of Raw Data	98.25
Standard Deviation of Raw Data	58.37
Kstar	3.56
Mean of Log Transformed Data	4.46
Standard Deviation of Log Transformed Data	0.487

Normal Distribution Test Results

Correlation Coefficient R	0.88
Shapiro Wilk Test Statistic	0.783
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.253
Lilliefors Critical (0.95) Value	0.189

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.958
A-D Test Statistic	0.983
A-D Critical (0.95) Value	0.747
K-S Test Statistic	0.22
K-S Critical(0.95) Value	0.186

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.963
Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical (0.95) Value	0.911
Lilliefors Test Statistic	0.19
Lilliefors Critical (0.95) Value	0.189

Data appear Lognormal at (0.05) Significance Level

Table D.1-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Antimony

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	22	0	22	16	6	27.27%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.042	0.042	0.042	0.042	0
Statistics (Detects Only)	16	0.0365	1.1	0.222	0.125	0.263
Statistics (All: NDs treated as DL value)	22	0.0365	1.1	0.173	0.084	0.237
Statistics (All: NDs treated as DL/2 value)	22	0.021	1.1	0.167	0.084	0.24
Statistics (Normal ROS Estimated Data)	22	-0.409	1.1	0.102	0.084	0.306
Statistics (Gamma ROS Estimated Data)	22	1E-09	1.1	0.176	0.11	0.237
Statistics (Lognormal ROS Estimated Data)	22	0.0105	1.1	0.168	0.084	0.239

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.327	1.177	0.167	-1.926	0.895	-0.464
Statistics (NDs = DL)	1.116	0.994	0.155	-2.266	0.945	-0.417
Statistics (NDs = DL/2)	0.88	0.79	0.19	-2.455	1.162	-0.474
Statistics (Gamma ROS Estimates)	0.329	0.314	0.534	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-2.428	1.155	-0.476

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.795	0.756	0.774	0.925

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.656	0.887	Data Not Normal
Lilliefors (Detects Only)	0.268	0.222	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.593	0.911	Data Not Normal
Lilliefors (NDs = DL)	0.282	0.189	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.619	0.911	Data Not Normal
Lilliefors (NDs = DL/2)	0.271	0.189	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.877	0.911	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.179	0.189	Data Appear Normal

Table D.1-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.942	0.932	0.951	0.979

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.571	0.758	
Kolmogorov-Smirnov (Detects Only)	0.167	0.22	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.247	0.768	
Kolmogorov-Smirnov (NDs = DL)	0.174	0.19	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	0.726	0.777	
Kolmogorov-Smirnov (NDs = DL/2)	0.143	0.192	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.792	0.841	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.319	0.2	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.985	0.949	0.97	0.996

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.972	0.887	Data Appear Lognormal
Lilliefors (Detects Only)	0.113	0.222	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.896	0.911	Data Not Lognormal
Lilliefors (NDs = DL)	0.175	0.189	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.93	0.911	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.16	0.189	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.991	0.911	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0837	0.189	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Table D.1-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Selenium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	22	0	22	21	1	4.55%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	21	0.12	0.37	0.224	0.21	0.0827
Statistics (All: NDs treated as DL value)	22	0.089	0.37	0.217	0.205	0.0857
Statistics (All: NDs treated as DL/2 value)	22	0.0445	0.37	0.215	0.205	0.0893
Statistics (Normal ROS Estimated Data)	22	0.0213	0.37	0.214	0.205	0.0915
Statistics (Gamma ROS Estimated Data)	22	0.0326	0.37	0.215	0.205	0.0904
Statistics (Lognormal ROS Estimated Data)	22	0.0835	0.37	0.217	0.205	0.0861

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	7.739	6.714	0.0289	-1.564	0.374	-0.239
Statistics (NDs = DL)	6.645	5.769	0.0327	-1.603	0.408	-0.254
Statistics (NDs = DL/2)	5.197	4.518	0.0415	-1.634	0.492	-0.301
Statistics (Gamma ROS Estimates)	4.669	4.063	0.046	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.606	0.414	-0.258

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.961	0.969	0.976	0.977

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.907	0.908	Data Not Normal
Lilliefors (Detects Only)	0.16	0.193	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.926	0.911	Data Appear Normal
Lilliefors (NDs = DL)	0.158	0.189	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.947	0.911	Data Appear Normal
Lilliefors (NDs = DL/2)	0.146	0.189	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.95	0.911	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.143	0.189	Data Appear Normal

Table D.1-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.968	0.972	0.967	0.963

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.657	0.744	
Kolmogorov-Smirnov (Detects Only)	0.175	0.19	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.519	0.746	
Kolmogorov-Smirnov (NDs = DL)	0.168	0.186	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.453	0.746	
Kolmogorov-Smirnov (NDs = DL/2)	0.155	0.186	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.507	0.746	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.149	0.186	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.97	0.979	0.944	0.979

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.923	0.908	Data Appear Lognormal
Lilliefors (Detects Only)	0.177	0.193	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.949	0.911	Data Appear Lognormal
Lilliefors (NDs = DL)	0.167	0.189	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.9	0.911	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.143	0.189	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.95	0.911	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.165	0.189	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Aluminum(site)

Background Data: Aluminum(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	7	28
Minimum	17000	3620
Maximum	25000	20100
Mean	21500	8300
Median	22000	6705
SD	2635	4279
SE of Mean	833.3	808.6

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	331
WMW Test U-Stat	276
WMW Critical Value (0.050)	217
Approximate P-Value	3.5315E-06

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Arsenic(bkd)

Background Data: Arsenic(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	28	28
Number of Distinct Observations	24	24
Minimum	1.5	1.5
Maximum	10.2	10.2
Mean	3.732	3.732
Median	2.75	2.75
SD	2.33	2.33
SE of Mean	0.44	0.44

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	798
WMW Test U-Stat	-0.00819
WMW Critical Value (0.050)	1.645
P-Value	0.503

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Barium(site)

Background Data: Barium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	4
Number of Detect Data	10	24
Minimum Non-Detect	N/A	0.36
Maximum Non-Detect	N/A	1
Percent Non detects	0.00%	14.29%
Minimum Detected	82	23.4
Maximum Detected	180	174
Mean of Detected Data	129	75.55
Median of Detected Data	130	61.85
SD of Detected Data	30.94	43.2

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	296
WMW Test U-Stat	241
WMW Critical Value (0.050)	217
Approximate P-Value	0.00043183

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Beryllium(site)

Background Data: Beryllium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	13
Number of Detect Data	10	15
Minimum Non-Detect	N/A	0.022
Maximum Non-Detect	N/A	0.03
Percent Non detects	0.00%	46.43%
Minimum Detected	0.59	0.61
Maximum Detected	1.1	1.5
Mean of Detected Data	0.851	0.887
Median of Detected Data	0.805	0.87
SD of Detected Data	0.169	0.246

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.03 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	258
WMW Test U-Stat	203
WMW Critical Value (0.050)	217
Approximate P-Value	0.0191

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Calcium(site)

Background Data: Calcium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	10	27
Minimum	5300	4.6
Maximum	87000	7340
Mean	26160	983.9
Median	11500	761.5
SD	26932	1380
SE of Mean	8517	260.8

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	332
WMW Test U-Stat	277
WMW Critical Value (0.050)	217
Approximate P-Value	3.0208E-06

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Chromium(site)

Background Data: Chromium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	10	27
Minimum	23	6.3
Maximum	160	53.3
Mean	81.4	21.09
Median	60.75	22.4
SD	55.8	10.5
SE of Mean	17.65	1.985

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	314
WMW Test U-Stat	259
WMW Critical Value (0.050)	217
Approximate P-Value	4.2785E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cobalt(site)

Background Data: Cobalt(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	8
Number of Detect Data	10	20
Minimum Non-Detect	N/A	0.11
Maximum Non-Detect	N/A	0.75
Percent Non detects	0.00%	28.57%
Minimum Detected	5.1	5.9
Maximum Detected	11.5	45.4
Mean of Detected Data	8.96	15.95
Median of Detected Data	9.5	12.1
SD of Detected Data	1.984	10.07

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.75 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	178
WMW Test U-Stat	123
WMW Critical Value (0.050)	217
Approximate P-Value	0.719

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Copper(site)

Background Data: Copper(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	2
Number of Detect Data	10	26
Minimum Non-Detect	N/A	0.17
Maximum Non-Detect	N/A	0.17
Percent Non detects	0.00%	7.14%
Minimum Detected	12	2.2
Maximum Detected	200	13.6
Mean of Detected Data	66.9	6.919
Median of Detected Data	54.25	5.35
SD of Detected Data	60.46	3.696

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	332
WMW Test U-Stat	277
WMW Critical Value (0.050)	217
Approximate P-Value	3.0208E-06

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Iron(site)

Background Data: Iron(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	6	26
Minimum	19000	7250
Maximum	31000	63000
Mean	25700	20108
Median	26000	19750
SD	3268	11869
SE of Mean	1033	2243

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	263
WMW Test U-Stat	208
WMW Critical Value (0.050)	217
Approximate P-Value	0.0126

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Lead(site)

Background Data: Lead(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	10	26
Minimum	25	8.9
Maximum	750	225
Mean	233.6	26.96
Median	155	15.15
SD	235	41.34
SE of Mean	74.32	7.813

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	322
WMW Test U-Stat	267
WMW Critical Value (0.050)	217
Approximate P-Value	1.3738E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Magnesium(site)

Background Data: Magnesium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	3
Number of Detect Data	10	25
Minimum Non-Detect	N/A	4.7
Maximum Non-Detect	N/A	5
Percent Non detects	0.00%	10.71%
Minimum Detected	3300	158
Maximum Detected	14000	20400
Mean of Detected Data	6550	2498
Median of Detected Data	5100	913
SD of Detected Data	3346	4334

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 5 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	303
WMW Test U-Stat	248
WMW Critical Value (0.050)	217
Approximate P-Value	0.00018291

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Manganese(site)

Background Data: Manganese(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	9	28
Minimum	260	43
Maximum	675	2040
Mean	513.5	695.9
Median	550	490
SD	139.3	591.5
SE of Mean	44.05	111.8

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	197
WMW Test U-Stat	142
WMW Critical Value (0.050)	217
Approximate P-Value	0.48

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Nickel(site)

Background Data: Nickel(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	11
Number of Detect Data	10	17
Minimum Non-Detect	N/A	0.21
Maximum Non-Detect	N/A	1.3
Percent Non detects	0.00%	39.29%
Minimum Detected	12	4.6
Maximum Detected	45	18.1
Mean of Detected Data	26.05	9.935
Median of Detected Data	24	9.4
SD of Detected Data	11.27	4.294

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.3 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	325
WMW Test U-Stat	270
WMW Critical Value (0.050)	217
Approximate P-Value	8.8184E-06

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Potassium(site)

Background Data: Potassium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	6
Number of Detect Data	10	22
Minimum Non-Detect	N/A	201
Maximum Non-Detect	N/A	271
Percent Non detects	0.00%	21.43%
Minimum Detected	1300	166
Maximum Detected	1700	2350
Mean of Detected Data	1545	735.4
Median of Detected Data	1600	509.5
SD of Detected Data	116.5	632.6

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 271 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	309
WMW Test U-Stat	254
WMW Critical Value (0.050)	217
Approximate P-Value	8.4116E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Vanadium(site)

Background Data: Vanadium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	9	27
Minimum	21	12.2
Maximum	43.5	101
Mean	34.55	33.89
Median	36.5	33.8
SD	7.143	17.78
SE of Mean	2.259	3.36

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	210
WMW Test U-Stat	155
WMW Critical Value (0.050)	217
Approximate P-Value	0.315

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.1-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Zinc(site)

Background Data: Zinc(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	9	28
Minimum	60	7.1
Maximum	280	216
Mean	139.5	41.21
Median	125	29.7
SD	65.77	40.24
SE of Mean	20.8	7.605

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	322
WMW Test U-Stat	267
WMW Critical Value (0.050)	217
Approximate P-Value	1.3738E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Aluminum(site)

Background Data: Aluminum(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	22	79
Number of Distinct Observations	12	75
Minimum	12000	3620
Maximum	25000	47900
Mean	18455	14204
Median	18000	12100
SD	3776	9433
SE of Mean	805.1	1061

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1543
WMW Test U-Stat	3.456
WMW Critical Value (0.050)	1.645
P-Value	0.0002746

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Arsenic(site)

Background Data: Arsenic(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	22	79
Number of Non-Detect Data	0	3
Number of Detect Data	22	76
Minimum Non-Detect	N/A	0.09
Maximum Non-Detect	N/A	0.12
Percent Non detects	0.00%	3.80%
Minimum Detected	0.82	1.2
Maximum Detected	10	35.9
Mean of Detected Data	3.176	4.989
Median of Detected Data	2	3.2
SD of Detected Data	2.842	5.36

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.12 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	825
WMW Test U-Stat	-2.448
WMW Critical Value (0.050)	1.645
P-Value	0.993

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Barium(site)

Background Data: Barium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	22	79
Number of Non-Detect Data	0	16
Number of Detect Data	22	63
Minimum Non-Detect	N/A	0.36
Maximum Non-Detect	N/A	1.1
Percent Non detects	0.00%	20.25%
Minimum Detected	60	23.4
Maximum Detected	180	174
Mean of Detected Data	116.5	68.4
Median of Detected Data	120	56.7
SD of Detected Data	28.97	40.39

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.1 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1749
WMW Test U-Stat	5.15
WMW Critical Value (0.050)	1.645
P-Value	1.2997E-07

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Beryllium(site)

Background Data: Beryllium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	22	79
Number of Non-Detect Data	0	39
Number of Detect Data	22	40
Minimum Non-Detect	N/A	0.022
Maximum Non-Detect	N/A	0.03
Percent Non detects	0.00%	49.37%
Minimum Detected	0.54	0.61
Maximum Detected	1.1	5.4
Mean of Detected Data	0.759	1.449
Median of Detected Data	0.76	1.1
SD of Detected Data	0.169	1.086

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.03 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1263
WMW Test U-Stat	1.152
WMW Critical Value (0.050)	1.645
P-Value	0.125

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cadmium(site)

Background Data: Cadmium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	22	79
Number of Non-Detect Data	0	66
Number of Detect Data	22	13
Minimum Non-Detect	N/A	0.02
Maximum Non-Detect	N/A	0.05
Percent Non detects	0.00%	83.54%
Minimum Detected	0.97	0.57
Maximum Detected	2.2	2.5
Mean of Detected Data	1.565	1.152
Median of Detected Data	1.55	1.1
SD of Detected Data	0.324	0.585

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.05 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1934
WMW Test U-Stat	6.677
WMW Critical Value (0.050)	1.645
P-Value	1.223E-11

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Chromium(site)

Background Data: Chromium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	22	79
Number of Distinct Observations	20	70
Minimum	21	6.3
Maximum	160	75.8
Mean	53.36	26.86
Median	34	26
SD	45.41	12.51
SE of Mean	9.681	1.408

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1468
WMW Test U-Stat	2.843
WMW Critical Value (0.050)	1.645
P-Value	0.00224

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cobalt(site)

Background Data: Cobalt(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	22	79
Number of Non-Detect Data	0	23
Number of Detect Data	22	56
Minimum Non-Detect	N/A	0.11
Maximum Non-Detect	N/A	0.84
Percent Non detects	0.00%	29.11%
Minimum Detected	5.1	5.9
Maximum Detected	12	130
Mean of Detected Data	9.091	22.23
Median of Detected Data	9.3	13.3
SD of Detected Data	1.636	23.94

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.84 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	980
WMW Test U-Stat	-1.172
WMW Critical Value (0.050)	1.645
P-Value	0.879

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Copper(site)

Background Data: Copper(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	22	79
Number of Distinct Observations	17	67
Minimum	10	0.17
Maximum	200	38.7
Mean	40.73	11.95
Median	17.75	9
SD	47.88	9.47
SE of Mean	10.21	1.065

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1603
WMW Test U-Stat	3.949
WMW Critical Value (0.050)	1.645
P-Value	0.00003921

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

Area of Concern Data: Iron(site)

Background Data: Iron(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	22	79
Number of Distinct Observations	12	72
Minimum	17000	7250
Maximum	31000	67700
Mean	24227	26963
Median	24000	25200
SD	3518	11990
SE of Mean	750	1349

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	99	-1.054	1.66	0.853
Satterthwaite (Unequal Variance)	98.7	-1.773	1.66	0.96

Pooled SD 10765.010

Conclusion with Alpha = 0.050

* Student t (Pooled) Test: Do Not Reject H0, Conclude Site <= Background
* Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background

Test of Equality of Variances

Numerator DF	Denominator DF	F-Test Value	P-Value
78	21	11.617	0

Conclusion with Alpha = 0.05

* Two variances are not equal

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Lead(site)

Background Data: Lead(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	22	79
Number of Distinct Observations	19	70
Minimum	9.6	2.1
Maximum	750	256
Mean	137.1	22.04
Median	58.5	12
SD	186.2	39.85
SE of Mean	39.69	4.483

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1671
WMW Test U-Stat	4.509
WMW Critical Value (0.050)	1.645
P-Value	3.2621E-06

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Magnesium(site)

Background Data: Magnesium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	22	79
Number of Non-Detect Data	0	7
Number of Detect Data	22	72
Minimum Non-Detect	N/A	3.8
Maximum Non-Detect	N/A	5
Percent Non detects	0.00%	8.86%
Minimum Detected	3300	139
Maximum Detected	44000	58100
Mean of Detected Data	8923	6394
Median of Detected Data	4725	1270
SD of Detected Data	10901	12925

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 5 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1612
WMW Test U-Stat	4.023
WMW Critical Value (0.050)	1.645
P-Value	2.8703E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Manganese(site)

Background Data: Manganese(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	22	79
Number of Distinct Observations	18	78
Minimum	230	16.7
Maximum	675	2040
Mean	432.5	471.4
Median	415	359
SD	137.9	467.1
SE of Mean	29.4	52.55

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1256
WMW Test U-Stat	1.098
WMW Critical Value (0.050)	1.645
P-Value	0.136

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Mercury(site)

Background Data: Mercury(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	22	79
Number of Non-Detect Data	0	61
Number of Detect Data	22	18
Minimum Non-Detect	N/A	0.019
Maximum Non-Detect	N/A	0.06
Percent Non detects	0.00%	77.22%
Minimum Detected	0.021	0.038
Maximum Detected	0.83	1.2
Mean of Detected Data	0.148	0.187
Median of Detected Data	0.06	0.125
SD of Detected Data	0.226	0.259

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.06 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1363
WMW Test U-Stat	1.979
WMW Critical Value (0.050)	1.645
P-Value	0.0239

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Nickel(site)

Background Data: Nickel(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	22	79
Number of Non-Detect Data	0	18
Number of Detect Data	22	61
Minimum Non-Detect	N/A	0.21
Maximum Non-Detect	N/A	1.4
Percent Non detects	0.00%	22.78%
Minimum Detected	11	4.6
Maximum Detected	45	94.2
Mean of Detected Data	20.52	17.95
Median of Detected Data	15.75	13.2
SD of Detected Data	9.991	15.68

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.4 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1511
WMW Test U-Stat	3.192
WMW Critical Value (0.050)	1.645
P-Value	0.00070584

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Potassium(site)

Background Data: Potassium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	22	79
Number of Non-Detect Data	0	12
Number of Detect Data	22	67
Minimum Non-Detect	N/A	201
Maximum Non-Detect	N/A	271
Percent Non detects	0.00%	15.19%
Minimum Detected	1300	123
Maximum Detected	3100	10900
Mean of Detected Data	1702	1690
Median of Detected Data	1600	694
SD of Detected Data	361.4	2232

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 271 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1585
WMW Test U-Stat	3.801
WMW Critical Value (0.050)	1.645
P-Value	7.2032E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Thallium(site)

Background Data: Thallium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	22	79
Number of Non-Detect Data	0	64
Number of Detect Data	22	15
Minimum Non-Detect	N/A	0.13
Maximum Non-Detect	N/A	0.45
Percent Non detects	0.00%	81.01%
Minimum Detected	0.059	1.3
Maximum Detected	0.235	5
Mean of Detected Data	0.17	2.527
Median of Detected Data	0.18	2.2
SD of Detected Data	0.0391	0.932

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.45 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	957
WMW Test U-Stat	-1.362
WMW Critical Value (0.050)	1.645
P-Value	0.913

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

Area of Concern Data: Vanadium(site)

Background Data: Vanadium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	22	79
Number of Distinct Observations	13	76
Minimum	21	12.2
Maximum	43.5	114
Mean	34.7	45.84
Median	35	41.4
SD	5.646	20.38
SE of Mean	1.204	2.293

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	99	-2.527	1.66	0.993
Satterthwaite (Unequal Variance)	99	-4.299	1.66	1

Pooled SD 18.277

Conclusion with Alpha = 0.050

* Student t (Pooled) Test: Do Not Reject H0, Conclude Site <= Background
* Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background

Test of Equality of Variances

Numerator DF	Denominator DF	F-Test Value	P-Value
78	21	13.034	0

Conclusion with Alpha = 0.05

* Two variances are not equal

Table D.1-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet_a.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Zinc(site)

Background Data: Zinc(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	22	79
Number of Distinct Observations	20	76
Minimum	41	4.7
Maximum	280	598
Mean	98.25	54.94
Median	76.5	30.2
SD	58.37	87.15
SE of Mean	12.44	9.805

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1724
WMW Test U-Stat	4.945
WMW Critical Value (0.050)	1.645
P-Value	3.813E-07

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

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APPENDIX D.2

SWMU 37 STATISTICAL CALCULATIONS

Table D.2-1a	EPC Calculation Results - SWMU 37 Surface Soil - ProUCL 4.0 for Full Data Sets
Table D.2-1b	EPC Calculation Results - SWMU 37 Surface Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.2-1c	EPC Calculation Results - SWMU 37 Total Soil - ProUCL 4.0 for Full Data Sets
Table D.2-1d	EPC Calculation Results - SWMU 37 Total Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.2-2a	ProUCL 4.0 - Summary of Background vs. Site Means Comparison - SWMU 37 Surface Soil
Table D.2-2b	ProUCL 4.0 - Summary of Background vs. Site Means Comparison - SWMU 37 Total Soil
Table D.2-2c	Background Data Goodness of Fit - Surface Soil - ProUCL 4.0 for Full Data Sets
Table D.2-2d	Background Goodness of Fit - Surface Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.2-2e	Background Data Goodness of Fit - Total Soil - ProUCL 4.0 for Full Data Sets
Table D.2-2f	Background Goodness of Fit - Total Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.2-2g	Goodness of Fit - Surface Soil - ProUCL 4.0 for Full Data Sets
Table D.2-2h	Goodness of Fit - Surface Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.2-2i	Goodness of Fit - Total Soil - ProUCL 4.0 for Full Data Sets
Table D.2-2j	Goodness of Fit - Total Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.2-2k	Background Versus Site Means Comparison - Surface Soil - ProUCL 4.0
Table D.2-2l	Background Versus Site Means Comparison - Total Soil - ProUCL 4.0

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Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Full Data Sets

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	9400	Minimum of Log Data	9.148
Maximum	29000	Maximum of Log Data	10.28
Mean	18310	Mean of log Data	9.755
Median	17750	SD of log Data	0.373
SD	6577		
Coefficient of Variation	0.359		
Skewness	0.41		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.943	Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	22122	95% H-UCL	23865
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	27877
95% Adjusted-CLT UCL	22019	97.5% Chebyshev (MVUE) UCL	32002
95% Modified-t UCL	22167	99% Chebyshev (MVUE) UCL	40107

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	5.955	Data appear Normal at 5% Significance Level	
Theta Star	3075		
nu star	119.1		
Approximate Chi Square Value (.05)	94.89	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	21731
Adjusted Chi Square Value	91.14	95% Jackknife UCL	22122
		95% Standard Bootstrap UCL	21626
Anderson-Darling Test Statistic	0.225	95% Bootstrap-t UCL	22625
Anderson-Darling 5% Critical Value	0.726	95% Hall's Bootstrap UCL	23444
Kolmogorov-Smirnov Test Statistic	0.128	95% Percentile Bootstrap UCL	21700
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	21720
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	27375
		97.5% Chebyshev(Mean, Sd) UCL	31298
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	39003
95% Approximate Gamma UCL	22979		
95% Adjusted Gamma UCL	23924		

Potential UCL to Use		Use 95% Student's-t UCL	22122

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Antimony (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.076	Minimum of Log Data	-2.577
Maximum	1.2	Maximum of Log Data	0.182
Mean	0.551	Mean of log Data	-1.026
Median	0.375	SD of log Data	1.059
SD	0.462		
Coefficient of Variation	0.839		
Skewness	0.492		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.845	Shapiro Wilk Test Statistic	0.897
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.818	95% H-UCL	1.963
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.474
95% Adjusted-CLT UCL	0.815	97.5% Chebyshev (MVUE) UCL	1.86
95% Modified-t UCL	0.822	99% Chebyshev (MVUE) UCL	2.619

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.98	Data appear Normal at 5% Significance Level	
Theta Star	0.562		
nu star	19.61		
Approximate Chi Square Value (.05)	10.56	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.791
Adjusted Chi Square Value	9.429	95% Jackknife UCL	0.818
		95% Standard Bootstrap UCL	0.778
Anderson-Darling Test Statistic	0.474	95% Bootstrap-t UCL	0.847
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	0.749
Kolmogorov-Smirnov Test Statistic	0.213	95% Percentile Bootstrap UCL	0.789
Kolmogorov-Smirnov 5% Critical Value	0.272	95% BCA Bootstrap UCL	0.793
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.187
		97.5% Chebyshev(Mean, Sd) UCL	1.463
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.004
95% Approximate Gamma UCL	1.022		
95% Adjusted Gamma UCL	1.145		

Potential UCL to Use		Use 95% Student's-t UCL	0.818

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	1	Minimum of Log Data	0
Maximum	11	Maximum of Log Data	2.398
Mean	4.865	Mean of log Data	1.289
Median	4.4	SD of log Data	0.861
SD	3.553		
Coefficient of Variation	0.73		
Skewness	0.68		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.911	Shapiro Wilk Test Statistic	0.936
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	6.925	95% H-UCL	11.83
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.22
95% Adjusted-CLT UCL	6.971	97.5% Chebyshev (MVUE) UCL	13.9
95% Modified-t UCL	6.965	99% Chebyshev (MVUE) UCL	19.17
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.367	Data appear Normal at 5% Significance Level	
Theta Star	3.56		
nu star	27.33		
Approximate Chi Square Value (.05)	16.41	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	6.713
Adjusted Chi Square Value	14.96	95% Jackknife UCL	6.925
		95% Standard Bootstrap UCL	6.587
Anderson-Darling Test Statistic	0.238	95% Bootstrap-t UCL	7.508
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	7.419
Kolmogorov-Smirnov Test Statistic	0.116	95% Percentile Bootstrap UCL	6.655
Kolmogorov-Smirnov 5% Critical Value	0.27	95% BCA Bootstrap UCL	6.945
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	9.763
		97.5% Chebyshev(Mean, Sd) UCL	11.88
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	16.04
95% Approximate Gamma UCL	8.103		
95% Adjusted Gamma UCL	8.891		
Potential UCL to Use		Use 95% Student's-t UCL	6.925

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	47	Minimum of Log Data	3.85
Maximum	103	Maximum of Log Data	4.635
Mean	71.85	Mean of log Data	4.234
Median	68.75	SD of log Data	0.302
SD	21.49		
Coefficient of Variation	0.299		
Skewness	0.281		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.895	Shapiro Wilk Test Statistic	0.9
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	84.31	95% H-UCL	88.09
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	102
95% Adjusted-CLT UCL	83.67	97.5% Chebyshev (MVUE) UCL	115
95% Modified-t UCL	84.41	99% Chebyshev (MVUE) UCL	140.6

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	8.767	Data appear Normal at 5% Significance Level	
Theta Star	8.195		
nu star	175.3		
Approximate Chi Square Value (.05)	145.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	83.03
Adjusted Chi Square Value	141	95% Jackknife UCL	84.31
		95% Standard Bootstrap UCL	82.64
Anderson-Darling Test Statistic	0.465	95% Bootstrap-t UCL	85.16
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	81.54
Kolmogorov-Smirnov Test Statistic	0.19	95% Percentile Bootstrap UCL	82.3
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	83.05
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	101.5
		97.5% Chebyshev(Mean, Sd) UCL	114.3
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	139.5
95% Approximate Gamma UCL	86.46		
95% Adjusted Gamma UCL	89.33		

Potential UCL to Use		Use 95% Student's-t UCL	84.31

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.46	Minimum of Log Data	-0.777
Maximum	1.4	Maximum of Log Data	0.336
Mean	0.809	Mean of log Data	-0.292
Median	0.68	SD of log Data	0.416
SD	0.345		
Coefficient of Variation	0.427		
Skewness	0.725		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.883	Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.009	95% H-UCL	1.091
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.276
95% Adjusted-CLT UCL	1.015	97.5% Chebyshev (MVUE) UCL	1.479
95% Modified-t UCL	1.013	99% Chebyshev (MVUE) UCL	1.877

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4.604	Data appear Normal at 5% Significance Level	
Theta Star	0.176		
nu star	92.08		
Approximate Chi Square Value (.05)	70.95	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.988
Adjusted Chi Square Value	67.73	95% Jackknife UCL	1.009
		95% Standard Bootstrap UCL	0.975
Anderson-Darling Test Statistic	0.42	95% Bootstrap-t UCL	1.051
Anderson-Darling 5% Critical Value	0.728	95% Hall's Bootstrap UCL	1.019
Kolmogorov-Smirnov Test Statistic	0.17	95% Percentile Bootstrap UCL	0.989
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	1.006
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.284
		97.5% Chebyshev(Mean, Sd) UCL	1.49
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.894
95% Approximate Gamma UCL	1.049		
95% Adjusted Gamma UCL	1.099		

Potential UCL to Use		Use 95% Student's-t UCL	1.009

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.93	Minimum of Log Data	-0.0726
Maximum	2.6	Maximum of Log Data	0.956
Mean	1.718	Mean of log Data	0.486
Median	1.8	SD of log Data	0.36
SD	0.567		
Coefficient of Variation	0.33		
Skewness	-0.104		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.941	Shapiro Wilk Test Statistic	0.909
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	2.047	95% H-UCL	2.218
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.588
95% Adjusted-CLT UCL	2.007	97.5% Chebyshev (MVUE) UCL	2.962
95% Modified-t UCL	2.046	99% Chebyshev (MVUE) UCL	3.697

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	6.549	**Data appear Normal at 5% Significance Level**	
Theta Star	0.262		
nu star	131		
Approximate Chi Square Value (.05)	105.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	2.013
Adjusted Chi Square Value	101.6	95% Jackknife UCL	2.047
		95% Standard Bootstrap UCL	2.001
Anderson-Darling Test Statistic	0.41	95% Bootstrap-t UCL	2.039
Anderson-Darling 5% Critical Value	0.726	95% Hall's Bootstrap UCL	1.995
Kolmogorov-Smirnov Test Statistic	0.175	95% Percentile Bootstrap UCL	1.995
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	1.97
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.499
		97.5% Chebyshev(Mean, Sd) UCL	2.837
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.502
95% Approximate Gamma UCL	2.132		
95% Adjusted Gamma UCL	2.215		

Potential UCL to Use		Use 95% Student's-t UCL	2.047

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	250	Minimum of Log Data	5.521
Maximum	106000	Maximum of Log Data	11.57
Mean	37303	Mean of log Data	9.224
Median	25350	SD of log Data	2.218
SD	40238		
Coefficient of Variation	1.079		
Skewness	0.651		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.854	Shapiro Wilk Test Statistic	0.866
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	60628	95% H-UCL	9462759
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	275758
95% Adjusted-CLT UCL	61030	97.5% Chebyshev (MVUE) UCL	365793
95% Modified-t UCL	61065	99% Chebyshev (MVUE) UCL	542649

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.409	**Data appear Normal at 5% Significance Level**	
Theta Star	91166		
nu star	8.184		
Approximate Chi Square Value (.05)	2.842	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	58233
Adjusted Chi Square Value	2.324	95% Jackknife UCL	60628
		95% Standard Bootstrap UCL	57146
Anderson-Darling Test Statistic	0.562	95% Bootstrap-t UCL	66855
Anderson-Darling 5% Critical Value	0.779	95% Hall's Bootstrap UCL	56132
Kolmogorov-Smirnov Test Statistic	0.237	95% Percentile Bootstrap UCL	58708
Kolmogorov-Smirnov 5% Critical Value	0.281	95% BCA Bootstrap UCL	60100
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	92767
		97.5% Chebyshev(Mean, Sd) UCL	116767
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	163909
95% Approximate Gamma UCL	107423		
95% Adjusted Gamma UCL	131359		

Potential UCL to Use		Use 95% Student's-t UCL	60628

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	15	Minimum of Log Data	2.708
Maximum	200	Maximum of Log Data	5.298
Mean	94	Mean of log Data	4.157
Median	93	SD of log Data	1.022
SD	71.92		
Coefficient of Variation	0.765		
Skewness	0.278		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.885	Shapiro Wilk Test Statistic	0.876
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	135.7	95% H-UCL	314.8
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	248.7
95% Adjusted-CLT UCL	133.6	97.5% Chebyshev (MVUE) UCL	313
95% Modified-t UCL	136	99% Chebyshev (MVUE) UCL	439.1
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.073	Data appear Normal at 5% Significance Level	
Theta Star	87.57		
nu star	21.47		
Approximate Chi Square Value (.05)	11.94	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	131.4
Adjusted Chi Square Value	10.73	95% Jackknife UCL	135.7
		95% Standard Bootstrap UCL	129.4
Anderson-Darling Test Statistic	0.498	95% Bootstrap-t UCL	137.8
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	127.2
Kolmogorov-Smirnov Test Statistic	0.197	95% Percentile Bootstrap UCL	130.4
Kolmogorov-Smirnov 5% Critical Value	0.271	95% BCA Bootstrap UCL	129
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	193.1
		97.5% Chebyshev(Mean, Sd) UCL	236
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	320.3
95% Approximate Gamma UCL	169		
95% Adjusted Gamma UCL	188.2		
Potential UCL to Use		Use 95% Student's-t UCL	135.7

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	2.8	Minimum of Log Data	1.03
Maximum	9.6	Maximum of Log Data	2.262
Mean	4.99	Mean of log Data	1.547
Median	4.775	SD of log Data	0.358
SD	1.957		
Coefficient of Variation	0.392		
Skewness	1.502		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.88	Shapiro Wilk Test Statistic	0.97
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	6.124	95% H-UCL	6.39
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	7.455
95% Adjusted-CLT UCL	6.322	97.5% Chebyshev (MVUE) UCL	8.529
95% Modified-t UCL	6.173	99% Chebyshev (MVUE) UCL	10.64

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	5.965	**Data appear Normal at 5% Significance Level**	
Theta Star	0.837		
nu star	119.3		
Approximate Chi Square Value (.05)	95.08	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	6.008
Adjusted Chi Square Value	91.33	95% Jackknife UCL	6.124
		95% Standard Bootstrap UCL	5.981
Anderson-Darling Test Statistic	0.252	95% Bootstrap-t UCL	6.717
Anderson-Darling 5% Critical Value	0.726	95% Hall's Bootstrap UCL	11.25
Kolmogorov-Smirnov Test Statistic	0.152	95% Percentile Bootstrap UCL	6.005
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	6.3
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	7.687
		97.5% Chebyshev(Mean, Sd) UCL	8.854
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	11.15
95% Approximate Gamma UCL	6.261		
95% Adjusted Gamma UCL	6.518		

Potential UCL to Use		Use 95% Student's-t UCL	6.124

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	6.9	Minimum of Log Data	1.932
Maximum	210	Maximum of Log Data	5.347
Mean	95.4	Mean of log Data	3.882
Median	87.75	SD of log Data	1.439
SD	84.72		
Coefficient of Variation	0.888		
Skewness	0.262		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.85	Shapiro Wilk Test Statistic	0.828
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	144.5	95% H-UCL	960.6
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	356.8
95% Adjusted-CLT UCL	141.8	97.5% Chebyshev (MVUE) UCL	461.3
95% Modified-t UCL	144.9	99% Chebyshev (MVUE) UCL	666.7
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.674	Data appear Normal at 5% Significance Level	
Theta Star	141.5		
nu star	13.49		
Approximate Chi Square Value (.05)	6.221	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	139.5
Adjusted Chi Square Value	5.387	95% Jackknife UCL	144.5
		95% Standard Bootstrap UCL	137.5
Anderson-Darling Test Statistic	0.698	95% Bootstrap-t UCL	148.3
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	132.4
Kolmogorov-Smirnov Test Statistic	0.225	95% Percentile Bootstrap UCL	135.6
Kolmogorov-Smirnov 5% Critical Value	0.275	95% BCA Bootstrap UCL	137.7
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	212.2
		97.5% Chebyshev(Mean, Sd) UCL	262.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	362
95% Approximate Gamma UCL	206.8		
95% Adjusted Gamma UCL	238.8		
Potential UCL to Use		Use 95% Student's-t UCL	144.5

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	14300	Minimum of Log Data	9.568
Maximum	29000	Maximum of Log Data	10.28
Mean	21220	Mean of log Data	9.932
Median	20250	SD of log Data	0.261
SD	5456		
Coefficient of Variation	0.257		
Skewness	0.213		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.92	Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	24383	95% H-UCL	25208
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	28899
95% Adjusted-CLT UCL	24182	97.5% Chebyshev (MVUE) UCL	32219
95% Modified-t UCL	24402	99% Chebyshev (MVUE) UCL	38742

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	11.73	Data appear Normal at 5% Significance Level	
Theta Star	1809		
nu star	234.6		
Approximate Chi Square Value (.05)	200.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	24058
Adjusted Chi Square Value	194.6	95% Jackknife UCL	24383
		95% Standard Bootstrap UCL	23938
Anderson-Darling Test Statistic	0.329	95% Bootstrap-t UCL	24568
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	23826
Kolmogorov-Smirnov Test Statistic	0.165	95% Percentile Bootstrap UCL	23900
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	24000
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	28741
		97.5% Chebyshev(Mean, Sd) UCL	31995
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	38387
95% Approximate Gamma UCL	24873		
95% Adjusted Gamma UCL	25581		

Potential UCL to Use		Use 95% Student's-t UCL	24383

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	10	Minimum of Log Data	2.303
Maximum	315	Maximum of Log Data	5.753
Mean	121	Mean of log Data	4.136
Median	106.3	SD of log Data	1.384
SD	113.4		
Coefficient of Variation	0.937		
Skewness	0.612		

Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.875	Shapiro Wilk Test Statistic	0.855
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	186.7	95% H-UCL	1004
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	422
95% Adjusted-CLT UCL	187.3	97.5% Chebyshev (MVUE) UCL	544.1
95% Modified-t UCL	187.8	99% Chebyshev (MVUE) UCL	783.9

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.688	Data appear Normal at 5% Significance Level	
Theta Star	175.7		
nu star	13.77		
Approximate Chi Square Value (.05)	6.412	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	179.9
Adjusted Chi Square Value	5.563	95% Jackknife UCL	186.7
		95% Standard Bootstrap UCL	177.4
Anderson-Darling Test Statistic	0.574	95% Bootstrap-t UCL	201.5
Anderson-Darling 5% Critical Value	0.752	95% Hall's Bootstrap UCL	192.5
Kolmogorov-Smirnov Test Statistic	0.237	95% Percentile Bootstrap UCL	182.2
Kolmogorov-Smirnov 5% Critical Value	0.275	95% BCA Bootstrap UCL	181.9
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	277.2
		97.5% Chebyshev(Mean, Sd) UCL	344.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	477.7
95% Approximate Gamma UCL	259.7		
95% Adjusted Gamma UCL	299.3		

Potential UCL to Use			
		Use 95% Student's-t UCL	186.7

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	880	Minimum of Log Data	6.78
Maximum	6900	Maximum of Log Data	8.839
Mean	3643	Mean of log Data	8.067
Median	3035	SD of log Data	0.581
SD	1868		
Coefficient of Variation	0.513		
Skewness	0.762		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.897	Shapiro Wilk Test Statistic	0.899
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	4726	95% H-UCL	5935
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	6737
95% Adjusted-CLT UCL	4766	97.5% Chebyshev (MVUE) UCL	8050
95% Modified-t UCL	4749	99% Chebyshev (MVUE) UCL	10628

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.803	**Data appear Normal at 5% Significance Level**	
Theta Star	1300		
nu star	56.06		
Approximate Chi Square Value (.05)	39.86	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	4614
Adjusted Chi Square Value	37.49	95% Jackknife UCL	4726
		95% Standard Bootstrap UCL	4565
Anderson-Darling Test Statistic	0.408	95% Bootstrap-t UCL	5294
Anderson-Darling 5% Critical Value	0.73	95% Hall's Bootstrap UCL	6026
Kolmogorov-Smirnov Test Statistic	0.199	95% Percentile Bootstrap UCL	4617
Kolmogorov-Smirnov 5% Critical Value	0.268	95% BCA Bootstrap UCL	4671
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	6217
		97.5% Chebyshev(Mean, Sd) UCL	7331
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	9519
95% Approximate Gamma UCL	5125		
95% Adjusted Gamma UCL	5448		

Potential UCL to Use		Use 95% Student's-t UCL	4726

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	130	Minimum of Log Data	4.868
Maximum	470	Maximum of Log Data	6.153
Mean	250.9	Mean of log Data	5.415
Median	202	SD of log Data	0.485
SD	127.3		
Coefficient of Variation	0.508		
Skewness	0.798		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.831	Shapiro Wilk Test Statistic	0.87
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	324.7	95% H-UCL	361.1
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	419.7
95% Adjusted-CLT UCL	328	97.5% Chebyshev (MVUE) UCL	493.2
95% Modified-t UCL	326.4	99% Chebyshev (MVUE) UCL	637.7
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.374	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	74.37		
nu star	67.47		
Approximate Chi Square Value (.05)	49.57	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	317.1
Adjusted Chi Square Value	46.91	95% Jackknife UCL	324.7
		95% Standard Bootstrap UCL	314.1
Anderson-Darling Test Statistic	0.692	95% Bootstrap-t UCL	351.3
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	307.4
Kolmogorov-Smirnov Test Statistic	0.259	95% Percentile Bootstrap UCL	315.4
Kolmogorov-Smirnov 5% Critical Value	0.268	95% BCA Bootstrap UCL	319.5
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	426.4
		97.5% Chebyshev(Mean, Sd) UCL	502.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	651.6
95% Approximate Gamma UCL	341.5		
95% Adjusted Gamma UCL	360.9		
Potential UCL to Use		Use 95% Approximate Gamma UCL	341.5

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	10
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.013	Minimum of Log Data	-4.343
Maximum	3.3	Maximum of Log Data	1.194
Mean	0.913	Mean of log Data	-1.195
Median	0.505	SD of log Data	1.877
SD	1.135		
Coefficient of Variation	1.244		
Skewness	1.411		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.797	Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.571	95% H-UCL	42.79
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	4.569
95% Adjusted-CLT UCL	1.675	97.5% Chebyshev (MVUE) UCL	6.009
95% Modified-t UCL	1.598	99% Chebyshev (MVUE) UCL	8.839
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.462	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.975		
nu star	9.242		
Approximate Chi Square Value (.05)	3.474	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	1.503
Adjusted Chi Square Value	2.887	95% Jackknife UCL	1.571
		95% Standard Bootstrap UCL	1.475
Anderson-Darling Test Statistic	0.303	95% Bootstrap-t UCL	2.312
Anderson-Darling 5% Critical Value	0.772	95% Hall's Bootstrap UCL	4.668
Kolmogorov-Smirnov Test Statistic	0.209	95% Percentile Bootstrap UCL	1.522
Kolmogorov-Smirnov 5% Critical Value	0.28	95% BCA Bootstrap UCL	1.672
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.478
		97.5% Chebyshev(Mean, Sd) UCL	3.155
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	4.485
95% Approximate Gamma UCL	2.428		
95% Adjusted Gamma UCL	2.922		
Potential UCL to Use		Use 95% Approximate Gamma UCL	2.428

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel (mg/kg)

General Statistics			
Number of Valid Observations	10	Number of Distinct Observations	9
Raw Statistics		**Log-transformed Statistics**	
Minimum	7.2	Minimum of Log Data	1.974
Maximum	53	Maximum of Log Data	3.97
Mean	29.6	Mean of log Data	3.122
Median	30.25	SD of log Data	0.831
SD	19.24		
Coefficient of Variation	0.65		
Skewness	-0.0259		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.836	Shapiro Wilk Test Statistic	0.824
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	40.75	95% H-UCL	69.01
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	67.27
95% Adjusted-CLT UCL	39.55	97.5% Chebyshev (MVUE) UCL	83.09
95% Modified-t UCL	40.74	99% Chebyshev (MVUE) UCL	114.2
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.488	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	19.9		
nu star	29.75		
Approximate Chi Square Value (.05)	18.3	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	39.61
Adjusted Chi Square Value	16.75	95% Jackknife UCL	40.75
		95% Standard Bootstrap UCL	39.31
Anderson-Darling Test Statistic	0.796	95% Bootstrap-t UCL	40.57
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	37.75
Kolmogorov-Smirnov Test Statistic	0.235	95% Percentile Bootstrap UCL	39.54
Kolmogorov-Smirnov 5% Critical Value	0.27	95% BCA Bootstrap UCL	38.96
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	56.12
		97.5% Chebyshev(Mean, Sd) UCL	67.59
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	90.13
95% Approximate Gamma UCL	48.13		
95% Adjusted Gamma UCL	52.57		
Potential UCL to Use		Use 95% Approximate Gamma UCL	48.13

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	677	Minimum of Log Data	6.518
Maximum	1700	Maximum of Log Data	7.438
Mean	1131	Mean of log Data	6.993
Median	1060	SD of log Data	0.289
SD	322.5		
Coefficient of Variation	0.285		
Skewness	0.376		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.968	Shapiro Wilk Test Statistic	0.979
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1318	95% H-UCL	1373
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1585
95% Adjusted-CLT UCL	1311	97.5% Chebyshev (MVUE) UCL	1781
95% Modified-t UCL	1320	99% Chebyshev (MVUE) UCL	2167

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	9.601	Data appear Normal at 5% Significance Level	
Theta Star	117.8		
nu star	192		
Approximate Chi Square Value (.05)	161	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	1298
Adjusted Chi Square Value	156	95% Jackknife UCL	1318
		95% Standard Bootstrap UCL	1288
Anderson-Darling Test Statistic	0.179	95% Bootstrap-t UCL	1354
Anderson-Darling 5% Critical Value	0.725	95% Hall's Bootstrap UCL	1309
Kolmogorov-Smirnov Test Statistic	0.121	95% Percentile Bootstrap UCL	1287
Kolmogorov-Smirnov 5% Critical Value	0.266	95% BCA Bootstrap UCL	1297
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1575
		97.5% Chebyshev(Mean, Sd) UCL	1768
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2146
95% Approximate Gamma UCL	1349		
95% Adjusted Gamma UCL	1392		

Potential UCL to Use		Use 95% Student's-t UCL	1318

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.028	Minimum of Log Data	-3.576
Maximum	0.3	Maximum of Log Data	-1.204
Mean	0.14	Mean of log Data	-2.287
Median	0.148	SD of log Data	0.92
SD	0.101		
Coefficient of Variation	0.718		
Skewness	0.265		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.893	Shapiro Wilk Test Statistic	0.863
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.199	95% H-UCL	0.382
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.341
95% Adjusted-CLT UCL	0.196	97.5% Chebyshev (MVUE) UCL	0.425
95% Modified-t UCL	0.199	99% Chebyshev (MVUE) UCL	0.591

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.253	Data appear Normal at 5% Significance Level	
Theta Star	0.112		
nu star	25.06		
Approximate Chi Square Value (.05)	14.65	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.193
Adjusted Chi Square Value	13.29	95% Jackknife UCL	0.199
		95% Standard Bootstrap UCL	0.19
Anderson-Darling Test Statistic	0.604	95% Bootstrap-t UCL	0.204
Anderson-Darling 5% Critical Value	0.738	95% Hall's Bootstrap UCL	0.192
Kolmogorov-Smirnov Test Statistic	0.234	95% Percentile Bootstrap UCL	0.19
Kolmogorov-Smirnov 5% Critical Value	0.271	95% BCA Bootstrap UCL	0.191
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.279
		97.5% Chebyshev(Mean, Sd) UCL	0.339
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.457
95% Approximate Gamma UCL	0.24		
95% Adjusted Gamma UCL	0.265		

Potential UCL to Use		Use 95% Student's-t UCL	0.199

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-transformed Statistics**	
Minimum	28	Minimum of Log Data	3.332
Maximum	110	Maximum of Log Data	4.7
Mean	70.95	Mean of log Data	4.184
Median	76.5	SD of log Data	0.442
SD	26.68		
Coefficient of Variation	0.376		
Skewness	-0.302		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.955	Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	86.42	95% H-UCL	99.13
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	115.8
95% Adjusted-CLT UCL	83.97	97.5% Chebyshev (MVUE) UCL	134.9
95% Modified-t UCL	86.28	99% Chebyshev (MVUE) UCL	172.5

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4.65	Data appear Normal at 5% Significance Level	
Theta Star	15.26		
nu star	92.99		
Approximate Chi Square Value (.05)	71.75	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	84.83
Adjusted Chi Square Value	68.52	95% Jackknife UCL	86.42
		95% Standard Bootstrap UCL	84.37
Anderson-Darling Test Statistic	0.375	95% Bootstrap-t UCL	85.19
Anderson-Darling 5% Critical Value	0.728	95% Hall's Bootstrap UCL	82.94
Kolmogorov-Smirnov Test Statistic	0.206	95% Percentile Bootstrap UCL	83.1
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	83.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	107.7
		97.5% Chebyshev(Mean, Sd) UCL	123.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	154.9
95% Approximate Gamma UCL	91.95		
95% Adjusted Gamma UCL	96.29		

Potential UCL to Use		Use 95% Student's-t UCL	86.42

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.048	Minimum of Log Data	-3.037
Maximum	0.2	Maximum of Log Data	-1.609
Mean	0.0996	Mean of log Data	-2.399
Median	0.0893	SD of log Data	0.448
SD	0.0466		
Coefficient of Variation	0.468		
Skewness	1.098		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.91	Shapiro Wilk Test Statistic	0.973
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.127	95% H-UCL	0.138
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.162
95% Adjusted-CLT UCL	0.129	97.5% Chebyshev (MVUE) UCL	0.189
95% Modified-t UCL	0.127	99% Chebyshev (MVUE) UCL	0.241

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.98	**Data appear Normal at 5% Significance Level**	
Theta Star	0.025		
nu star	79.6		
Approximate Chi Square Value (.05)	60.04	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	0.124
Adjusted Chi Square Value	57.1	95% Jackknife UCL	0.127
		95% Standard Bootstrap UCL	0.123
Anderson-Darling Test Statistic	0.227	95% Bootstrap-t UCL	0.136
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	0.14
Kolmogorov-Smirnov Test Statistic	0.149	95% Percentile Bootstrap UCL	0.125
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	0.129
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.164
		97.5% Chebyshev(Mean, Sd) UCL	0.192
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.246
95% Approximate Gamma UCL	0.132		
95% Adjusted Gamma UCL	0.139		

Potential UCL to Use		Use 95% Student's-t UCL	0.127

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	8

Raw Statistics		**Log-transformed Statistics**	
Minimum	16	Minimum of Log Data	2.773
Maximum	49	Maximum of Log Data	3.892
Mean	25.3	Mean of log Data	3.146
Median	20	SD of log Data	0.403
SD	12.6		
Coefficient of Variation	0.498		
Skewness	1.702		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.633	Shapiro Wilk Test Statistic	0.71
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	32.6	95% H-UCL	33.38
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	39.03
95% Adjusted-CLT UCL	34.14	97.5% Chebyshev (MVUE) UCL	45.11
95% Modified-t UCL	32.96	99% Chebyshev (MVUE) UCL	57.04

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4.316	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.862		
nu star	86.33		
Approximate Chi Square Value (.05)	65.91	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	31.85
Adjusted Chi Square Value	62.81	95% Jackknife UCL	32.6
		95% Standard Bootstrap UCL	31.59
Anderson-Darling Test Statistic	1.619	95% Bootstrap-t UCL	68.42
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	90.52
Kolmogorov-Smirnov Test Statistic	0.379	95% Percentile Bootstrap UCL	31.6
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	33.75
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	42.67
		97.5% Chebyshev(Mean, Sd) UCL	50.18
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	64.94
95% Approximate Gamma UCL	33.14		
95% Adjusted Gamma UCL	34.77		

Potential UCL to Use		Use 95% Student's-t UCL	32.6
		or 95% Modified-t UCL	32.96

Table D.2-1a
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc (mg/kg)

General Statistics

Number of Valid Observations	10	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	31	Minimum of Log Data	3.434
Maximum	150	Maximum of Log Data	5.011
Mean	89.2	Mean of log Data	4.384
Median	82	SD of log Data	0.506
SD	41.48		
Coefficient of Variation	0.465		
Skewness	0.414		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.926	Shapiro Wilk Test Statistic	0.953
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	113.2	95% H-UCL	132.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	153.5
95% Adjusted-CLT UCL	112.6	97.5% Chebyshev (MVUE) UCL	181.1
95% Modified-t UCL	113.5	99% Chebyshev (MVUE) UCL	235.2

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.446	Data appear Normal at 5% Significance Level	
Theta Star	25.89		
nu star	68.92		
Approximate Chi Square Value (.05)	50.81	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0267	95% CLT UCL	110.8
Adjusted Chi Square Value	48.11	95% Jackknife UCL	113.2
		95% Standard Bootstrap UCL	109.8
Anderson-Darling Test Statistic	0.228	95% Bootstrap-t UCL	116.2
Anderson-Darling 5% Critical Value	0.729	95% Hall's Bootstrap UCL	111.4
Kolmogorov-Smirnov Test Statistic	0.144	95% Percentile Bootstrap UCL	109.6
Kolmogorov-Smirnov 5% Critical Value	0.267	95% BCA Bootstrap UCL	110.9
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	146.4
		97.5% Chebyshev(Mean, Sd) UCL	171.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	219.7
95% Approximate Gamma UCL	121		
95% Adjusted Gamma UCL	127.8		

Potential UCL to Use		Use 95% Student's-t UCL	113.2

Table D.2-1b
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Selenium (mg/kg)

General Statistics

Number of Valid Data	10	Number of Detected Data	8
Number of Distinct Detected Data	8	Number of Non-Detect Data	2
		Percent Non-Detects	20.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.0708	Minimum Detected	-2.649
Maximum Detected	0.47	Maximum Detected	-0.755
Mean of Detected	0.245	Mean of Detected	-1.633
SD of Detected	0.166	SD of Detected	0.746
Minimum Non-Detect	0.089	Minimum Non-Detect	-2.419
Maximum Non-Detect	0.089	Maximum Non-Detect	-2.419

Warning: There are only 8 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough tp draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.832	Shapiro Wilk Test Statistic	0.892
5% Shapiro Wilk Critical Value	0.818	5% Shapiro Wilk Critical Value	0.818
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.205	Mean	-1.929
SD	0.169	SD	0.907
95% DL/2 (t) UCL	0.303	95% H-Stat (DL/2) UCL	0.32
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.153	Mean in Log Scale	-1.825
SD	0.226	SD in Log Scale	0.779
95% MLE (t) UCL	0.284	Mean in Original Scale	0.212
95% MLE (Tiku) UCL	0.301	SD in Original Scale	0.163
		95% Percentile Bootstrap UCL	0.297
		95% BCA Bootstrap UCL	0.305

Table D.2-1b
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	1.548
Theta Star	0.159
nu star	24.77
A-D Test Statistic	0.511
5% A-D Critical Value	0.723
K-S Test Statistic	0.723
5% K-S Critical Value	0.297
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0635
Maximum	0.47
Mean	0.219
Median	0.168
SD	0.158
k star	1.605
Theta star	0.137
Nu star	32.1
AppChi2	20.15
95% Gamma Approximate UCL	0.349
95% Adjusted Gamma UCL	0.38

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Normal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.212
SD	0.155
SE of Mean	0.0523
95% KM (t) UCL	0.307
95% KM (z) UCL	0.298
95% KM (jackknife) UCL	0.306
95% KM (bootstrap t) UCL	0.328
95% KM (BCA) UCL	0.312
95% KM (Percentile Bootstrap) UCL	0.302
95% KM (Chebyshev) UCL	0.439
97.5% KM (Chebyshev) UCL	0.538
99% KM (Chebyshev) UCL	0.732
Potential UCLs to Use	
95% KM (t) UCL	0.307
95% KM (Percentile Bootstrap) UCL	0.302

Table D.2-1b
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Aroclor 1254 (ug/kg)

General Statistics

Number of Valid Data	8	Number of Detected Data	6
Number of Distinct Detected Data	5	Number of Non-Detect Data	2
		Percent Non-Detects	25.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	17	Minimum Detected	2.833
Maximum Detected	1000	Maximum Detected	6.908
Mean of Detected	534.5	Mean of Detected	5.711
SD of Detected	410.2	SD of Detected	1.547
Minimum Non-Detect	5	Minimum Non-Detect	1.609
Maximum Non-Detect	5.3	Maximum Non-Detect	1.668

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	2
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	6
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	25.00%

Warning: There are only 6 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough tp draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.913	Shapiro Wilk Test Statistic	0.818
5% Shapiro Wilk Critical Value	0.788	5% Shapiro Wilk Critical Value	0.788
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	401.5	Mean	4.52
SD	425.2	SD	2.564
95% DL/2 (t) UCL	686.4	95% H-Stat (DL/2) UCL	1426861

Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	326.6	Mean in Log Scale	4.856
SD	500.3	SD in Log Scale	2.052
95% MLE (t) UCL	661.7	Mean in Original Scale	403.4
95% MLE (Tiku) UCL	676.1	SD in Original Scale	423.3
		95% Percentile Bootstrap UCL	629.6
		95% BCA Bootstrap UCL	650.9

Table D.2-1b
EPC Calculation Results - SWMU 37 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.616
Theta Star	867.1
nu star	7.397
A-D Test Statistic	0.388
5% A-D Critical Value	0.715
K-S Test Statistic	0.715
5% K-S Critical Value	0.341
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	17
Maximum	1000
Mean	429.4
Median	302.5
SD	397.5
k star	0.692
Theta star	620.7
Nu star	11.07
AppChi2	4.621
95% Gamma Approximate UCL	1029
95% Adjusted Gamma UCL	1311

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Normal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	405.1
SD	394.2
SE of Mean	152.7
95% KM (t) UCL	694.4
95% KM (z) UCL	656.2
95% KM (jackknife) UCL	683.5
95% KM (bootstrap t) UCL	748.9
95% KM (BCA) UCL	712.5
95% KM (Percentile Bootstrap) UCL	701.9
95% KM (Chebyshev) UCL	1071
97.5% KM (Chebyshev) UCL	1359
99% KM (Chebyshev) UCL	1924
Potential UCLs to Use	
95% KM (t) UCL	694.4
95% KM (Percentile Bootstrap) UCL	701.9

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Full Data Sets

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	17

Raw Statistics		**Log-transformed Statistics**	
Minimum	9400	Minimum of Log Data	9.148
Maximum	29000	Maximum of Log Data	10.28
Mean	17857	Mean of log Data	9.756
Median	18000	SD of log Data	0.272
SD	4773		
Coefficient of Variation	0.267		
Skewness	0.616		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	19653	95% H-UCL	19994
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	22551
95% Adjusted-CLT UCL	19720	97.5% Chebyshev (MVUE) UCL	24576
95% Modified-t UCL	19677	99% Chebyshev (MVUE) UCL	28554

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	12.64	Data appear Normal at 5% Significance Level	
Theta Star	1413		
nu star	530.8		
Approximate Chi Square Value (.05)	478.4	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	19570
Adjusted Chi Square Value	474.6	95% Jackknife UCL	19653
		95% Standard Bootstrap UCL	19474
Anderson-Darling Test Statistic	0.442	95% Bootstrap-t UCL	19834
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	20248
Kolmogorov-Smirnov Test Statistic	0.155	95% Percentile Bootstrap UCL	19562
Kolmogorov-Smirnov 5% Critical Value	0.189	95% BCA Bootstrap UCL	19733
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	22397
		97.5% Chebyshev(Mean, Sd) UCL	24361
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	28220
95% Approximate Gamma UCL	19814		
95% Adjusted Gamma UCL	19974		

Potential UCL to Use		Use 95% Student's-t UCL	19653

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Antimony (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.076	Minimum of Log Data	-2.577
Maximum	1.5	Maximum of Log Data	0.405
Mean	0.402	Mean of log Data	-1.428
Median	0.19	SD of log Data	0.996
SD	0.45		
Coefficient of Variation	1.12		
Skewness	1.442		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.717	Shapiro Wilk Test Statistic	0.876
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.571	95% H-UCL	0.697
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.786
95% Adjusted-CLT UCL	0.596	97.5% Chebyshev (MVUE) UCL	0.962
95% Modified-t UCL	0.576	99% Chebyshev (MVUE) UCL	1.306

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.98	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.41		
nu star	41.17		
Approximate Chi Square Value (.05)	27.46	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	0.563
Adjusted Chi Square Value	26.6	95% Jackknife UCL	0.571
		95% Standard Bootstrap UCL	0.564
Anderson-Darling Test Statistic	1.567	95% Bootstrap-t UCL	0.625
Anderson-Darling 5% Critical Value	0.767	95% Hall's Bootstrap UCL	0.56
Kolmogorov-Smirnov Test Statistic	0.295	95% Percentile Bootstrap UCL	0.566
Kolmogorov-Smirnov 5% Critical Value	0.194	95% BCA Bootstrap UCL	0.612
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.829
		97.5% Chebyshev(Mean, Sd) UCL	1.014
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.378
95% Approximate Gamma UCL	0.602		
95% Adjusted Gamma UCL	0.622		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.829

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	17

Raw Statistics		**Log-transformed Statistics**	
Minimum	1	Minimum of Log Data	0
Maximum	11	Maximum of Log Data	2.398
Mean	3.036	Mean of log Data	0.763
Median	1.6	SD of log Data	0.795
SD	2.991		
Coefficient of Variation	0.985		
Skewness	1.75		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.712	Shapiro Wilk Test Statistic	0.854
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	4.161	95% H-UCL	4.427
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	5.255
95% Adjusted-CLT UCL	4.376	97.5% Chebyshev (MVUE) UCL	6.28
95% Modified-t UCL	4.203	99% Chebyshev (MVUE) UCL	8.293

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.391	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.182		
nu star	58.44		
Approximate Chi Square Value (.05)	41.87	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	4.109
Adjusted Chi Square Value	40.79	95% Jackknife UCL	4.161
		95% Standard Bootstrap UCL	4.059
Anderson-Darling Test Statistic	1.584	95% Bootstrap-t UCL	4.875
Anderson-Darling 5% Critical Value	0.757	95% Hall's Bootstrap UCL	4.555
Kolmogorov-Smirnov Test Statistic	0.231	95% Percentile Bootstrap UCL	4.076
Kolmogorov-Smirnov 5% Critical Value	0.193	95% BCA Bootstrap UCL	4.35
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5.881
		97.5% Chebyshev(Mean, Sd) UCL	7.112
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	9.53
95% Approximate Gamma UCL	4.238		
95% Adjusted Gamma UCL	4.35		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	5.881

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	15

Raw Statistics		**Log-transformed Statistics**	
Minimum	47	Minimum of Log Data	3.85
Maximum	132	Maximum of Log Data	4.883
Mean	94.83	Mean of log Data	4.503
Median	103	SD of log Data	0.339
SD	27.89		
Coefficient of Variation	0.294		
Skewness	-0.517		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.91	Shapiro Wilk Test Statistic	0.863
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	105.3	95% H-UCL	110
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	126.6
95% Adjusted-CLT UCL	104.1	97.5% Chebyshev (MVUE) UCL	140.1
95% Modified-t UCL	105.2	99% Chebyshev (MVUE) UCL	166.7

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	8.81	Data appear Normal at 5% Significance Level	
Theta Star	10.76		
nu star	370		
Approximate Chi Square Value (.05)	326.4	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	104.8
Adjusted Chi Square Value	323.3	95% Jackknife UCL	105.3
		95% Standard Bootstrap UCL	104.6
Anderson-Darling Test Statistic	1.021	95% Bootstrap-t UCL	104.5
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	104.1
Kolmogorov-Smirnov Test Statistic	0.202	95% Percentile Bootstrap UCL	104.6
Kolmogorov-Smirnov 5% Critical Value	0.189	95% BCA Bootstrap UCL	102.9
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	121.4
		97.5% Chebyshev(Mean, Sd) UCL	132.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	155.4
95% Approximate Gamma UCL	107.5		
95% Adjusted Gamma UCL	108.5		

Potential UCL to Use		Use 95% Student's-t UCL	105.3

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.46	Minimum of Log Data	-0.777
Maximum	1.4	Maximum of Log Data	0.336
Mean	0.779	Mean of log Data	-0.3
Median	0.72	SD of log Data	0.325
SD	0.261		
Coefficient of Variation	0.334		
Skewness	0.84		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.921	Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.877	95% H-UCL	0.893
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.024
95% Adjusted-CLT UCL	0.884	97.5% Chebyshev (MVUE) UCL	1.13
95% Modified-t UCL	0.879	99% Chebyshev (MVUE) UCL	1.338

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	8.594	Data appear Normal at 5% Significance Level	
Theta Star	0.0907		
nu star	360.9		
Approximate Chi Square Value (.05)	317.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	0.873
Adjusted Chi Square Value	314.8	95% Jackknife UCL	0.877
		95% Standard Bootstrap UCL	0.871
Anderson-Darling Test Statistic	0.334	95% Bootstrap-t UCL	0.888
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	0.896
Kolmogorov-Smirnov Test Statistic	0.105	95% Percentile Bootstrap UCL	0.875
Kolmogorov-Smirnov 5% Critical Value	0.189	95% BCA Bootstrap UCL	0.874
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.027
		97.5% Chebyshev(Mean, Sd) UCL	1.134
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.345
95% Approximate Gamma UCL	0.885		
95% Adjusted Gamma UCL	0.893		

Potential UCL to Use		Use 95% Student's-t UCL	0.877

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	15

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.79	Minimum of Log Data	-0.236
Maximum	2.6	Maximum of Log Data	0.956
Mean	1.651	Mean of log Data	0.451
Median	1.6	SD of log Data	0.332
SD	0.514		
Coefficient of Variation	0.311		
Skewness	0.0884		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.973	Shapiro Wilk Test Statistic	0.964
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.844	95% H-UCL	1.905
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.187
95% Adjusted-CLT UCL	1.838	97.5% Chebyshev (MVUE) UCL	2.417
95% Modified-t UCL	1.845	99% Chebyshev (MVUE) UCL	2.87

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	8.736	Data appear Normal at 5% Significance Level	
Theta Star	0.189		
nu star	366.9		
Approximate Chi Square Value (.05)	323.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	1.835
Adjusted Chi Square Value	320.4	95% Jackknife UCL	1.844
		95% Standard Bootstrap UCL	1.827
Anderson-Darling Test Statistic	0.263	95% Bootstrap-t UCL	1.842
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	1.841
Kolmogorov-Smirnov Test Statistic	0.142	95% Percentile Bootstrap UCL	1.83
Kolmogorov-Smirnov 5% Critical Value	0.189	95% BCA Bootstrap UCL	1.829
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.14
		97.5% Chebyshev(Mean, Sd) UCL	2.351
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.767
95% Approximate Gamma UCL	1.872		
95% Adjusted Gamma UCL	1.891		

Potential UCL to Use		Use 95% Student's-t UCL	1.844

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	250	Minimum of Log Data	5.521
Maximum	106000	Maximum of Log Data	11.57
Mean	19527	Mean of log Data	8.526
Median	2400	SD of log Data	1.702
SD	32158		
Coefficient of Variation	1.647		
Skewness	1.809		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.64	Shapiro Wilk Test Statistic	0.898
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	31630	95% H-UCL	85769
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	55514
95% Adjusted-CLT UCL	34029	97.5% Chebyshev (MVUE) UCL	71492
95% Modified-t UCL	32092	99% Chebyshev (MVUE) UCL	102879

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.438	Data do not follow a Discernable Distribution (0.05)	
Theta Star	44631		
nu star	18.38		
Approximate Chi Square Value (.05)	9.663	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	31069
Adjusted Chi Square Value	9.179	95% Jackknife UCL	31630
		95% Standard Bootstrap UCL	30866
Anderson-Darling Test Statistic	1.753	95% Bootstrap-t UCL	38841
Anderson-Darling 5% Critical Value	0.811	95% Hall's Bootstrap UCL	31503
Kolmogorov-Smirnov Test Statistic	0.272	95% Percentile Bootstrap UCL	31570
Kolmogorov-Smirnov 5% Critical Value	0.201	95% BCA Bootstrap UCL	33770
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	50115
		97.5% Chebyshev(Mean, Sd) UCL	63351
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	89350
95% Approximate Gamma UCL	37133		
95% Adjusted Gamma UCL	39091		

Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	89350

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	16

Raw Statistics		**Log-transformed Statistics**	
Minimum	15	Minimum of Log Data	2.708
Maximum	200	Maximum of Log Data	5.298
Mean	58.57	Mean of log Data	3.683
Median	30	SD of log Data	0.842
SD	59.5		
Coefficient of Variation	1.016		
Skewness	1.507		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.698	Shapiro Wilk Test Statistic	0.838
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	80.96	95% H-UCL	88.35
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	104
95% Adjusted-CLT UCL	84.49	97.5% Chebyshev (MVUE) UCL	125.1
95% Modified-t UCL	81.68	99% Chebyshev (MVUE) UCL	166.3

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.261	Data do not follow a Discernable Distribution (0.05)	
Theta Star	46.47		
nu star	52.94		
Approximate Chi Square Value (.05)	37.23	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	79.93
Adjusted Chi Square Value	36.21	95% Jackknife UCL	80.96
		95% Standard Bootstrap UCL	79.51
Anderson-Darling Test Statistic	2.035	95% Bootstrap-t UCL	89.66
Anderson-Darling 5% Critical Value	0.76	95% Hall's Bootstrap UCL	78.64
Kolmogorov-Smirnov Test Statistic	0.334	95% Percentile Bootstrap UCL	79.52
Kolmogorov-Smirnov 5% Critical Value	0.193	95% BCA Bootstrap UCL	85.62
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	115.2
		97.5% Chebyshev(Mean, Sd) UCL	139.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	187.8
95% Approximate Gamma UCL	83.3		
95% Adjusted Gamma UCL	85.62		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	115.2

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	2.8	Minimum of Log Data	1.03
Maximum	13	Maximum of Log Data	2.565
Mean	7.667	Mean of log Data	1.936
Median	7.4	SD of log Data	0.479
SD	3.293		
Coefficient of Variation	0.43		
Skewness	0.0788		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.931	Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	8.906	95% H-UCL	9.599
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.37
95% Adjusted-CLT UCL	8.862	97.5% Chebyshev (MVUE) UCL	12.94
95% Modified-t UCL	8.908	99% Chebyshev (MVUE) UCL	16.04

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4.409	Data appear Normal at 5% Significance Level	
Theta Star	1.739		
nu star	185.2		
Approximate Chi Square Value (.05)	154.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	8.849
Adjusted Chi Square Value	152.6	95% Jackknife UCL	8.906
		95% Standard Bootstrap UCL	8.862
Anderson-Darling Test Statistic	0.54	95% Bootstrap-t UCL	8.93
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	8.848
Kolmogorov-Smirnov Test Statistic	0.153	95% Percentile Bootstrap UCL	8.836
Kolmogorov-Smirnov 5% Critical Value	0.19	95% BCA Bootstrap UCL	8.81
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.8
		97.5% Chebyshev(Mean, Sd) UCL	12.15
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	14.82
95% Approximate Gamma UCL	9.177		
95% Adjusted Gamma UCL	9.306		

Potential UCL to Use		Use 95% Student's-t UCL	8.906

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	16

Raw Statistics		**Log-transformed Statistics**	
Minimum	6.9	Minimum of Log Data	1.932
Maximum	210	Maximum of Log Data	5.347
Mean	52.12	Mean of log Data	3.169
Median	14	SD of log Data	1.202
SD	70.87		
Coefficient of Variation	1.36		
Skewness	1.5		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.65	Shapiro Wilk Test Statistic	0.781
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	78.8	95% H-UCL	105.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	107.9
95% Adjusted-CLT UCL	82.97	97.5% Chebyshev (MVUE) UCL	134.5
95% Modified-t UCL	79.64	99% Chebyshev (MVUE) UCL	186.8

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.684	Data do not follow a Discernable Distribution (0.05)	
Theta Star	76.16		
nu star	28.74		
Approximate Chi Square Value (.05)	17.51	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	77.56
Adjusted Chi Square Value	16.84	95% Jackknife UCL	78.8
		95% Standard Bootstrap UCL	76.51
Anderson-Darling Test Statistic	2.649	95% Bootstrap-t UCL	87.93
Anderson-Darling 5% Critical Value	0.782	95% Hall's Bootstrap UCL	75.53
Kolmogorov-Smirnov Test Statistic	0.355	95% Percentile Bootstrap UCL	78.01
Kolmogorov-Smirnov 5% Critical Value	0.197	95% BCA Bootstrap UCL	81.76
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	119.5
		97.5% Chebyshev(Mean, Sd) UCL	148.7
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	206
95% Approximate Gamma UCL	85.57		
95% Adjusted Gamma UCL	89		

Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	206

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	16

Raw Statistics		**Log-transformed Statistics**	
Minimum	14300	Minimum of Log Data	9.568
Maximum	32000	Maximum of Log Data	10.37
Mean	23500	Mean of log Data	10.04
Median	23500	SD of log Data	0.236
SD	5202		
Coefficient of Variation	0.221		
Skewness	-0.254		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.943	Shapiro Wilk Test Statistic	0.925
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	25458	95% H-UCL	25896
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	28857
95% Adjusted-CLT UCL	25300	97.5% Chebyshev (MVUE) UCL	31164
95% Modified-t UCL	25447	99% Chebyshev (MVUE) UCL	35695

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	17.07	Data appear Normal at 5% Significance Level	
Theta Star	1377		
nu star	717		
Approximate Chi Square Value (.05)	655.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	25367
Adjusted Chi Square Value	651.4	95% Jackknife UCL	25458
		95% Standard Bootstrap UCL	25274
Anderson-Darling Test Statistic	0.569	95% Bootstrap-t UCL	25324
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	25343
Kolmogorov-Smirnov Test Statistic	0.189	95% Percentile Bootstrap UCL	25338
Kolmogorov-Smirnov 5% Critical Value	0.189	95% BCA Bootstrap UCL	25214
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	28448
		97.5% Chebyshev(Mean, Sd) UCL	30589
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	34795
95% Approximate Gamma UCL	25690		
95% Adjusted Gamma UCL	25867		

Potential UCL to Use		Use 95% Student's-t UCL	25458

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	16

Raw Statistics		**Log-transformed Statistics**	
Minimum	7.4	Minimum of Log Data	2.001
Maximum	315	Maximum of Log Data	5.753
Mean	64.05	Mean of log Data	3.249
Median	13	SD of log Data	1.296
SD	94.3		
Coefficient of Variation	1.472		
Skewness	1.743		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.65	Shapiro Wilk Test Statistic	0.786
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	99.54	95% H-UCL	141.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	136.6
95% Adjusted-CLT UCL	106.3	97.5% Chebyshev (MVUE) UCL	171.5
95% Modified-t UCL	100.8	99% Chebyshev (MVUE) UCL	240.2

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.604	Data do not follow a Discernable Distribution (0.05)	
Theta Star	106		
nu star	25.39		
Approximate Chi Square Value (.05)	14.91	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	97.9
Adjusted Chi Square Value	14.29	95% Jackknife UCL	99.54
		95% Standard Bootstrap UCL	97.74
Anderson-Darling Test Statistic	2.552	95% Bootstrap-t UCL	114.4
Anderson-Darling 5% Critical Value	0.79	95% Hall's Bootstrap UCL	103.6
Kolmogorov-Smirnov Test Statistic	0.33	95% Percentile Bootstrap UCL	98.57
Kolmogorov-Smirnov 5% Critical Value	0.198	95% BCA Bootstrap UCL	110.3
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	153.7
		97.5% Chebyshev(Mean, Sd) UCL	192.6
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	268.8
95% Approximate Gamma UCL	109.1		
95% Adjusted Gamma UCL	113.8		

Potential UCL to Use		Use 99% Chebyshev (Mean, Sd) UCL	268.8

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	880	Minimum of Log Data	6.78
Maximum	6900	Maximum of Log Data	8.839
Mean	3957	Mean of log Data	8.211
Median	3800	SD of log Data	0.43
SD	1372		
Coefficient of Variation	0.347		
Skewness	0.19		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.963	Shapiro Wilk Test Statistic	0.854
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	4474	95% H-UCL	4858
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	5706
95% Adjusted-CLT UCL	4463	97.5% Chebyshev (MVUE) UCL	6437
95% Modified-t UCL	4476	99% Chebyshev (MVUE) UCL	7873

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	6.083	Data appear Normal at 5% Significance Level	
Theta Star	650.6		
nu star	255.5		
Approximate Chi Square Value (.05)	219.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	4450
Adjusted Chi Square Value	216.9	95% Jackknife UCL	4474
		95% Standard Bootstrap UCL	4437
Anderson-Darling Test Statistic	0.476	95% Bootstrap-t UCL	4494
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	4497
Kolmogorov-Smirnov Test Statistic	0.125	95% Percentile Bootstrap UCL	4444
Kolmogorov-Smirnov 5% Critical Value	0.19	95% BCA Bootstrap UCL	4440
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5262
		97.5% Chebyshev(Mean, Sd) UCL	5827
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6937
95% Approximate Gamma UCL	4606		
95% Adjusted Gamma UCL	4661		

Potential UCL to Use		Use 95% Student's-t UCL	4474

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	20

Raw Statistics		**Log-transformed Statistics**	
Minimum	130	Minimum of Log Data	4.868
Maximum	640	Maximum of Log Data	6.461
Mean	317.8	Mean of log Data	5.657
Median	330	SD of log Data	0.484
SD	141.4		
Coefficient of Variation	0.445		
Skewness	0.359		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.938	Shapiro Wilk Test Statistic	0.922
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	371	95% H-UCL	398.5
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	472.4
95% Adjusted-CLT UCL	371.1	97.5% Chebyshev (MVUE) UCL	538.3
95% Modified-t UCL	371.4	99% Chebyshev (MVUE) UCL	667.9

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4.271	Data appear Normal at 5% Significance Level	
Theta Star	74.41		
nu star	179.4		
Approximate Chi Square Value (.05)	149.4	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	368.5
Adjusted Chi Square Value	147.3	95% Jackknife UCL	371
		95% Standard Bootstrap UCL	367.4
Anderson-Darling Test Statistic	0.581	95% Bootstrap-t UCL	371.3
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	370.6
Kolmogorov-Smirnov Test Statistic	0.164	95% Percentile Bootstrap UCL	368.4
Kolmogorov-Smirnov 5% Critical Value	0.19	95% BCA Bootstrap UCL	368.4
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	452.3
		97.5% Chebyshev(Mean, Sd) UCL	510.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	624.7
95% Approximate Gamma UCL	381.6		
95% Adjusted Gamma UCL	387		

Potential UCL to Use		Use 95% Student's-t UCL	371

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel (mg/kg)

General Statistics			
Number of Valid Observations	21	Number of Distinct Observations	15
Raw Statistics		**Log-transformed Statistics**	
Minimum	7.2	Minimum of Log Data	1.974
Maximum	53	Maximum of Log Data	3.97
Mean	21.67	Mean of log Data	2.88
Median	15	SD of log Data	0.615
SD	15.14		
Coefficient of Variation	0.699		
Skewness	1.24		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.765	Shapiro Wilk Test Statistic	0.894
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	27.36	95% H-UCL	28.75
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	34.46
95% Adjusted-CLT UCL	28.05	97.5% Chebyshev (MVUE) UCL	40.16
95% Modified-t UCL	27.51	99% Chebyshev (MVUE) UCL	51.34
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.353	Data do not follow a Discernable Distribution (0.05)	
Theta Star	9.208		
nu star	98.83		
Approximate Chi Square Value (.05)	76.89	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	27.1
Adjusted Chi Square Value	75.41	95% Jackknife UCL	27.36
		95% Standard Bootstrap UCL	27.03
Anderson-Darling Test Statistic	1.378	95% Bootstrap-t UCL	28.57
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	27.08
Kolmogorov-Smirnov Test Statistic	0.25	95% Percentile Bootstrap UCL	27.26
Kolmogorov-Smirnov 5% Critical Value	0.191	95% BCA Bootstrap UCL	27.7
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	36.06
		97.5% Chebyshev(Mean, Sd) UCL	42.29
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	54.53
95% Approximate Gamma UCL	27.85		
95% Adjusted Gamma UCL	28.4		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	36.06

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	677	Minimum of Log Data	6.518
Maximum	2700	Maximum of Log Data	7.901
Mean	1684	Mean of log Data	7.35
Median	1700	SD of log Data	0.421
SD	643.4		
Coefficient of Variation	0.382		
Skewness	0.0489		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.947	Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1926	95% H-UCL	2039
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2390
95% Adjusted-CLT UCL	1917	97.5% Chebyshev (MVUE) UCL	2692
95% Modified-t UCL	1927	99% Chebyshev (MVUE) UCL	3284

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	5.617	Data appear Normal at 5% Significance Level	
Theta Star	299.8		
nu star	235.9		
Approximate Chi Square Value (.05)	201.3	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	1915
Adjusted Chi Square Value	198.9	95% Jackknife UCL	1926
		95% Standard Bootstrap UCL	1915
Anderson-Darling Test Statistic	0.412	95% Bootstrap-t UCL	1935
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	1913
Kolmogorov-Smirnov Test Statistic	0.148	95% Percentile Bootstrap UCL	1909
Kolmogorov-Smirnov 5% Critical Value	0.19	95% BCA Bootstrap UCL	1911
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2296
		97.5% Chebyshev(Mean, Sd) UCL	2561
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3081
95% Approximate Gamma UCL	1973		
95% Adjusted Gamma UCL	1997		

Potential UCL to Use		Use 95% Student's-t UCL	1926

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	19

Raw Statistics		**Log-transformed Statistics**	
Minimum	28	Minimum of Log Data	3.332
Maximum	110	Maximum of Log Data	4.7
Mean	70.17	Mean of log Data	4.202
Median	69	SD of log Data	0.332
SD	21.21		
Coefficient of Variation	0.302		
Skewness	0.143		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.98	Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	78.15	95% H-UCL	81.06
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	93.06
95% Adjusted-CLT UCL	77.93	97.5% Chebyshev (MVUE) UCL	102.9
95% Modified-t UCL	78.17	99% Chebyshev (MVUE) UCL	122.1

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	9.014	Data appear Normal at 5% Significance Level	
Theta Star	7.785		
nu star	378.6		
Approximate Chi Square Value (.05)	334.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	77.78
Adjusted Chi Square Value	331.3	95% Jackknife UCL	78.15
		95% Standard Bootstrap UCL	77.68
Anderson-Darling Test Statistic	0.206	95% Bootstrap-t UCL	78.32
Anderson-Darling 5% Critical Value	0.743	95% Hall's Bootstrap UCL	78.15
Kolmogorov-Smirnov Test Statistic	0.12	95% Percentile Bootstrap UCL	77.38
Kolmogorov-Smirnov 5% Critical Value	0.189	95% BCA Bootstrap UCL	77.67
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	90.34
		97.5% Chebyshev(Mean, Sd) UCL	99.07
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	116.2
95% Approximate Gamma UCL	79.42		
95% Adjusted Gamma UCL	80.18		

Potential UCL to Use		Use 95% Student's-t UCL	78.15

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	17

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.048	Minimum of Log Data	-3.037
Maximum	0.27	Maximum of Log Data	-1.309
Mean	0.153	Mean of log Data	-1.991
Median	0.15	SD of log Data	0.521
SD	0.0677		
Coefficient of Variation	0.442		
Skewness	0.00703		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.96	Shapiro Wilk Test Statistic	0.926
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.179	95% H-UCL	0.198
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.235
95% Adjusted-CLT UCL	0.177	97.5% Chebyshev (MVUE) UCL	0.27
95% Modified-t UCL	0.179	99% Chebyshev (MVUE) UCL	0.338

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.912	Data appear Normal at 5% Significance Level	
Theta Star	0.0391		
nu star	164.3		
Approximate Chi Square Value (.05)	135.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	0.177
Adjusted Chi Square Value	133.7	95% Jackknife UCL	0.179
		95% Standard Bootstrap UCL	0.177
Anderson-Darling Test Statistic	0.431	95% Bootstrap-t UCL	0.178
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	0.177
Kolmogorov-Smirnov Test Statistic	0.117	95% Percentile Bootstrap UCL	0.176
Kolmogorov-Smirnov 5% Critical Value	0.19	95% BCA Bootstrap UCL	0.177
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.218
		97.5% Chebyshev(Mean, Sd) UCL	0.245
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.3
95% Approximate Gamma UCL	0.185		
95% Adjusted Gamma UCL	0.188		

Potential UCL to Use		Use 95% Student's-t UCL	0.179

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium (mg/kg)

General Statistics			
Number of Valid Observations	21	Number of Distinct Observations	17
Raw Statistics		**Log-transformed Statistics**	
Minimum	16	Minimum of Log Data	2.773
Maximum	49	Maximum of Log Data	3.892
Mean	31.05	Mean of log Data	3.371
Median	31	SD of log Data	0.374
SD	11.16		
Coefficient of Variation	0.359		
Skewness	0.196		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.903	Shapiro Wilk Test Statistic	0.908
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	35.25	95% H-UCL	36.53
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	42.39
95% Adjusted-CLT UCL	35.16	97.5% Chebyshev (MVUE) UCL	47.28
95% Modified-t UCL	35.27	99% Chebyshev (MVUE) UCL	56.89
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	6.781	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	4.579		
nu star	284.8		
Approximate Chi Square Value (.05)	246.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	35.05
Adjusted Chi Square Value	244	95% Jackknife UCL	35.25
		95% Standard Bootstrap UCL	34.93
Anderson-Darling Test Statistic	0.81	95% Bootstrap-t UCL	35.49
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	34.99
Kolmogorov-Smirnov Test Statistic	0.167	95% Percentile Bootstrap UCL	34.98
Kolmogorov-Smirnov 5% Critical Value	0.19	95% BCA Bootstrap UCL	34.62
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	41.66
		97.5% Chebyshev(Mean, Sd) UCL	46.26
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	55.28
95% Approximate Gamma UCL	35.84		
95% Adjusted Gamma UCL	36.24		
Potential UCL to Use		Use 95% Approximate Gamma UCL	35.84

Table D.2-1c
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc (mg/kg)

General Statistics			
Number of Valid Observations	21	Number of Distinct Observations	18
Raw Statistics		**Log-transformed Statistics**	
Minimum	31	Minimum of Log Data	3.434
Maximum	150	Maximum of Log Data	5.011
Mean	77.57	Mean of log Data	4.286
Median	68	SD of log Data	0.364
SD	30.69		
Coefficient of Variation	0.396		
Skewness	1.4		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.831	Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	89.12	95% H-UCL	90.49
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	104.8
95% Adjusted-CLT UCL	90.77	97.5% Chebyshev (MVUE) UCL	116.6
95% Modified-t UCL	89.46	99% Chebyshev (MVUE) UCL	139.9
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	6.73	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	11.53		
nu star	282.7		
Approximate Chi Square Value (.05)	244.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	88.59
Adjusted Chi Square Value	242	95% Jackknife UCL	89.12
		95% Standard Bootstrap UCL	88.23
Anderson-Darling Test Statistic	0.88	95% Bootstrap-t UCL	92.79
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	92.95
Kolmogorov-Smirnov Test Statistic	0.18	95% Percentile Bootstrap UCL	88.9
Kolmogorov-Smirnov 5% Critical Value	0.19	95% BCA Bootstrap UCL	89.81
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	106.8
		97.5% Chebyshev(Mean, Sd) UCL	119.4
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	144.2
95% Approximate Gamma UCL	89.6		
95% Adjusted Gamma UCL	90.6		
Potential UCL to Use		Use 95% Approximate Gamma UCL	89.6

Table D.2-1d
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Mercury (mg/kg)

General Statistics

Number of Valid Data	21	Number of Detected Data	18
Number of Distinct Detected Data	18	Number of Non-Detect Data	3
		Percent Non-Detects	14.29%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.013	Minimum Detected	-4.343
Maximum Detected	3.3	Maximum Detected	1.194
Mean of Detected	0.523	Mean of Detected	-2.213
SD of Detected	0.94	SD of Detected	1.828
Minimum Non-Detect	0.0077	Minimum Non-Detect	-4.867
Maximum Non-Detect	0.0077	Maximum Non-Detect	-4.867

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.613	Shapiro Wilk Test Statistic	0.867
5% Shapiro Wilk Critical Value	0.897	5% Shapiro Wilk Critical Value	0.897
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.448	Mean	-2.691
SD	0.887	SD	2.069
95% DL/2 (t) UCL	0.782	95% H-Stat (DL/2) UCL	3.753
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.356	Mean in Log Scale	-2.813
SD	0.96	SD in Log Scale	2.27
95% MLE (t) UCL	0.717	Mean in Original Scale	0.448
95% MLE (Tiku) UCL	0.699	SD in Original Scale	0.887
		95% Percentile Bootstrap UCL	0.788
		95% BCA Bootstrap UCL	0.894

Table D.2-1d
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.385
Theta Star	1.356
nu star	13.87
A-D Test Statistic	1.555
5% A-D Critical Value	0.817
K-S Test Statistic	0.817
5% K-S Critical Value	0.217
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	3.3
Mean	0.448
Median	0.046
SD	0.887
k star	0.189
Theta star	2.365
Nu star	7.954
AppChi2	2.708
95% Gamma Approximate UCL	1.315
95% Adjusted Gamma UCL	1.437
Note: DL/2 is not a recommended method.	

Data Distribution Test with Detected Values Only	
Data do not follow a Discernable Distribution (0.05)	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.45
SD	0.865
SE of Mean	0.194
95% KM (t) UCL	0.785
95% KM (z) UCL	0.769
95% KM (jackknife) UCL	0.783
95% KM (bootstrap t) UCL	1.254
95% KM (BCA) UCL	0.799
95% KM (Percentile Bootstrap) UCL	0.792
95% KM (Chebyshev) UCL	1.296
97.5% KM (Chebyshev) UCL	1.662
99% KM (Chebyshev) UCL	2.382
Potential UCLs to Use	
99% KM (Chebyshev) UCL	2.382

Table D.2-1d
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Selenium (mg/kg)

General Statistics

Number of Valid Data	21	Number of Detected Data	17
Number of Distinct Detected Data	13	Number of Non-Detect Data	4
		Percent Non-Detects	19.05%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.0708	Minimum Detected	-2.649
Maximum Detected	0.6	Maximum Detected	-0.511
Mean of Detected	0.255	Mean of Detected	-1.595
SD of Detected	0.177	SD of Detected	0.702
Minimum Non-Detect	0.089	Minimum Non-Detect	-2.419
Maximum Non-Detect	0.089	Maximum Non-Detect	-2.419

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.831	Shapiro Wilk Test Statistic	0.906
5% Shapiro Wilk Critical Value	0.892	5% Shapiro Wilk Critical Value	0.892
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.215	Mean	-1.884
SD	0.18	SD	0.876
95% DL/2 (t) UCL	0.283	95% H-Stat (DL/2) UCL	0.26
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.184	Mean in Log Scale	-1.82
SD	0.216	SD in Log Scale	0.797
95% MLE (t) UCL	0.266	Mean in Original Scale	0.219
95% MLE (Tiku) UCL	0.27	SD in Original Scale	0.177
		95% Percentile Bootstrap UCL	0.285
		95% BCA Bootstrap UCL	0.289

Table D.2-1d
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	1.952
Theta Star	0.131
nu star	66.38
A-D Test Statistic	0.937
5% A-D Critical Value	0.748
K-S Test Statistic	0.748
5% K-S Critical Value	0.211
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	0.6
Mean	0.222
Median	0.16
SD	0.176
k star	0.514
Theta star	0.431
Nu star	21.6
AppChi2	12.04
95% Gamma Approximate UCL	0.398
95% Adjusted Gamma UCL	0.417
Note: DL/2 is not a recommended method.	

Data Distribution Test with Detected Values Only	
Data appear Lognormal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.221
SD	0.17
SE of Mean	0.0383
95% KM (t) UCL	0.287
95% KM (z) UCL	0.284
95% KM (jackknife) UCL	0.287
95% KM (bootstrap t) UCL	0.301
95% KM (BCA) UCL	0.286
95% KM (Percentile Bootstrap) UCL	0.284
95% KM (Chebyshev) UCL	0.388
97.5% KM (Chebyshev) UCL	0.46
99% KM (Chebyshev) UCL	0.602
Potential UCLs to Use	
95% KM (Chebyshev) UCL	0.388

Table D.2-1d
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver (mg/kg)

General Statistics

Number of Valid Observations	21	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.028	Minimum of Log Data	-3.576
Maximum	0.3	Maximum of Log Data	-1.204
Mean	0.0913	Mean of log Data	-2.699
Median	0.046	SD of log Data	0.743
SD	0.083		
Coefficient of Variation	0.909		
Skewness	1.502		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.703	Shapiro Wilk Test Statistic	0.802
Shapiro Wilk Critical Value	0.908	Shapiro Wilk Critical Value	0.908
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.123	95% H-UCL	0.129
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.154
95% Adjusted-CLT UCL	0.127	97.5% Chebyshev (MVUE) UCL	0.182
95% Modified-t UCL	0.124	99% Chebyshev (MVUE) UCL	0.239

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.565	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.0583		
nu star	65.74		
Approximate Chi Square Value (.05)	48.09	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0383	95% CLT UCL	0.121
Adjusted Chi Square Value	46.93	95% Jackknife UCL	0.123
		95% Standard Bootstrap UCL	0.121
Anderson-Darling Test Statistic	2.386	95% Bootstrap-t UCL	0.133
Anderson-Darling 5% Critical Value	0.756	95% Hall's Bootstrap UCL	0.121
Kolmogorov-Smirnov Test Statistic	0.332	95% Percentile Bootstrap UCL	0.122
Kolmogorov-Smirnov 5% Critical Value	0.192	95% BCA Bootstrap UCL	0.128
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.17
		97.5% Chebyshev(Mean, Sd) UCL	0.204
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.271
95% Approximate Gamma UCL	0.125		
95% Adjusted Gamma UCL	0.128		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.17

Table D.2-1d
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Aroclor 1254 (ug/kg)

General Statistics

Number of Valid Data	16	Number of Detected Data	8
Number of Distinct Detected Data	7	Number of Non-Detect Data	8
		Percent Non-Detects	50.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	17	Minimum Detected	2.833
Maximum Detected	1000	Maximum Detected	6.908
Mean of Detected	420.9	Mean of Detected	5.378
SD of Detected	405.6	SD of Detected	1.447
Minimum Non-Detect	5	Minimum Non-Detect	1.609
Maximum Non-Detect	5.3	Maximum Non-Detect	1.668

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	8
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	8
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	50.00%

Warning: There are only 8 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough tp draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.849	Shapiro Wilk Test Statistic	0.922
5% Shapiro Wilk Critical Value	0.818	5% Shapiro Wilk Critical Value	0.818
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	211.7	Mean	3.168
SD	351.3	SD	2.487
95% DL/2 (t) UCL	365.7	95% H-Stat (DL/2) UCL	3713

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	3.389
		SD in Log Scale	2.379
		Mean in Original Scale	213.4
		SD in Original Scale	350.3
		95% Percentile Bootstrap UCL	369.7
		95% BCA Bootstrap UCL	394.1

Table D.2-1d
EPC Calculation Results - SWMU 37 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.634
Theta Star	663.3
nu star	10.15
A-D Test Statistic	0.297
5% A-D Critical Value	0.74
K-S Test Statistic	0.74
5% K-S Critical Value	0.303
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	17
Maximum	1000
Mean	420.9
Median	404.4
SD	294.9
k star	1.287
Theta star	326.9
Nu star	41.2
AppChi2	27.49
95% Gamma Approximate UCL	630.8
95% Adjusted Gamma UCL	661.4

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only			
Data appear Normal at 5% Significance Level			
Nonparametric Statistics			
Kaplan-Meier (KM) Method			
Mean	218.9		
SD	335.8		
SE of Mean	89.74		
95% KM (t) UCL	376.3		
95% KM (z) UCL	366.5		
95% KM (jackknife) UCL	357.7		
95% KM (bootstrap t) UCL	456.2		
95% KM (BCA) UCL	411.1		
95% KM (Percentile Bootstrap) UCL	389.7		
95% KM (Chebyshev) UCL	610.1		
97.5% KM (Chebyshev) UCL	779.3		
99% KM (Chebyshev) UCL	1112		
Potential UCLs to Use			
95% KM (t) UCL	376.3		
95% KM (Percentile Bootstrap) UCL	389.7		

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Table D.2-2a
PROUCL 4.0 - Summary of Background vs Site Means Comparison - SWMU 37 Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	Is Site Data Distribution Normal?	Is Background Data Distibution Normal?	Means Test for Comparison	Background Comparison Results (Y/N)
Aluminum	Yes	No	Mann-Whitney	**Y**
Antimony	Yes	--	--	--
Arsenic	Yes	No	Mann-Whitney	N
Barium	Yes	Yes	Mann-Whitney**	N
Beryllium	Yes	No	Mann-Whitney	N
Cadmium	Yes	--	--	--
Calcium	Yes	No	Mann-Whitney	**Y**
Chromium	Yes	No	Mann-Whitney	**Y**
Cobalt	Yes	No	Mann-Whitney	N
Copper	Yes	No	Mann-Whitney	**Y**
Iron	Yes	No	Mann-Whitney	N
Lead	Yes	No	Mann-Whitney	N
Magnesium	Yes	No	Mann-Whitney	**Y**
Manganese	No	No	Mann-Whitney	N
Mercury	No	--	--	--
Nickel	No	No	Mann-Whitney	**Y**
Potassium	Yes	No	Mann-Whitney	**Y**
Selenium	Yes	--	--	--
Silver	Yes	--	--	--
Sodium	Yes	--	--	--
Thallium	Yes	--	--	--
Vanadium	No	No	Mann-Whitney	N
Zinc	Yes	No	Mann-Whitney	**Y**

Notes:
** Data set(s) included non-detects therefore Mann-Whitney test used
-- = Insufficient Detections to Determine Distribution
N = Site <= Background
Y = Site > Background

Table D.2-2b
PROUCL 4.0 - Summary of Background vs Site Means Comparison - SWMU 37 Total Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	Is Site Data Distribution Normal?	Is Background Data Distibution Normal?	Means Test for Comparison	Background Comparison Results (Y/N)
Aluminum	Yes	No	Mann-Whitney	**Y**
Antimony	No	--	--	--
Arsenic	No	No	Mann-Whitney	N
Barium	Yes	No	Mann-Whitney	**Y**
Beryllium	Yes	No	Mann-Whitney	N
Cadmium	Yes	No	Mann-Whitney	**Y**
Calcium	No	No	Mann-Whitney	**Y**
Chromium	No	Yes	Mann-Whitney	**Y**
Cobalt	Yes	No	Mann-Whitney	N
Copper	No	No	Mann-Whitney	**Y**
Iron	Yes	Yes	Paired-t test	N
Lead	No	No	Mann-Whitney	**Y**
Magnesium	Yes	No	Mann-Whitney	**Y**
Manganese	Yes	No	Mann-Whitney	N
Mercury	No	No	Mann-Whitney	**Y**
Nickel	No	No	Mann-Whitney	**Y**
Potassium	Yes	No	Mann-Whitney	**Y**
Selenium	No	--	--	--
Silver	No	--	--	--
Sodium	Yes	--	--	--
Thallium	Yes	Yes	Mann-Whitney**	N
Vanadium	No	Yes	Mann-Whitney	N
Zinc	No	No	Mann-Whitney	**Y**

Notes:
** Data set(s) included non-detects therefore Mann-Whitney test used
-- = Insufficient Detections to Determine Distribution
N = Site <= Background
Y = Site > Background

Table D.2-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Chromium

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	27
Minimum	6.3
Maximum	53.3
Mean of Raw Data	21.09
Standard Deviation of Raw Data	10.5
Kstar	3.695
Mean of Log Transformed Data	2.922
Standard Deviation of Log Transformed Data	0.529

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.11
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.612
A-D Critical (0.95) Value	0.75
K-S Test Statistic	0.145
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.946
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.17
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.2-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	26
Minimum	7250
Maximum	63000
Mean of Raw Data	20108
Standard Deviation of Raw Data	11869
Kstar	3.069
Mean of Log Transformed Data	9.755
Standard Deviation of Log Transformed Data	0.57

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.846
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.139
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.612
A-D Critical (0.95) Value	0.752
K-S Test Statistic	0.151
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.153
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.2-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	26
Minimum	8.9
Maximum	225
Mean of Raw Data	26.96
Standard Deviation of Raw Data	41.34
Kstar	1.324
Mean of Log Transformed Data	2.913
Standard Deviation of Log Transformed Data	0.702

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.416
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.375
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	3.163
A-D Critical (0.95) Value	0.764
K-S Test Statistic	0.253
K-S Critical(0.95) Value	0.169

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.798
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.192
Lilliefors Critical (0.95) Value	0.167

Data not Lognormal at (0.05) Significance Level

Table D.2-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	27
Minimum	12.2
Maximum	101
Mean of Raw Data	33.89
Standard Deviation of Raw Data	17.78
Kstar	3.946
Mean of Log Transformed Data	3.405
Standard Deviation of Log Transformed Data	0.497

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.832
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.141
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.622
A-D Critical (0.95) Value	0.749
K-S Test Statistic	0.111
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.138
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.2-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	28
Minimum	7.1
Maximum	216
Mean of Raw Data	41.21
Standard Deviation of Raw Data	40.24
Kstar	1.654
Mean of Log Transformed Data	3.421
Standard Deviation of Log Transformed Data	0.761

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.665
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.203
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.54
A-D Critical (0.95) Value	0.76
K-S Test Statistic	0.105
K-S Critical(0.95) Value	0.168

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.975
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.1
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.2-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Calcium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Calcium Data	28	0	28	23	5	17.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	4.6	6.6	5.12	4.8	0.844
Statistics (Detects Only)	23	116	7340	1197	885	1440
Statistics (All: NDs treated as DL value)	28	4.6	7340	983.9	761.5	1380
Statistics (All: NDs treated as DL/2 value)	28	2.3	7340	983.5	761.5	1380
Statistics (Normal ROS Estimated Data)	28	-1605	7340	751.5	761.5	1625
Statistics (Gamma ROS Estimated Data)	28	0	7340	984.5	761.5	1380
Statistics (Lognormal ROS Estimated Data)	28	104.3	7340	1007	761.5	1364

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.506	1.368	794.6	6.72	0.84	0.125
Statistics (NDs = DL)	0.575	0.537	1712	5.81	2.128	0.366
Statistics (NDs = DL/2)	0.523	0.491	1879	5.686	2.383	0.419
Statistics (Gamma ROS Estimates)	0.178	0.183	5519	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.391	1.047	0.164

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.553	0.914	Data Not Normal
Lilliefors (Detects Only)	0.275	0.185	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.244	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.244	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.761	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.207	0.167	Data Not Normal

Table D.2-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.694	0.76	
Kolmogorov-Smirnov (Detects Only)	0.152	0.185	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.232	0.803	
Kolmogorov-Smirnov (NDs = DL)	0.192	0.174	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.47	0.808	
Kolmogorov-Smirnov (NDs = DL/2)	0.211	0.175	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	6.572	0.907	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.417	0.184	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.967	0.914	Data Appear Lognormal
Lilliefors (Detects Only)	0.0979	0.185	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.779	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.279	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.75	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.296	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.949	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.114	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cobalt Data	28	0	28	20	8	28.57%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	0.11	0.75	0.501	0.72	0.319
Statistics (Detects Only)	20	5.9	45.4	15.95	12.1	10.07
Statistics (All: NDs treated as DL value)	28	0.11	45.4	11.53	10.15	11.04
Statistics (All: NDs treated as DL/2 value)	28	0.055	45.4	11.46	10.15	11.11
Statistics (Normal ROS Estimated Data)	28	-10.02	45.4	9.494	10.15	13.45
Statistics (Gamma ROS Estimated Data)	28	3.774	45.4	13.39	10.15	9.473
Statistics (Lognormal ROS Estimated Data)	28	3.134	45.4	12.48	10.15	10.13

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	3.439	3.095	4.636	2.617	0.545	0.208
Statistics (NDs = DL)	0.701	0.65	16.45	1.583	1.793	1.132
Statistics (NDs = DL/2)	0.588	0.549	19.49	1.385	2.092	1.51
Statistics (Gamma ROS Estimates)	2.851	2.569	4.697	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.25	0.749	0.333

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.819	0.905	Data Not Normal
Lilliefors (Detects Only)	0.236	0.198	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.158	0.167	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.156	0.167	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.936	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.128	0.167	Data Appear Normal

Table D.2-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.596	0.747	
Kolmogorov-Smirnov (Detects Only)	0.167	0.195	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.122	0.79	
Kolmogorov-Smirnov (NDs = DL)	0.195	0.172	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.507	0.801	
Kolmogorov-Smirnov (NDs = DL/2)	0.221	0.174	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.785	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.155	0.167	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.96	0.905	Data Appear Lognormal
Lilliefors (Detects Only)	0.132	0.198	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.831	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.257	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.802	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.288	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.954	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.126	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Magnesium Data	28	0	28	25	3	10.71%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	4.7	5	4.833	4.8	0.153
Statistics (Detects Only)	25	158	20400	2498	913	4334
Statistics (All: NDs treated as DL value)	28	4.7	20400	2231	741	4161
Statistics (All: NDs treated as DL/2 value)	28	2.35	20400	2230	741	4161
Statistics (Normal ROS Estimated Data)	28	-5148	20400	1678	741	4743
Statistics (Gamma ROS Estimated Data)	28	0	20400	2230	741	4161
Statistics (Lognormal ROS Estimated Data)	28	56.13	20400	2236	741	4158

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.694	0.643	3600	6.951	1.272	0.183
Statistics (NDs = DL)	0.479	0.451	4657	6.375	2.075	0.325
Statistics (NDs = DL/2)	0.457	0.432	4879	6.301	2.257	0.358
Statistics (Gamma ROS Estimates)	0.198	0.201	11267	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.638	1.512	0.228

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.558	0.918	Data Not Normal
Lilliefors (Detects Only)	0.303	0.177	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.299	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.299	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.729	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.267	0.167	Data Not Normal

Table D.2-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.247	0.789	
Kolmogorov-Smirnov (Detects Only)	0.183	0.182	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	0.674	0.815	
Kolmogorov-Smirnov (NDs = DL)	0.131	0.175	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.681	0.82	
Kolmogorov-Smirnov (NDs = DL/2)	0.141	0.176	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.847	0.898	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.366	0.183	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.95	0.918	Data Appear Lognormal
Lilliefors (Detects Only)	0.107	0.177	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.889	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.195	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.856	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.22	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.973	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0849	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	75
Minimum	3620
Maximum	47900
Mean of Raw Data	14204
Standard Deviation of Raw Data	9433
Kstar	2.689
Mean of Log Transformed Data	9.371
Standard Deviation of Log Transformed Data	0.618

Normal Distribution Test Results

Lilliefors Test Statistic	0.15
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.604
A-D Critical (0.95) Value	0.76
K-S Test Statistic	0.0772
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0626
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.2-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	70
Minimum	6.3
Maximum	75.8
Mean of Raw Data	26.86
Standard Deviation of Raw Data	12.51
Kstar	4.382
Mean of Log Transformed Data	3.177
Standard Deviation of Log Transformed Data	0.501

Normal Distribution Test Results

Lilliefors Test Statistic	0.0734
Lilliefors Critical (0.95) Value	0.0997

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.591
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.0909
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.122
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.2-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	72
Minimum	7250
Maximum	67700
Mean of Raw Data	26963
Standard Deviation of Raw Data	11990
Kstar	4.441
Mean of Log Transformed Data	10.09
Standard Deviation of Log Transformed Data	0.508

Normal Distribution Test Results

Lilliefors Test Statistic	0.0648
Lilliefors Critical (0.95) Value	0.0997

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.831
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.082
K-S Critical(0.95) Value	0.101

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.115
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.2-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	70
Minimum	2.1
Maximum	256
Mean of Raw Data	22.04
Standard Deviation of Raw Data	39.85
Kstar	1.149
Mean of Log Transformed Data	2.615
Standard Deviation of Log Transformed Data	0.783

Normal Distribution Test Results

Lilliefors Test Statistic	0.344
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	7.671
A-D Critical (0.95) Value	0.777
K-S Test Statistic	0.245
K-S Critical(0.95) Value	0.103

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.147
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.2-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	78
Minimum	16.7
Maximum	2040
Mean of Raw Data	471.4
Standard Deviation of Raw Data	467.1
Kstar	1.087
Mean of Log Transformed Data	5.647
Standard Deviation of Log Transformed Data	1.118

Normal Distribution Test Results

Lilliefors Test Statistic	0.165
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.359
A-D Critical (0.95) Value	0.779
K-S Test Statistic	0.0515
K-S Critical(0.95) Value	0.103

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.093
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.2-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Samples	78
Number of Unique Samples	75
Minimum	12.2
Maximum	101
Mean of Raw Data	44.97
Standard Deviation of Raw Data	18.97
Kstar	5.086
Mean of Log Transformed Data	3.708
Standard Deviation of Log Transformed Data	0.466

Normal Distribution Test Results

Lilliefors Test Statistic	0.0902
Lilliefors Critical (0.95) Value	0.1

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.29
A-D Critical (0.95) Value	0.754
K-S Test Statistic	0.059
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0891
Lilliefors Critical (0.95) Value	0.1

Data appear Lognormal at (0.05) Significance Level

Table D.2-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	76
Minimum	4.7
Maximum	598
Mean of Raw Data	54.94
Standard Deviation of Raw Data	87.15
Kstar	1.05
Mean of Log Transformed Data	3.478
Standard Deviation of Log Transformed Data	0.93

Normal Distribution Test Results

Lilliefors Test Statistic	0.291
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	3.363
A-D Critical (0.95) Value	0.78
K-S Test Statistic	0.145
K-S Critical(0.95) Value	0.103

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0696
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.2-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Arsenic

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Arsenic Data	79	0	79	76	3	3.80%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.09	0.12	0.103	0.1	0.0153
Statistics (Detects Only)	76	1.2	35.9	4.989	3.2	5.36
Statistics (All: NDs treated as DL value)	79	0.09	35.9	4.804	3.1	5.339
Statistics (All: NDs treated as DL/2 value)	79	0.045	35.9	4.802	3.1	5.341
Statistics (Normal ROS Estimated Data)	79	-5.169	35.9	4.604	3.1	5.608
Statistics (Gamma ROS Estimated Data)	79	0	35.9	4.8	3.1	5.343
Statistics (Lognormal ROS Estimated Data)	79	0.728	35.9	4.828	3.1	5.32

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.819	1.759	2.742	1.308	0.692	0.529
Statistics (NDs = DL)	1.401	1.356	3.429	1.172	0.968	0.826
Statistics (NDs = DL/2)	1.323	1.281	3.631	1.146	1.067	0.932
Statistics (Gamma ROS Estimates)	0.568	0.555	8.454	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.246	0.748	0.6

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.282	0.102	Data Not Normal
Lilliefors (NDs = DL)	0.279	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.279	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.263	0.0997	Data Not Normal

Table D.2-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.409	0.766	
Kolmogorov-Smirnov (Detects Only)	0.213	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.469	0.772	
Kolmogorov-Smirnov (NDs = DL)	0.182	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.587	0.774	
Kolmogorov-Smirnov (NDs = DL/2)	0.176	0.103	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.23	0.812	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.332	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.151	0.102	Data Not Lognormal
Lilliefors (NDs = DL)	0.159	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.187	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.134	0.0997	Data Not Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Beryllium Data	71	0	71	32	39	54.93%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	39	0.022	0.03	0.0286	0.03	0.00265
Statistics (Detects Only)	32	0.61	1.6	1.017	0.975	0.272
Statistics (All: NDs treated as DL value)	71	0.022	1.6	0.474	0.03	0.527
Statistics (All: NDs treated as DL/2 value)	71	0.011	1.6	0.466	0.015	0.534
Statistics (Normal ROS Estimated Data)	71	-0.475	1.6	0.59	0.557	0.472
Statistics (Gamma ROS Estimated Data)	71	0.61	1.6	1.031	1.052	0.198
Statistics (Lognormal ROS Estimated Data)	71	0.233	1.6	0.721	0.617	0.335

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	14.61	14	0.0696	-0.0179	0.268	-15
Statistics (NDs = DL)	0.519	0.507	0.913	-1.962	1.784	-0.909
Statistics (NDs = DL/2)	0.414	0.406	1.125	-2.343	2.13	-0.909
Statistics (Gamma ROS Estimates)	26.7	25.58	0.0386	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.429	0.456	-1.063

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.953	0.93	Data Appear Normal
Lilliefors (Detects Only)	0.118	0.157	Data Appear Normal
Lilliefors (NDs = DL)	0.349	0.105	Data Not Normal
Lilliefors (NDs = DL/2)	0.35	0.105	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0495	0.105	Data Appear Normal

Table D.2-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.268	0.746	
Kolmogorov-Smirnov (Detects Only)	0.0843	0.155	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	8.979	0.815	
Kolmogorov-Smirnov (NDs = DL)	0.36	0.112	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	9.326	0.838	
Kolmogorov-Smirnov (NDs = DL/2)	0.361	0.113	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.819	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0939	0.105	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.967	0.93	Data Appear Lognormal
Lilliefors (Detects Only)	0.0849	0.157	Data Appear Lognormal
Lilliefors (NDs = DL)	0.356	0.105	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.358	0.105	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0725	0.105	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2f
Background Goodness of Fit - Total Soil
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Cadmium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cadmium Data	79	0	79	13	66	83.54%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	66	0.02	0.05	0.0256	0.02	0.00861
Statistics (Detects Only)	13	0.57	2.5	1.152	1.1	0.585
Statistics (All: NDs treated as DL value)	79	0.02	2.5	0.211	0.02	0.479
Statistics (All: NDs treated as DL/2 value)	79	0.01	2.5	0.2	0.01	0.483
Statistics (Normal ROS Estimated Data)	79	-4.148	2.5	-1.016	-1.143	1.342
Statistics (Gamma ROS Estimated Data)	79	0.197	2.987	1.943	2.175	0.717
Statistics (Lognormal ROS Estimated Data)	79	0.0167	2.5	0.338	0.174	0.444

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	5.194	5.005	0.222	0.0424	0.448	10.55
Statistics (NDs = DL)	0.424	0.416	0.498	-3.093	1.437	-0.465
Statistics (NDs = DL/2)	0.329	0.325	0.609	-3.672	1.69	-0.46
Statistics (Gamma ROS Estimates)	5.206	5.016	0.373	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.649	1.046	-0.634

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.82	0.866	Data Not Normal
Lilliefors (Detects Only)	0.246	0.246	Data Not Normal
Lilliefors (NDs = DL)	0.467	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.477	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0689	0.0997	Data Appear Normal

Table D.2-2f
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.512	0.736	
Kolmogorov-Smirnov (Detects Only)	0.181	0.237	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	17.17	0.836	
Kolmogorov-Smirnov (NDs = DL)	0.422	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	18.08	0.858	
Kolmogorov-Smirnov (NDs = DL/2)	0.448	0.109	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.804	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.164	0.101	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.934	0.866	Data Appear Lognormal
Lilliefors (Detects Only)	0.158	0.246	Data Appear Lognormal
Lilliefors (NDs = DL)	0.327	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.348	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0689	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2f
Background Goodness of Fit - Total Soil
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Calcium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Calcium Data	79	0	79	63	16	20.25%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	16	4.6	6.7	5.563	5.4	0.796
Statistics (Detects Only)	63	116	25700	1392	717	3322
Statistics (All: NDs treated as DL value)	79	4.6	25700	1111	534	3014
Statistics (All: NDs treated as DL/2 value)	79	2.3	25700	1111	534	3014
Statistics (Normal ROS Estimated Data)	79	-3726	25700	537.2	534	3423
Statistics (Gamma ROS Estimated Data)	79	0	25700	1110	534	3014
Statistics (Lognormal ROS Estimated Data)	79	60.37	25700	1129	534	3007

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.899	0.873	1548	6.588	0.949	0.144
Statistics (NDs = DL)	0.456	0.447	2437	5.599	2.149	0.384
Statistics (NDs = DL/2)	0.42	0.413	2643	5.459	2.409	0.441
Statistics (Gamma ROS Estimates)	0.131	0.135	8441	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.173	1.189	0.193

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.359	0.112	Data Not Normal
Lilliefors (NDs = DL)	0.357	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.357	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.289	0.0997	Data Not Normal

Table D.2-2f
Background Goodness of Fit - Total Soil
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.055	0.785	
Kolmogorov-Smirnov (Detects Only)	0.223	0.116	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.78	0.829	
Kolmogorov-Smirnov (NDs = DL)	0.146	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.129	0.837	
Kolmogorov-Smirnov (NDs = DL/2)	0.149	0.107	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	17.18	0.972	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.418	0.114	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.108	0.112	Data Appear Lognormal
Lilliefors (NDs = DL)	0.224	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.251	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0933	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2f
Background Goodness of Fit - Total Soil
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Cobalt

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cobalt Data	79	0	79	56	23	29.11%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	23	0.11	0.84	0.587	0.73	0.286
Statistics (Detects Only)	56	5.9	130	22.23	13.3	23.94
Statistics (All: NDs treated as DL value)	79	0.11	130	15.93	11.4	22.41
Statistics (All: NDs treated as DL/2 value)	79	0.055	130	15.84	11.4	22.47
Statistics (Normal ROS Estimated Data)	79	-40.83	130	8.784	11.4	29.44
Statistics (Gamma ROS Estimated Data)	79	0	130	17.57	11.9	21.54
Statistics (Lognormal ROS Estimated Data)	79	1.86	130	16.76	11.4	21.87

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.78	1.721	12.49	2.795	0.701	0.251
Statistics (NDs = DL)	0.61	0.595	26.11	1.758	1.787	1.017
Statistics (NDs = DL/2)	0.523	0.511	30.31	1.556	2.08	1.337
Statistics (Gamma ROS Estimates)	0.504	0.494	34.83	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.331	0.947	0.406

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.263	0.118	Data Not Normal
Lilliefors (NDs = DL)	0.24	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.241	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.17	0.0997	Data Not Normal

Table D.2-2f
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	3.203	0.765	
Kolmogorov-Smirnov (Detects Only)	0.162	0.121	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.127	0.807	
Kolmogorov-Smirnov (NDs = DL)	0.155	0.105	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.851	0.816	
Kolmogorov-Smirnov (NDs = DL/2)	0.171	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	9.036	0.818	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.36	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.13	0.118	Data Not Lognormal
Lilliefors (NDs = DL)	0.213	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.251	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0915	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2f
Background Goodness of Fit - Total Soil
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Magnesium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Magnesium Data	79	0	79	72	7	8.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	3.8	5	4.686	4.8	0.402
Statistics (Detects Only)	72	139	58100	6394	1270	12925
Statistics (All: NDs treated as DL value)	79	3.8	58100	5828	1080	12466
Statistics (All: NDs treated as DL/2 value)	79	1.9	58100	5827	1080	12466
Statistics (Normal ROS Estimated Data)	79	-1911	58100	4438	1080	13862
Statistics (Gamma ROS Estimated Data)	79	0	58100	5827	1080	12466
Statistics (Lognormal ROS Estimated Data)	79	28.2	58100	5832	1080	12464

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.484	0.474	13216	7.443	1.571	0.211
Statistics (NDs = DL)	0.379	0.373	15366	6.92	2.257	0.326
Statistics (NDs = DL/2)	0.368	0.363	15828	6.859	2.409	0.351
Statistics (Gamma ROS Estimates)	0.198	0.199	29431	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	7.129	1.812	0.254

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.323	0.104	Data Not Normal
Lilliefors (NDs = DL)	0.321	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.29	0.0997	Data Not Normal

Table D.2-2f
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.255	0.821	
Kolmogorov-Smirnov (Detects Only)	0.17	0.111	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.668	0.847	
Kolmogorov-Smirnov (NDs = DL)	0.136	0.108	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.542	0.849	
Kolmogorov-Smirnov (NDs = DL/2)	0.129	0.108	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	7.068	0.912	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.298	0.111	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0868	0.104	Data Appear Lognormal
Lilliefors (NDs = DL)	0.135	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.157	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0546	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2f
Background Goodness of Fit - Total Soil
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Mercury

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Mercury Data	79	0	79	18	61	77.22%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	61	0.019	0.06	0.0484	0.06	0.0158
Statistics (Detects Only)	18	0.038	1.2	0.187	0.125	0.259
Statistics (All: NDs treated as DL value)	79	0.019	1.2	0.0799	0.06	0.135
Statistics (All: NDs treated as DL/2 value)	79	0.0095	1.2	0.0612	0.03	0.139
Statistics (Normal ROS Estimated Data)	79	-1.214	1.2	-0.361	-0.372	0.403
Statistics (Gamma ROS Estimated Data)	79	0.038	1.2	0.173	0.156	0.138
Statistics (Lognormal ROS Estimated Data)	79	0.0007952	1.2	0.0541	0.0171	0.141

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.552	1.501	0.12	-2.035	0.727	-0.358
Statistics (NDs = DL)	1.645	1.591	0.0485	-2.861	0.681	-0.238
Statistics (NDs = DL/2)	0.962	0.934	0.0636	-3.396	0.902	-0.266
Statistics (Gamma ROS Estimates)	3.073	2.965	0.0563	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-4.029	1.44	-0.357

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.442	0.897	Data Not Normal
Lilliefors (Detects Only)	0.384	0.209	Data Not Normal
Lilliefors (NDs = DL)	0.356	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.361	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.067	0.0997	Data Appear Normal

Table D.2-2f
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.702	0.756	
Kolmogorov-Smirnov (Detects Only)	0.274	0.207	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	6.715	0.768	
Kolmogorov-Smirnov (NDs = DL)	0.33	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	8.44	0.784	
Kolmogorov-Smirnov (NDs = DL/2)	0.377	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.725	0.759	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0728	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.871	0.897	Data Not Lognormal
Lilliefors (Detects Only)	0.193	0.209	Data Appear Lognormal
Lilliefors (NDs = DL)	0.269	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.062	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2f
Background Goodness of Fit - Total Soil
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Potassium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Potassium Data	79	0	79	67	12	15.19%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	201	271	223.1	217	20.78
Statistics (Detects Only)	67	123	10900	1690	694	2232
Statistics (All: NDs treated as DL value)	79	123	10900	1467	618	2120
Statistics (All: NDs treated as DL/2 value)	79	100.5	10900	1450	618	2131
Statistics (Normal ROS Estimated Data)	79	-1878	10900	1235	618	2322
Statistics (Gamma ROS Estimated Data)	79	0	10900	1433	618	2142
Statistics (Lognormal ROS Estimated Data)	79	104.7	10900	1456	618	2127

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.92	0.893	1837	6.798	1.115	0.164
Statistics (NDs = DL)	0.837	0.814	1752	6.586	1.143	0.174
Statistics (NDs = DL/2)	0.75	0.73	1933	6.481	1.273	0.196
Statistics (Gamma ROS Estimates)	0.163	0.165	8778	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.525	1.216	0.186

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.247	0.108	Data Not Normal
Lilliefors (NDs = DL)	0.263	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.263	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.21	0.0997	Data Not Normal

Table D.2-2f
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.945	0.784	
Kolmogorov-Smirnov (Detects Only)	0.153	0.112	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.288	0.789	
Kolmogorov-Smirnov (NDs = DL)	0.171	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.192	0.793	
Kolmogorov-Smirnov (NDs = DL/2)	0.147	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	14.88	0.944	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.392	0.113	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0982	0.108	Data Appear Lognormal
Lilliefors (NDs = DL)	0.106	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.0732	0.0997	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0941	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2f
Background Goodness of Fit - Total Soil
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Thallium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Thallium Data	79	0	79	15	64	81.01%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	64	0.13	0.45	0.189	0.15	0.0931
Statistics (Detects Only)	15	1.3	5	2.527	2.2	0.932
Statistics (All: NDs treated as DL value)	79	0.13	5	0.633	0.16	1.007
Statistics (All: NDs treated as DL/2 value)	79	0.065	5	0.556	0.08	1.039
Statistics (Normal ROS Estimated Data)	79	-4.787	5	-0.573	-0.722	1.972
Statistics (Gamma ROS Estimated Data)	79	1.3	5	2.489	2.468	0.399
Statistics (Lognormal ROS Estimated Data)	79	0.155	5	0.998	0.707	0.884

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	8.698	8.377	0.29	0.868	0.352	0.405
Statistics (NDs = DL)	0.753	0.733	0.841	-1.253	1.097	-0.876
Statistics (NDs = DL/2)	0.515	0.504	1.08	-1.814	1.358	-0.748
Statistics (Gamma ROS Estimates)	44.1	42.44	0.0564	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.291	0.738	-2.538

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.893	0.881	Data Appear Normal
Lilliefors (Detects Only)	0.17	0.229	Data Appear Normal
Lilliefors (NDs = DL)	0.382	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.435	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0779	0.0997	Data Appear Normal

Table D.2-2f
Background Goodness of Fit - Total Soil
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.367	0.738	
Kolmogorov-Smirnov (Detects Only)	0.145	0.222	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	12.86	0.793	
Kolmogorov-Smirnov (NDs = DL)	0.361	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	14.62	0.817	
Kolmogorov-Smirnov (NDs = DL/2)	0.371	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.13	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.319	0.1	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.959	0.881	Data Appear Lognormal
Lilliefors (Detects Only)	0.134	0.229	Data Appear Lognormal
Lilliefors (NDs = DL)	0.334	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.34	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0779	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	9400
Maximum	29000
Mean of Raw Data	18310
Standard Deviation of Raw Data	6577
Kstar	5.955
Mean of Log Transformed Data	9.755
Standard Deviation of Log Transformed Data	0.373

Normal Distribution Test Results

Correlation Coefficient R	0.977
Shapiro Wilk Test Statistic	0.943
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.141
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.979
A-D Test Statistic	0.225
A-D Critical (0.95) Value	0.726
K-S Test Statistic	0.128
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.983
Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.154
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Antimony

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	0.076
Maximum	1.2
Mean of Raw Data	0.551
Standard Deviation of Raw Data	0.462
Kstar	0.98
Mean of Log Transformed Data	-1.026
Standard Deviation of Log Transformed Data	1.059

Normal Distribution Test Results

Correlation Coefficient R	0.935
Shapiro Wilk Test Statistic	0.845
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.256
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.919
A-D Test Statistic	0.474
A-D Critical (0.95) Value	0.743
K-S Test Statistic	0.213
K-S Critical(0.95) Value	0.272

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.961
Shapiro Wilk Test Statistic	0.897
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.162
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	1
Maximum	11
Mean of Raw Data	4.865
Standard Deviation of Raw Data	3.553
Kstar	1.367
Mean of Log Transformed Data	1.289
Standard Deviation of Log Transformed Data	0.861

Normal Distribution Test Results

Correlation Coefficient R	0.964
Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.147
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.976
A-D Test Statistic	0.238
A-D Critical (0.95) Value	0.737
K-S Test Statistic	0.116
K-S Critical(0.95) Value	0.27

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.978
Shapiro Wilk Test Statistic	0.936
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.145
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	47
Maximum	103
Mean of Raw Data	71.85
Standard Deviation of Raw Data	21.49
Kstar	8.767
Mean of Log Transformed Data	4.234
Standard Deviation of Log Transformed Data	0.302

Normal Distribution Test Results

Correlation Coefficient R	0.96
Shapiro Wilk Test Statistic	0.895
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.184
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.962
A-D Test Statistic	0.465
A-D Critical (0.95) Value	0.725
K-S Test Statistic	0.19
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.963
Shapiro Wilk Test Statistic	0.9
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.174
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	0.46
Maximum	1.4
Mean of Raw Data	0.809
Standard Deviation of Raw Data	0.345
Kstar	4.604
Mean of Log Transformed Data	-0.292
Standard Deviation of Log Transformed Data	0.416

Normal Distribution Test Results

Correlation Coefficient R	0.95
Shapiro Wilk Test Statistic	0.883
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.201
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.973
A-D Test Statistic	0.42
A-D Critical (0.95) Value	0.728
K-S Test Statistic	0.17
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.967
Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.156
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	0.93
Maximum	2.6
Mean of Raw Data	1.718
Standard Deviation of Raw Data	0.567
Kstar	6.549
Mean of Log Transformed Data	0.486
Standard Deviation of Log Transformed Data	0.36

Normal Distribution Test Results

Correlation Coefficient R	0.978
Shapiro Wilk Test Statistic	0.941
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.162
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.967
A-D Test Statistic	0.41
A-D Critical (0.95) Value	0.726
K-S Test Statistic	0.175
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.962
Shapiro Wilk Test Statistic	0.909
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.182
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	250
Maximum	106000
Mean of Raw Data	37303
Standard Deviation of Raw Data	40238
Kstar	0.409
Mean of Log Transformed Data	9.224
Standard Deviation of Log Transformed Data	2.218

Normal Distribution Test Results

Correlation Coefficient R	0.936
Shapiro Wilk Test Statistic	0.854
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.213
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.91
A-D Test Statistic	0.562
A-D Critical (0.95) Value	0.779
K-S Test Statistic	0.237
K-S Critical(0.95) Value	0.281

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.94
Shapiro Wilk Test Statistic	0.866
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.215
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	15
Maximum	200
Mean of Raw Data	94
Standard Deviation of Raw Data	71.92
Kstar	1.073
Mean of Log Transformed Data	4.157
Standard Deviation of Log Transformed Data	1.022

Normal Distribution Test Results

Correlation Coefficient R	0.955
Shapiro Wilk Test Statistic	0.885
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.198
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.927
A-D Test Statistic	0.498
A-D Critical (0.95) Value	0.74
K-S Test Statistic	0.197
K-S Critical(0.95) Value	0.271

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.951
Shapiro Wilk Test Statistic	0.876
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.215
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	2.8
Maximum	9.6
Mean of Raw Data	4.99
Standard Deviation of Raw Data	1.957
Kstar	5.965
Mean of Log Transformed Data	1.547
Standard Deviation of Log Transformed Data	0.358

Normal Distribution Test Results

Correlation Coefficient R	0.93
Shapiro Wilk Test Statistic	0.88
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.198
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.967
A-D Test Statistic	0.252
A-D Critical (0.95) Value	0.726
K-S Test Statistic	0.152
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.982
Shapiro Wilk Test Statistic	0.97
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.131
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	6.9
Maximum	210
Mean of Raw Data	95.4
Standard Deviation of Raw Data	84.72
Kstar	0.674
Mean of Log Transformed Data	3.882
Standard Deviation of Log Transformed Data	1.439

Normal Distribution Test Results

Correlation Coefficient R	0.939
Shapiro Wilk Test Statistic	0.85
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.229
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.878
A-D Test Statistic	0.698
A-D Critical (0.95) Value	0.753
K-S Test Statistic	0.225
K-S Critical(0.95) Value	0.275

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.927
Shapiro Wilk Test Statistic	0.828
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.229
Lilliefors Critical (0.95) Value	0.28

Data not Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	14300
Maximum	29000
Mean of Raw Data	21220
Standard Deviation of Raw Data	5456
Kstar	11.73
Mean of Log Transformed Data	9.932
Standard Deviation of Log Transformed Data	0.261

Normal Distribution Test Results

Correlation Coefficient R	0.972
Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.155
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.97
A-D Test Statistic	0.329
A-D Critical (0.95) Value	0.725
K-S Test Statistic	0.165
K-S Critical(0.95) Value	0.266

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.976
Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.151
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	10
Maximum	315
Mean of Raw Data	121
Standard Deviation of Raw Data	113.4
Kstar	0.688
Mean of Log Transformed Data	4.136
Standard Deviation of Log Transformed Data	1.384

Normal Distribution Test Results

Correlation Coefficient R	0.947
Shapiro Wilk Test Statistic	0.875
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.218
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.944
A-D Test Statistic	0.574
A-D Critical (0.95) Value	0.752
K-S Test Statistic	0.237
K-S Critical(0.95) Value	0.275

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.94
Shapiro Wilk Test Statistic	0.855
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.216
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	880
Maximum	6900
Mean of Raw Data	3643
Standard Deviation of Raw Data	1868
Kstar	2.803
Mean of Log Transformed Data	8.067
Standard Deviation of Log Transformed Data	0.581

Normal Distribution Test Results

Correlation Coefficient R	0.946
Shapiro Wilk Test Statistic	0.897
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.179
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.962
A-D Test Statistic	0.408
A-D Critical (0.95) Value	0.73
K-S Test Statistic	0.199
K-S Critical(0.95) Value	0.268

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.939
Shapiro Wilk Test Statistic	0.899
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.238
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	130
Maximum	470
Mean of Raw Data	250.9
Standard Deviation of Raw Data	127.3
Kstar	3.374
Mean of Log Transformed Data	5.415
Standard Deviation of Log Transformed Data	0.485

Normal Distribution Test Results

Correlation Coefficient R	0.921
Shapiro Wilk Test Statistic	0.831
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.253
Lilliefors Critical (0.95) Value	0.28

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.952
A-D Test Statistic	0.692
A-D Critical (0.95) Value	0.729
K-S Test Statistic	0.259
K-S Critical(0.95) Value	0.268

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.945
Shapiro Wilk Test Statistic	0.87
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.242
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	0.013
Maximum	3.3
Mean of Raw Data	0.913
Standard Deviation of Raw Data	1.135
Kstar	0.462
Mean of Log Transformed Data	-1.195
Standard Deviation of Log Transformed Data	1.877

Normal Distribution Test Results

Correlation Coefficient R	0.895
Shapiro Wilk Test Statistic	0.797
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.228
Lilliefors Critical (0.95) Value	0.28

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.978
A-D Test Statistic	0.303
A-D Critical (0.95) Value	0.772
K-S Test Statistic	0.209
K-S Critical(0.95) Value	0.28

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.973
Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.178
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	7.2
Maximum	53
Mean of Raw Data	29.6
Standard Deviation of Raw Data	19.24
Kstar	1.488
Mean of Log Transformed Data	3.122
Standard Deviation of Log Transformed Data	0.831

Normal Distribution Test Results

Correlation Coefficient R	0.932
Shapiro Wilk Test Statistic	0.836
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.231
Lilliefors Critical (0.95) Value	0.28

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.883
A-D Test Statistic	0.796
A-D Critical (0.95) Value	0.735
K-S Test Statistic	0.235
K-S Critical(0.95) Value	0.27

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.924
Shapiro Wilk Test Statistic	0.824
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.232
Lilliefors Critical (0.95) Value	0.28

Data not Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	677
Maximum	1700
Mean of Raw Data	1131
Standard Deviation of Raw Data	322.5
Kstar	9.601
Mean of Log Transformed Data	6.993
Standard Deviation of Log Transformed Data	0.289

Normal Distribution Test Results

Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.968
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.138
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.992
A-D Test Statistic	0.179
A-D Critical (0.95) Value	0.725
K-S Test Statistic	0.121
K-S Critical(0.95) Value	0.266

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.993
Shapiro Wilk Test Statistic	0.979
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.12
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	0.028
Maximum	0.3
Mean of Raw Data	0.14
Standard Deviation of Raw Data	0.101
Kstar	1.253
Mean of Log Transformed Data	-2.287
Standard Deviation of Log Transformed Data	0.92

Normal Distribution Test Results

Correlation Coefficient R	0.957
Shapiro Wilk Test Statistic	0.893
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.228
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.941
A-D Test Statistic	0.604
A-D Critical (0.95) Value	0.738
K-S Test Statistic	0.234
K-S Critical(0.95) Value	0.271

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.942
Shapiro Wilk Test Statistic	0.863
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.236
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	28
Maximum	110
Mean of Raw Data	70.95
Standard Deviation of Raw Data	26.68
Kstar	4.65
Mean of Log Transformed Data	4.184
Standard Deviation of Log Transformed Data	0.442

Normal Distribution Test Results

Correlation Coefficient R	0.983
Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.174
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.954
A-D Test Statistic	0.375
A-D Critical (0.95) Value	0.728
K-S Test Statistic	0.206
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.959
Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.203
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	0.048
Maximum	0.2
Mean of Raw Data	0.0996
Standard Deviation of Raw Data	0.0466
Kstar	3.98
Mean of Log Transformed Data	-2.399
Standard Deviation of Log Transformed Data	0.448

Normal Distribution Test Results

Correlation Coefficient R	0.953
Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.156
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.987
A-D Test Statistic	0.227
A-D Critical (0.95) Value	0.729
K-S Test Statistic	0.149
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.99
Shapiro Wilk Test Statistic	0.973
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.133
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	8
Minimum	16
Maximum	49
Mean of Raw Data	25.3
Standard Deviation of Raw Data	12.6
Kstar	4.316
Mean of Log Transformed Data	3.146
Standard Deviation of Log Transformed Data	0.403

Normal Distribution Test Results

Correlation Coefficient R	0.796
Shapiro Wilk Test Statistic	0.633
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.403
Lilliefors Critical (0.95) Value	0.28

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.858
A-D Test Statistic	1.619
A-D Critical (0.95) Value	0.729
K-S Test Statistic	0.379
K-S Critical(0.95) Value	0.267

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.843
Shapiro Wilk Test Statistic	0.71
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.354
Lilliefors Critical (0.95) Value	0.28

Data not Lognormal at (0.05) Significance Level

Table D.2-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Observations	10
Number of Distinct Observations	9
Minimum	31
Maximum	150
Mean of Raw Data	89.2
Standard Deviation of Raw Data	41.48
Kstar	3.446
Mean of Log Transformed Data	4.384
Standard Deviation of Log Transformed Data	0.506

Normal Distribution Test Results

Correlation Coefficient R	0.971
Shapiro Wilk Test Statistic	0.926
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.173
Lilliefors Critical (0.95) Value	0.28

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.966
A-D Test Statistic	0.228
A-D Critical (0.95) Value	0.729
K-S Test Statistic	0.144
K-S Critical(0.95) Value	0.267

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.98
Shapiro Wilk Test Statistic	0.953
Shapiro Wilk Critical (0.95) Value	0.842
Lilliefors Test Statistic	0.127
Lilliefors Critical (0.95) Value	0.28

Data appear Lognormal at (0.05) Significance Level

Table D.2-2h
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Selenium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	10	0	10	8	2	20.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	0.089	0.089	0.089	0.089	0
Statistics (Detects Only)	8	0.0708	0.47	0.245	0.175	0.166
Statistics (All: NDs treated as DL value)	10	0.0708	0.47	0.214	0.155	0.161
Statistics (All: NDs treated as DL/2 value)	10	0.0445	0.47	0.205	0.155	0.169
Statistics (Normal ROS Estimated Data)	10	-0.00176	0.47	0.205	0.155	0.171
Statistics (Gamma ROS Estimated Data)	10	0.0635	0.47	0.219	0.168	0.158
Statistics (Lognormal ROS Estimated Data)	10	0.0603	0.47	0.212	0.155	0.163

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	2.343	1.707	0.105	-1.633	0.746	-0.457
Statistics (NDs = DL)	2.159	1.578	0.0992	-1.79	0.737	-0.411
Statistics (NDs = DL/2)	1.594	1.183	0.129	-1.929	0.907	-0.47
Statistics (Gamma ROS Estimates)	2.198	1.605	0.0997	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.825	0.779	-0.427

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.927	0.897	0.917	0.933

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.832	0.818	Data Appear Normal
Lilliefors (Detects Only)	0.278	0.313	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.784	0.842	Data Not Normal
Lilliefors (NDs = DL)	0.284	0.28	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.817	0.842	Data Not Normal
Lilliefors (NDs = DL/2)	0.259	0.28	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.855	0.842	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.258	0.28	Data Appear Normal

Table D.2-2h
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.921	0.931	0.934	0.935

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.511	0.723	
Kolmogorov-Smirnov (Detects Only)	0.242	0.297	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.74	0.735	
Kolmogorov-Smirnov (NDs = DL)	0.212	0.27	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	0.495	0.739	
Kolmogorov-Smirnov (NDs = DL/2)	0.199	0.271	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.571	0.735	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.221	0.27	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.958	0.945	0.965	0.959

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.892	0.818	Data Appear Lognormal
Lilliefors (Detects Only)	0.223	0.313	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.867	0.842	Data Appear Lognormal
Lilliefors (NDs = DL)	0.203	0.28	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.903	0.842	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.179	0.28	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.894	0.842	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.191	0.28	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	17
Minimum	9400
Maximum	29000
Mean of Raw Data	17857
Standard Deviation of Raw Data	4773
Kstar	12.64
Mean of Log Transformed Data	9.756
Standard Deviation of Log Transformed Data	0.272

Normal Distribution Test Results

Correlation Coefficient R	0.964
Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.184
Lilliefors Critical (0.95) Value	0.193

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.97
A-D Test Statistic	0.442
A-D Critical (0.95) Value	0.743
K-S Test Statistic	0.155
K-S Critical(0.95) Value	0.189

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.973
Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.151
Lilliefors Critical (0.95) Value	0.193

Data appear Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Antimony

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	18
Minimum	0.076
Maximum	1.5
Mean of Raw Data	0.402
Standard Deviation of Raw Data	0.45
Kstar	0.98
Mean of Log Transformed Data	-1.428
Standard Deviation of Log Transformed Data	0.996

Normal Distribution Test Results

Correlation Coefficient R	0.849
Shapiro Wilk Test Statistic	0.717
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.363
Lilliefors Critical (0.95) Value	0.193

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.954
A-D Test Statistic	1.567
A-D Critical (0.95) Value	0.767
K-S Test Statistic	0.295
K-S Critical(0.95) Value	0.194

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.944
Shapiro Wilk Test Statistic	0.876
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.231
Lilliefors Critical (0.95) Value	0.193

Data not Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	17
Minimum	1
Maximum	11
Mean of Raw Data	3.036
Standard Deviation of Raw Data	2.991
Kstar	1.391
Mean of Log Transformed Data	0.763
Standard Deviation of Log Transformed Data	0.795

Normal Distribution Test Results

Correlation Coefficient R	0.844
Shapiro Wilk Test Statistic	0.712
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.289
Lilliefors Critical (0.95) Value	0.193

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.962
A-D Test Statistic	1.584
A-D Critical (0.95) Value	0.757
K-S Test Statistic	0.231
K-S Critical(0.95) Value	0.193

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.931
Shapiro Wilk Test Statistic	0.854
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.18
Lilliefors Critical (0.95) Value	0.193

Data not Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	15
Minimum	47
Maximum	132
Mean of Raw Data	94.83
Standard Deviation of Raw Data	27.89
Kstar	8.81
Mean of Log Transformed Data	4.503
Standard Deviation of Log Transformed Data	0.339

Normal Distribution Test Results

Correlation Coefficient R	0.962
Shapiro Wilk Test Statistic	0.91
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.164
Lilliefors Critical (0.95) Value	0.193

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.932
A-D Test Statistic	1.021
A-D Critical (0.95) Value	0.743
K-S Test Statistic	0.202
K-S Critical(0.95) Value	0.189

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.936
Shapiro Wilk Test Statistic	0.863
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.215
Lilliefors Critical (0.95) Value	0.193

Data not Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	18
Minimum	0.46
Maximum	1.4
Mean of Raw Data	0.779
Standard Deviation of Raw Data	0.261
Kstar	8.594
Mean of Log Transformed Data	-0.3
Standard Deviation of Log Transformed Data	0.325

Normal Distribution Test Results

Correlation Coefficient R	0.963
Shapiro Wilk Test Statistic	0.921
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.139
Lilliefors Critical (0.95) Value	0.193

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.983
A-D Test Statistic	0.334
A-D Critical (0.95) Value	0.743
K-S Test Statistic	0.105
K-S Critical(0.95) Value	0.189

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.983
Shapiro Wilk Test Statistic	0.955
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.0992
Lilliefors Critical (0.95) Value	0.193

Data appear Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	15
Minimum	0.79
Maximum	2.6
Mean of Raw Data	1.651
Standard Deviation of Raw Data	0.514
Kstar	8.736
Mean of Log Transformed Data	0.451
Standard Deviation of Log Transformed Data	0.332

Normal Distribution Test Results

Correlation Coefficient R	0.991
Shapiro Wilk Test Statistic	0.973
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.116
Lilliefors Critical (0.95) Value	0.193

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.984
A-D Test Statistic	0.263
A-D Critical (0.95) Value	0.743
K-S Test Statistic	0.142
K-S Critical(0.95) Value	0.189

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.986
Shapiro Wilk Test Statistic	0.964
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.145
Lilliefors Critical (0.95) Value	0.193

Data appear Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	18
Minimum	250
Maximum	106000
Mean of Raw Data	19527
Standard Deviation of Raw Data	32158
Kstar	0.438
Mean of Log Transformed Data	8.526
Standard Deviation of Log Transformed Data	1.702

Normal Distribution Test Results

Correlation Coefficient R	0.799
Shapiro Wilk Test Statistic	0.64
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.331
Lilliefors Critical (0.95) Value	0.193

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.965
A-D Test Statistic	1.753
A-D Critical (0.95) Value	0.811
K-S Test Statistic	0.272
K-S Critical(0.95) Value	0.201

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.951
Shapiro Wilk Test Statistic	0.898
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.222
Lilliefors Critical (0.95) Value	0.193

Data not Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	16
Minimum	15
Maximum	200
Mean of Raw Data	58.57
Standard Deviation of Raw Data	59.5
Kstar	1.261
Mean of Log Transformed Data	3.683
Standard Deviation of Log Transformed Data	0.842

Normal Distribution Test Results

Correlation Coefficient R	0.838
Shapiro Wilk Test Statistic	0.698
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.374
Lilliefors Critical (0.95) Value	0.193

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.943
A-D Test Statistic	2.035
A-D Critical (0.95) Value	0.76
K-S Test Statistic	0.334
K-S Critical(0.95) Value	0.193

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.922
Shapiro Wilk Test Statistic	0.838
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.288
Lilliefors Critical (0.95) Value	0.193

Data not Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	18
Minimum	2.8
Maximum	13
Mean of Raw Data	7.667
Standard Deviation of Raw Data	3.293
Kstar	4.409
Mean of Log Transformed Data	1.936
Standard Deviation of Log Transformed Data	0.479

Normal Distribution Test Results

Correlation Coefficient R	0.973
Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.13
Lilliefors Critical (0.95) Value	0.193

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.956
A-D Test Statistic	0.54
A-D Critical (0.95) Value	0.745
K-S Test Statistic	0.153
K-S Critical(0.95) Value	0.19

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.971
Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.159
Lilliefors Critical (0.95) Value	0.193

Data appear Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	16
Minimum	6.9
Maximum	210
Mean of Raw Data	52.12
Standard Deviation of Raw Data	70.87
Kstar	0.684
Mean of Log Transformed Data	3.169
Standard Deviation of Log Transformed Data	1.202

Normal Distribution Test Results

Correlation Coefficient R	0.81
Shapiro Wilk Test Statistic	0.65
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.389
Lilliefors Critical (0.95) Value	0.193

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.933
A-D Test Statistic	2.649
A-D Critical (0.95) Value	0.782
K-S Test Statistic	0.355
K-S Critical(0.95) Value	0.197

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.891
Shapiro Wilk Test Statistic	0.781
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.316
Lilliefors Critical (0.95) Value	0.193

Data not Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	16
Minimum	14300
Maximum	32000
Mean of Raw Data	23500
Standard Deviation of Raw Data	5202
Kstar	17.07
Mean of Log Transformed Data	10.04
Standard Deviation of Log Transformed Data	0.236

Normal Distribution Test Results

Correlation Coefficient R	0.976
Shapiro Wilk Test Statistic	0.943
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.178
Lilliefors Critical (0.95) Value	0.193

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.962
A-D Test Statistic	0.569
A-D Critical (0.95) Value	0.743
K-S Test Statistic	0.189
K-S Critical(0.95) Value	0.189

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.967
Shapiro Wilk Test Statistic	0.925
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.185
Lilliefors Critical (0.95) Value	0.193

Data appear Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	16
Minimum	7.4
Maximum	315
Mean of Raw Data	64.05
Standard Deviation of Raw Data	94.3
Kstar	0.604
Mean of Log Transformed Data	3.249
Standard Deviation of Log Transformed Data	1.296

Normal Distribution Test Results

Correlation Coefficient R	0.806
Shapiro Wilk Test Statistic	0.65
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.363
Lilliefors Critical (0.95) Value	0.193

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.963
A-D Test Statistic	2.552
A-D Critical (0.95) Value	0.79
K-S Test Statistic	0.33
K-S Critical(0.95) Value	0.198

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.894
Shapiro Wilk Test Statistic	0.786
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.281
Lilliefors Critical (0.95) Value	0.193

Data not Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	18
Minimum	880
Maximum	6900
Mean of Raw Data	3957
Standard Deviation of Raw Data	1372
Kstar	6.083
Mean of Log Transformed Data	8.211
Standard Deviation of Log Transformed Data	0.43

Normal Distribution Test Results

Correlation Coefficient R	0.977
Shapiro Wilk Test Statistic	0.963
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.128
Lilliefors Critical (0.95) Value	0.193

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.973
A-D Test Statistic	0.476
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.125
K-S Critical(0.95) Value	0.19

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.913
Shapiro Wilk Test Statistic	0.854
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.143
Lilliefors Critical (0.95) Value	0.193

Data not Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	20
Minimum	130
Maximum	640
Mean of Raw Data	317.8
Standard Deviation of Raw Data	141.4
Kstar	4.271
Mean of Log Transformed Data	5.657
Standard Deviation of Log Transformed Data	0.484

Normal Distribution Test Results

Correlation Coefficient R	0.972
Shapiro Wilk Test Statistic	0.938
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.147
Lilliefors Critical (0.95) Value	0.193

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.975
A-D Test Statistic	0.581
A-D Critical (0.95) Value	0.745
K-S Test Statistic	0.164
K-S Critical(0.95) Value	0.19

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.966
Shapiro Wilk Test Statistic	0.922
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.161
Lilliefors Critical (0.95) Value	0.193

Data appear Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	15
Minimum	7.2
Maximum	53
Mean of Raw Data	21.67
Standard Deviation of Raw Data	15.14
Kstar	2.353
Mean of Log Transformed Data	2.88
Standard Deviation of Log Transformed Data	0.615

Normal Distribution Test Results

Correlation Coefficient R	0.88
Shapiro Wilk Test Statistic	0.765
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.31
Lilliefors Critical (0.95) Value	0.193

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.938
A-D Test Statistic	1.378
A-D Critical (0.95) Value	0.751
K-S Test Statistic	0.25
K-S Critical(0.95) Value	0.191

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.951
Shapiro Wilk Test Statistic	0.894
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.208
Lilliefors Critical (0.95) Value	0.193

Data not Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	18
Minimum	677
Maximum	2700
Mean of Raw Data	1684
Standard Deviation of Raw Data	643.4
Kstar	5.617
Mean of Log Transformed Data	7.35
Standard Deviation of Log Transformed Data	0.421

Normal Distribution Test Results

Correlation Coefficient R	0.981
Shapiro Wilk Test Statistic	0.947
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.118
Lilliefors Critical (0.95) Value	0.193

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.966
A-D Test Statistic	0.412
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.148
K-S Critical(0.95) Value	0.19

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.976
Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.153
Lilliefors Critical (0.95) Value	0.193

Data appear Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	18
Minimum	0.028
Maximum	0.3
Mean of Raw Data	0.0913
Standard Deviation of Raw Data	0.083
Kstar	1.565
Mean of Log Transformed Data	-2.699
Standard Deviation of Log Transformed Data	0.743

Normal Distribution Test Results

Correlation Coefficient R	0.839
Shapiro Wilk Test Statistic	0.703
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.349
Lilliefors Critical (0.95) Value	0.193

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.943
A-D Test Statistic	2.386
A-D Critical (0.95) Value	0.756
K-S Test Statistic	0.332
K-S Critical(0.95) Value	0.192

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.9
Shapiro Wilk Test Statistic	0.802
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.302
Lilliefors Critical (0.95) Value	0.193

Data not Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	19
Minimum	28
Maximum	110
Mean of Raw Data	70.17
Standard Deviation of Raw Data	21.21
Kstar	9.014
Mean of Log Transformed Data	4.202
Standard Deviation of Log Transformed Data	0.332

Normal Distribution Test Results

Correlation Coefficient R	0.991
Shapiro Wilk Test Statistic	0.98
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.122
Lilliefors Critical (0.95) Value	0.193

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.986
A-D Test Statistic	0.206
A-D Critical (0.95) Value	0.743
K-S Test Statistic	0.12
K-S Critical(0.95) Value	0.189

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.952
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.144
Lilliefors Critical (0.95) Value	0.193

Data appear Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	17
Minimum	0.048
Maximum	0.27
Mean of Raw Data	0.153
Standard Deviation of Raw Data	0.0677
Kstar	3.912
Mean of Log Transformed Data	-1.991
Standard Deviation of Log Transformed Data	0.521

Normal Distribution Test Results

Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.0984
Lilliefors Critical (0.95) Value	0.193

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.966
A-D Test Statistic	0.431
A-D Critical (0.95) Value	0.746
K-S Test Statistic	0.117
K-S Critical(0.95) Value	0.19

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.968
Shapiro Wilk Test Statistic	0.926
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.143
Lilliefors Critical (0.95) Value	0.193

Data appear Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	17
Minimum	16
Maximum	49
Mean of Raw Data	31.05
Standard Deviation of Raw Data	11.16
Kstar	6.781
Mean of Log Transformed Data	3.371
Standard Deviation of Log Transformed Data	0.374

Normal Distribution Test Results

Correlation Coefficient R	0.959
Shapiro Wilk Test Statistic	0.903
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.172
Lilliefors Critical (0.95) Value	0.193

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.956
A-D Test Statistic	0.81
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.167
K-S Critical(0.95) Value	0.19

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.962
Shapiro Wilk Test Statistic	0.908
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.164
Lilliefors Critical (0.95) Value	0.193

Data not Lognormal at (0.05) Significance Level

Table D.2-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Observations	21
Number of Distinct Observations	18
Minimum	31
Maximum	150
Mean of Raw Data	77.57
Standard Deviation of Raw Data	30.69
Kstar	6.73
Mean of Log Transformed Data	4.286
Standard Deviation of Log Transformed Data	0.364

Normal Distribution Test Results

Correlation Coefficient R	0.91
Shapiro Wilk Test Statistic	0.831
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.23
Lilliefors Critical (0.95) Value	0.193

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.945
A-D Test Statistic	0.88
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.18
K-S Critical(0.95) Value	0.19

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.958
Shapiro Wilk Test Statistic	0.927
Shapiro Wilk Critical (0.95) Value	0.908
Lilliefors Test Statistic	0.158
Lilliefors Critical (0.95) Value	0.193

Data appear Lognormal at (0.05) Significance Level

Table D.2-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Mercury

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	21	0	21	18	3	14.29%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.0077	0.0077	0.0077	0.0077	1.062E-18
Statistics (Detects Only)	18	0.013	3.3	0.523	0.06	0.94
Statistics (All: NDs treated as DL value)	21	0.0077	3.3	0.449	0.046	0.886
Statistics (All: NDs treated as DL/2 value)	21	0.00385	3.3	0.448	0.046	0.887
Statistics (Normal ROS Estimated Data)	21	-1.624	3.3	0.261	0.046	1.092
Statistics (Gamma ROS Estimated Data)	21	1E-09	3.3	0.448	0.046	0.887
Statistics (Lognormal ROS Estimated Data)	21	0.00079817	3.3	0.448	0.046	0.887

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.418	0.39	1.251	-2.213	1.828	-0.826
Statistics (NDs = DL)	0.372	0.35	1.208	-2.592	1.935	-0.747
Statistics (NDs = DL/2)	0.355	0.336	1.263	-2.691	2.069	-0.769
Statistics (Gamma ROS Estimates)	0.184	0.189	2.436	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-2.813	2.27	-0.807

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.777	0.746	0.747	0.896

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.613	0.897	Data Not Normal
Lilliefors (Detects Only)	0.347	0.209	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.568	0.908	Data Not Normal
Lilliefors (NDs = DL)	0.375	0.193	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.569	0.908	Data Not Normal
Lilliefors (NDs = DL/2)	0.375	0.193	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.819	0.908	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.28	0.193	Data Not Normal

Table D.2-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.981	0.979	0.98	0.98

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.555	0.817	
Kolmogorov-Smirnov (Detects Only)	0.314	0.217	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	1.822	0.831	
Kolmogorov-Smirnov (NDs = DL)	0.31	0.204	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.547	0.835	
Kolmogorov-Smirnov (NDs = DL/2)	0.298	0.204	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.303	0.896	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.271	0.21	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.939	0.95	0.966	0.979

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.867	0.897	Data Not Lognormal
Lilliefors (Detects Only)	0.232	0.209	Data Not Lognormal
Shapiro-Wilks (NDs = DL)	0.89	0.908	Data Not Lognormal
Lilliefors (NDs = DL)	0.198	0.193	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.922	0.908	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.18	0.193	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.954	0.908	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.162	0.193	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Table D.2-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Selenium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	21	0	21	17	4	19.05%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	4	0.089	0.089	0.089	0.089	0
Statistics (Detects Only)	17	0.0708	0.6	0.255	0.17	0.177
Statistics (All: NDs treated as DL value)	21	0.0708	0.6	0.224	0.16	0.172
Statistics (All: NDs treated as DL/2 value)	21	0.0445	0.6	0.215	0.16	0.18
Statistics (Normal ROS Estimated Data)	21	-0.125	0.6	0.201	0.16	0.198
Statistics (Gamma ROS Estimated Data)	21	1E-09	0.6	0.222	0.16	0.176
Statistics (Lognormal ROS Estimated Data)	21	0.0419	0.6	0.219	0.16	0.177

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	2.323	2.023	0.11	-1.595	0.702	-0.44
Statistics (NDs = DL)	2.114	1.843	0.106	-1.752	0.71	-0.405
Statistics (NDs = DL/2)	1.582	1.388	0.136	-1.884	0.876	-0.465
Statistics (Gamma ROS Estimates)	0.563	0.514	0.394	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.82	0.797	-0.438

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.919	0.889	0.913	0.959

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.831	0.892	Data Not Normal
Lilliefors (Detects Only)	0.312	0.215	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.781	0.908	Data Not Normal
Lilliefors (NDs = DL)	0.315	0.193	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.823	0.908	Data Not Normal
Lilliefors (NDs = DL/2)	0.292	0.193	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.916	0.908	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.257	0.193	Data Not Normal

Table D.2-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.95	0.949	0.957	0.924

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.937	0.748	
Kolmogorov-Smirnov (Detects Only)	0.257	0.211	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	1.441	0.753	
Kolmogorov-Smirnov (NDs = DL)	0.242	0.192	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.786	0.757	
Kolmogorov-Smirnov (NDs = DL/2)	0.193	0.193	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.621	0.8	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.306	0.199	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.961	0.942	0.968	0.973

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.906	0.892	Data Appear Lognormal
Lilliefors (Detects Only)	0.215	0.215	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.873	0.908	Data Not Lognormal
Lilliefors (NDs = DL)	0.193	0.193	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.919	0.908	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.163	0.193	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.935	0.908	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.17	0.193	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Aluminum(site)

Background Data: Aluminum(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	10	28
Minimum	9400	3620
Maximum	29000	20100
Mean	18310	8300
Median	17750	6705
SD	6577	4279
SE of Mean	2080	808.6

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	309
WMW Test U-Stat	254
WMW Critical Value (0.050)	217
Approximate P-Value	8.4116E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Arsenic(site)

Background Data: Arsenic(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	10	24
Minimum	1	1.5
Maximum	11	10.2
Mean	4.865	3.732
Median	4.4	2.75
SD	3.553	2.33
SE of Mean	1.124	0.44

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	211.5
WMW Test U-Stat	156.5
WMW Critical Value (0.050)	217
Approximate P-Value	0.298

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Barium(site)

Background Data: Barium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	4
Number of Detect Data	10	24
Minimum Non-Detect	N/A	0.36
Maximum Non-Detect	N/A	1
Percent Non detects	0.00%	14.29%
Minimum Detected	47	23.4
Maximum Detected	103	174
Mean of Detected Data	71.85	75.55
Median of Detected Data	68.75	61.85
SD of Detected Data	21.49	43.2

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	220
WMW Test U-Stat	165
WMW Critical Value (0.050)	217
Approximate P-Value	0.208

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Beryllium(site)

Background Data: Beryllium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	13
Number of Detect Data	10	15
Minimum Non-Detect	N/A	0.022
Maximum Non-Detect	N/A	0.03
Percent Non detects	0.00%	46.43%
Minimum Detected	0.46	0.61
Maximum Detected	1.4	1.5
Mean of Detected Data	0.809	0.887
Median of Detected Data	0.68	0.87
SD of Detected Data	0.345	0.246

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.03 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	243.5
WMW Test U-Stat	188.5
WMW Critical Value (0.050)	217
Approximate P-Value	0.0558

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Calcium(site)

Background Data: Calcium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	9	27
Minimum	250	4.6
Maximum	106000	7340
Mean	37303	983.9
Median	25350	761.5
SD	40238	1380
SE of Mean	12724	260.8

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	297
WMW Test U-Stat	242
WMW Critical Value (0.050)	217
Approximate P-Value	0.00038315

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Chromium(site)

Background Data: Chromium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	10	27
Minimum	15	6.3
Maximum	200	53.3
Mean	94	21.09
Median	93	22.4
SD	71.92	10.5
SE of Mean	22.74	1.985

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	286
WMW Test U-Stat	231
WMW Critical Value (0.050)	217
Approximate P-Value	0.00135

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cobalt(site)

Background Data: Cobalt(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	8
Number of Detect Data	10	20
Minimum Non-Detect	N/A	0.11
Maximum Non-Detect	N/A	0.75
Percent Non detects	0.00%	28.57%
Minimum Detected	2.8	5.9
Maximum Detected	9.6	45.4
Mean of Detected Data	4.99	15.95
Median of Detected Data	4.775	12.1
SD of Detected Data	1.957	10.07

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.75 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	141
WMW Test U-Stat	86
WMW Critical Value (0.050)	217
Approximate P-Value	0.965

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Copper(site)

Background Data: Copper(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	2
Number of Detect Data	10	26
Minimum Non-Detect	N/A	0.17
Maximum Non-Detect	N/A	0.17
Percent Non detects	0.00%	7.14%
Minimum Detected	6.9	2.2
Maximum Detected	210	13.6
Mean of Detected Data	95.4	6.919
Median of Detected Data	87.75	5.35
SD of Detected Data	84.72	3.696

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	309
WMW Test U-Stat	254
WMW Critical Value (0.050)	217
Approximate P-Value	8.4116E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Iron(site)

Background Data: Iron(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	10	26
Minimum	14300	7250
Maximum	29000	63000
Mean	21220	20108
Median	20250	19750
SD	5456	11869
SE of Mean	1725	2243

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	214.5
WMW Test U-Stat	159.5
WMW Critical Value (0.050)	217
Approximate P-Value	0.264

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Lead(site)

Background Data: Lead(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	10	26
Minimum	10	8.9
Maximum	315	225
Mean	121	26.96
Median	106.3	15.15
SD	113.4	41.34
SE of Mean	35.86	7.813

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	260.5
WMW Test U-Stat	205.5
WMW Critical Value (0.050)	217
Approximate P-Value	0.0156

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Magnesium(site)

Background Data: Magnesium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	3
Number of Detect Data	10	25
Minimum Non-Detect	N/A	4.7
Maximum Non-Detect	N/A	5
Percent Non detects	0.00%	10.71%
Minimum Detected	880	158
Maximum Detected	6900	20400
Mean of Detected Data	3643	2498
Median of Detected Data	3035	913
SD of Detected Data	1868	4334

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 5 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	284
WMW Test U-Stat	229
WMW Critical Value (0.050)	217
Approximate P-Value	0.00167

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Manganese(site)

Background Data: Manganese(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	10	28
Minimum	130	43
Maximum	470	2040
Mean	250.9	695.9
Median	202	490
SD	127.3	591.5
SE of Mean	40.27	111.8

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	119
WMW Test U-Stat	64
WMW Critical Value (0.050)	217
Approximate P-Value	0.994

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Nickel(site)

Background Data: Nickel(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	11
Number of Detect Data	10	17
Minimum Non-Detect	N/A	0.21
Maximum Non-Detect	N/A	1.3
Percent Non detects	0.00%	39.29%
Minimum Detected	7.2	4.6
Maximum Detected	53	18.1
Mean of Detected Data	29.6	9.935
Median of Detected Data	30.25	9.4
SD of Detected Data	19.24	4.294

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.3 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	299
WMW Test U-Stat	244
WMW Critical Value (0.050)	217
Approximate P-Value	0.00030069

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Potassium(site)

Background Data: Potassium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	10	28
Number of Non-Detect Data	0	6
Number of Detect Data	10	22
Minimum Non-Detect	N/A	201
Maximum Non-Detect	N/A	271
Percent Non detects	0.00%	21.43%
Minimum Detected	677	166
Maximum Detected	1700	2350
Mean of Detected Data	1131	735.4
Median of Detected Data	1060	509.5
SD of Detected Data	322.5	632.6

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 271 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	282
WMW Test U-Stat	227
WMW Critical Value (0.050)	217
Approximate P-Value	0.00207

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Vanadium(site)

Background Data: Vanadium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	8	27
Minimum	16	12.2
Maximum	49	101
Mean	25.3	33.89
Median	20	33.8
SD	12.6	17.78
SE of Mean	3.984	3.36

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	161
WMW Test U-Stat	106
WMW Critical Value (0.050)	217
Approximate P-Value	0.874

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.2-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Zinc(site)

Background Data: Zinc(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	10	28
Number of Distinct Observations	9	28
Minimum	31	7.1
Maximum	150	216
Mean	89.2	41.21
Median	82	29.7
SD	41.48	40.24
SE of Mean	13.12	7.605

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	298
WMW Test U-Stat	243
WMW Critical Value (0.050)	217
Approximate P-Value	0.0003396

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Aluminum(site)

Background Data: Aluminum(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	21	79
Number of Distinct Observations	17	75
Minimum	9400	3620
Maximum	29000	47900
Mean	17857	14204
Median	18000	12100
SD	4773	9433
SE of Mean	1041	1061

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1409
WMW Test U-Stat	2.941
WMW Critical Value (0.050)	1.645
P-Value	0.00164

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Arsenic(site)

Background Data: Arsenic(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	21	79
Number of Non-Detect Data	0	3
Number of Detect Data	21	76
Minimum Non-Detect	N/A	0.09
Maximum Non-Detect	N/A	0.12
Percent Non detects	0.00%	3.80%
Minimum Detected	1	1.2
Maximum Detected	11	35.9
Mean of Detected Data	3.036	4.989
Median of Detected Data	1.6	3.2
SD of Detected Data	2.991	5.36

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.12 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	722.5
WMW Test U-Stat	-2.865
WMW Critical Value (0.050)	1.645
P-Value	0.998

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Barium(site)

Background Data: Barium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	21	79
Number of Non-Detect Data	0	16
Number of Detect Data	21	63
Minimum Non-Detect	N/A	0.36
Maximum Non-Detect	N/A	1.1
Percent Non detects	0.00%	20.25%
Minimum Detected	47	23.4
Maximum Detected	132	174
Mean of Detected Data	94.83	68.4
Median of Detected Data	103	56.7
SD of Detected Data	27.89	40.39

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.1 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1529
WMW Test U-Stat	3.956
WMW Critical Value (0.050)	1.645
P-Value	3.8061E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Beryllium(site)

Background Data: Beryllium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	21	79
Number of Distinct Observations	18	32
Minimum	0.46	0.022
Maximum	1.4	5.4
Mean	0.779	0.748
Median	0.72	0.61
SD	0.261	1.049
SE of Mean	0.0569	0.118

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1223
WMW Test U-Stat	1.367
WMW Critical Value (0.050)	1.645
P-Value	0.0859

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cadmium(site)

Background Data: Cadmium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	21	79
Number of Non-Detect Data	0	66
Number of Detect Data	21	13
Minimum Non-Detect	N/A	0.02
Maximum Non-Detect	N/A	0.05
Percent Non detects	0.00%	83.54%
Minimum Detected	0.79	0.57
Maximum Detected	2.6	2.5
Mean of Detected Data	1.651	1.152
Median of Detected Data	1.6	1.1
SD of Detected Data	0.514	0.585

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.05 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1829
WMW Test U-Stat	6.495
WMW Critical Value (0.050)	1.645
P-Value	4.149E-11

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Calcium(site)

Background Data: Calcium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	21	79
Number of Non-Detect Data	0	16
Number of Detect Data	21	63
Minimum Non-Detect	N/A	4.6
Maximum Non-Detect	N/A	6.7
Percent Non detects	0.00%	20.25%
Minimum Detected	250	116
Maximum Detected	106000	25700
Mean of Detected Data	19527	1392
Median of Detected Data	2400	717
SD of Detected Data	32158	3322

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 6.7 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1740
WMW Test U-Stat	5.742
WMW Critical Value (0.050)	1.645
P-Value	4.6807E-09

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Chromium(site)

Background Data: Chromium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	21	79
Number of Distinct Observations	16	70
Minimum	15	6.3
Maximum	200	75.8
Mean	58.57	26.86
Median	30	26
SD	59.5	12.51
SE of Mean	12.98	1.408

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1280
WMW Test U-Stat	1.853
WMW Critical Value (0.050)	1.645
P-Value	0.0319

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cobalt(site)

Background Data: Cobalt(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	21	79
Number of Non-Detect Data	0	23
Number of Detect Data	21	56
Minimum Non-Detect	N/A	0.11
Maximum Non-Detect	N/A	0.84
Percent Non detects	0.00%	29.11%
Minimum Detected	2.8	5.9
Maximum Detected	13	130
Mean of Detected Data	7.667	22.23
Median of Detected Data	7.4	13.3
SD of Detected Data	3.293	23.94

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.84 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	878
WMW Test U-Stat	-1.549
WMW Critical Value (0.050)	1.645
P-Value	0.939

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Copper(site)

Background Data: Copper(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	21	79
Number of Non-Detect Data	0	2
Number of Detect Data	21	77
Minimum Non-Detect	N/A	0.17
Maximum Non-Detect	N/A	0.17
Percent Non detects	0.00%	2.53%
Minimum Detected	6.9	1.6
Maximum Detected	210	38.7
Mean of Detected Data	52.12	12.25
Median of Detected Data	14	9.1
SD of Detected Data	70.87	9.397

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1421
WMW Test U-Stat	3.042
WMW Critical Value (0.050)	1.645
P-Value	0.00117

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

Area of Concern Data: Iron(site)

Background Data: Iron(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	21	79
Number of Distinct Observations	16	72
Minimum	14300	7250
Maximum	32000	67700
Mean	23500	26963
Median	23500	25200
SD	5202	11990
SE of Mean	1135	1349

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	98	-1.288	1.661	0.9
Satterthwaite (Unequal Variance)	77	-1.964	1.665	0.973

Pooled SD 10951.673

Conclusion with Alpha = 0.050

* Student t (Pooled) Test: Do Not Reject H0, Conclude Site <= Background
* Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background

Test of Equality of Variances

Numerator DF	Denominator DF	F-Test Value	P-Value
78	20	5.312	0

Conclusion with Alpha = 0.05

* Two variances are not equal

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Lead(site)

Background Data: Lead(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	21	79
Number of Distinct Observations	16	70
Minimum	7.4	2.1
Maximum	315	256
Mean	64.05	22.04
Median	13	12
SD	94.3	39.85
SE of Mean	20.58	4.483

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1261
WMW Test U-Stat	1.693
WMW Critical Value (0.050)	1.645
P-Value	0.0453

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Magnesium(site)

Background Data: Magnesium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	21	79
Number of Non-Detect Data	0	7
Number of Detect Data	21	72
Minimum Non-Detect	N/A	3.8
Maximum Non-Detect	N/A	5
Percent Non detects	0.00%	8.86%
Minimum Detected	880	139
Maximum Detected	6900	58100
Mean of Detected Data	3957	6394
Median of Detected Data	3800	1270
SD of Detected Data	1372	12925

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 5 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1416
WMW Test U-Stat	3.004
WMW Critical Value (0.050)	1.645
P-Value	0.00133

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Manganese(site)

Background Data: Manganese(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	21	79
Number of Distinct Observations	20	78
Minimum	130	16.7
Maximum	640	2040
Mean	317.8	471.4
Median	330	359
SD	141.4	467.1
SE of Mean	30.85	52.55

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	992.5
WMW Test U-Stat	-0.58
WMW Critical Value (0.050)	1.645
P-Value	0.719

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Mercury(site)

Background Data: Mercury(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	21	79
Number of Non-Detect Data	3	61
Number of Detect Data	18	18
Minimum Non-Detect	0.0077	0.019
Maximum Non-Detect	0.0077	0.06
Percent Non detects	14.29%	77.22%
Minimum Detected	0.013	0.038
Maximum Detected	3.3	1.2
Mean of Detected Data	0.523	0.187
Median of Detected Data	0.06	0.125
SD of Detected Data	0.94	0.259

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.06 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1271
WMW Test U-Stat	1.777
WMW Critical Value (0.050)	1.645
P-Value	0.0378

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Nickel(site)

Background Data: Nickel(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	21	79
Number of Non-Detect Data	0	18
Number of Detect Data	21	61
Minimum Non-Detect	N/A	0.21
Maximum Non-Detect	N/A	1.4
Percent Non detects	0.00%	22.78%
Minimum Detected	7.2	4.6
Maximum Detected	53	94.2
Mean of Detected Data	21.67	17.95
Median of Detected Data	15	13.2
SD of Detected Data	15.14	15.68

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.4 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1387
WMW Test U-Stat	2.759
WMW Critical Value (0.050)	1.645
P-Value	0.0029

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Potassium(site)

Background Data: Potassium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	21	79
Number of Non-Detect Data	0	12
Number of Detect Data	21	67
Minimum Non-Detect	N/A	201
Maximum Non-Detect	N/A	271
Percent Non detects	0.00%	15.19%
Minimum Detected	677	123
Maximum Detected	2700	10900
Mean of Detected Data	1684	1690
Median of Detected Data	1700	694
SD of Detected Data	643.4	2232

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 271 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1455
WMW Test U-Stat	3.334
WMW Critical Value (0.050)	1.645
P-Value	0.00042759

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Thallium(site)

Background Data: Thallium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	21	79
Number of Non-Detect Data	0	64
Number of Detect Data	21	15
Minimum Non-Detect	N/A	0.13
Maximum Non-Detect	N/A	0.45
Percent Non detects	0.00%	81.01%
Minimum Detected	0.048	1.3
Maximum Detected	0.27	5
Mean of Detected Data	0.153	2.527
Median of Detected Data	0.15	2.2
SD of Detected Data	0.0677	0.932

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.45 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	903
WMW Test U-Stat	-1.337
WMW Critical Value (0.050)	1.645
P-Value	0.909

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Vanadium(site)

Background Data: Vanadium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	21	79
Number of Distinct Observations	17	76
Minimum	16	12.2
Maximum	49	114
Mean	31.05	45.84
Median	31	41.4
SD	11.16	20.38
SE of Mean	2.436	2.293

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	702.5
WMW Test U-Stat	-3.034
WMW Critical Value (0.050)	1.645
P-Value	0.999

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.2-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Zinc(site)

Background Data: Zinc(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	21	79
Number of Distinct Observations	18	76
Minimum	31	4.7
Maximum	150	598
Mean	77.57	54.94
Median	68	30.2
SD	30.69	87.15
SE of Mean	6.698	9.805

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1592
WMW Test U-Stat	4.494
WMW Critical Value (0.050)	1.645
P-Value	3.5003E-06

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

APPENDIX D.3

SWMU 38 STATISTICAL CALCULATIONS

Table D.3-1a	EPC Calculation Results - SWMU 38 Surface Soil - ProUCL 4.0 for Full Data Sets
Table D.3-1b	EPC Calculation Results - SWMU 38 Surface Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.3-1c	EPC Calculation Results - SWMU 38 Total Soil - ProUCL 4.0 for Full Data Sets
Table D.3-1d	EPC Calculation Results - SWMU 38 Total Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.3-2a	ProUCL 4.0 - Summary of Background vs. Site Means Comparison - SWMU 38 Surface Soil
Table D.3-2b	ProUCL 4.0 - Summary of Background vs. Site Means Comparison - SWMU 38 Total Soil
Table D.3-2c	Background Data Goodness of Fit - Surface Soil - ProUCL 4.0 for Full Data Sets
Table D.3-2d	Background Goodness of Fit - Surface Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.3-2e	Background Data Goodness of Fit - Total Soil - ProUCL 4.0 for Full Data Sets
Table D.3-2f	Background Goodness of Fit - Total Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.3-2g	Goodness of Fit - Surface Soil - ProUCL 4.0 for Full Data Sets
Table D.3-2h	Goodness of Fit - Surface Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.3-2i	Goodness of Fit - Total Soil - ProUCL 4.0 for Full Data Sets
Table D.3-2j	Goodness of Fit - Total Soil - ProUCL 4.0 for Data Sets with Non-Detects
Table D.3-2k	Background Versus Site Means Comparison - Surface Soil - ProUCL 4.0
Table D.3-2l	Background Versus Site Means Comparison - Total Soil - ProUCL 4.0

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Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Full Data Sets

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum (mg/kg)

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	11

Raw Statistics		**Log-transformed Statistics**	
Minimum	7820	Minimum of Log Data	8.964
Maximum	26400	Maximum of Log Data	10.18
Mean	16217	Mean of log Data	9.605
Median	14500	SD of log Data	0.45
SD	6726		
Coefficient of Variation	0.415		
Skewness	0.0567		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.89	Shapiro Wilk Test Statistic	0.884
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	19542	95% H-UCL	21457
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	25344
95% Adjusted-CLT UCL	19317	97.5% Chebyshev (MVUE) UCL	29264
95% Modified-t UCL	19547	99% Chebyshev (MVUE) UCL	36962

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	4.513	Data appear Normal at 5% Significance Level	
Theta Star	3593		
nu star	117.3		
Approximate Chi Square Value (.05)	93.32	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	19285
Adjusted Chi Square Value	90.28	95% Jackknife UCL	19542
		95% Standard Bootstrap UCL	19204
Anderson-Darling Test Statistic	0.66	95% Bootstrap-t UCL	19647
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	19013
Kolmogorov-Smirnov Test Statistic	0.246	95% Percentile Bootstrap UCL	19069
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	19177
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	24348
		97.5% Chebyshev(Mean, Sd) UCL	27867
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	34779
95% Approximate Gamma UCL	20389		
95% Adjusted Gamma UCL	21078		

Potential UCL to Use		Use 95% Student's-t UCL	19542

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	11
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.635	Minimum of Log Data	-0.454
Maximum	5.1	Maximum of Log Data	1.629
Mean	2.029	Mean of log Data	0.47
Median	1.4	SD of log Data	0.709
SD	1.505		
Coefficient of Variation	0.742		
Skewness	1.139		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.833	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	2.773	95% H-UCL	3.352
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	3.816
95% Adjusted-CLT UCL	2.856	97.5% Chebyshev (MVUE) UCL	4.597
95% Modified-t UCL	2.795	99% Chebyshev (MVUE) UCL	6.132
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.791	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	1.133		
nu star	46.57		
Approximate Chi Square Value (.05)	31.91	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	2.716
Adjusted Chi Square Value	30.19	95% Jackknife UCL	2.773
		95% Standard Bootstrap UCL	2.7
Anderson-Darling Test Statistic	0.486	95% Bootstrap-t UCL	3.031
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	2.89
Kolmogorov-Smirnov Test Statistic	0.205	95% Percentile Bootstrap UCL	2.741
Kolmogorov-Smirnov 5% Critical Value	0.239	95% BCA Bootstrap UCL	2.891
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	3.849
		97.5% Chebyshev(Mean, Sd) UCL	4.636
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6.183
95% Approximate Gamma UCL	2.961		
95% Adjusted Gamma UCL	3.13		
Potential UCL to Use		Use 95% Approximate Gamma UCL	2.961

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium (mg/kg)

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	11

Raw Statistics		**Log-transformed Statistics**	
Minimum	87	Minimum of Log Data	4.466
Maximum	160	Maximum of Log Data	5.075
Mean	119	Mean of log Data	4.765
Median	120	SD of log Data	0.179
SD	21.43		
Coefficient of Variation	0.18		
Skewness	0.424		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.965	Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	129.6	95% H-UCL	130.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	144.9
95% Adjusted-CLT UCL	129.6	97.5% Chebyshev (MVUE) UCL	156.1
95% Modified-t UCL	129.8	99% Chebyshev (MVUE) UCL	178.1

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	26.12	Data appear Normal at 5% Significance Level	
Theta Star	4.557		
nu star	679.2		
Approximate Chi Square Value (.05)	619.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	128.8
Adjusted Chi Square Value	611.6	95% Jackknife UCL	129.6
		95% Standard Bootstrap UCL	128.2
Anderson-Darling Test Statistic	0.2	95% Bootstrap-t UCL	130.4
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	130.4
Kolmogorov-Smirnov Test Statistic	0.151	95% Percentile Bootstrap UCL	128.3
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	128.9
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	145
		97.5% Chebyshev(Mean, Sd) UCL	156.2
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	178.2
95% Approximate Gamma UCL	130.5		
95% Adjusted Gamma UCL	132.2		

Potential UCL to Use		Use 95% Student's-t UCL	129.6

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	12
Raw Statistics		**Log-transformed Statistics**	
Minimum	0.465	Minimum of Log Data	-0.766
Maximum	0.91	Maximum of Log Data	-0.0943
Mean	0.686	Mean of log Data	-0.392
Median	0.68	SD of log Data	0.182
SD	0.124		
Coefficient of Variation	0.181		
Skewness	0.388		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.949	Shapiro Wilk Test Statistic	0.959
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.748	95% H-UCL	0.756
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.838
95% Adjusted-CLT UCL	0.747	97.5% Chebyshev (MVUE) UCL	0.903
95% Modified-t UCL	0.748	99% Chebyshev (MVUE) UCL	1.032
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	25.58	Data appear Normal at 5% Significance Level	
Theta Star	0.0268		
nu star	665.1		
Approximate Chi Square Value (.05)	606.3	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	0.743
Adjusted Chi Square Value	598.3	95% Jackknife UCL	0.748
		95% Standard Bootstrap UCL	0.74
Anderson-Darling Test Statistic	0.306	95% Bootstrap-t UCL	0.756
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	0.758
Kolmogorov-Smirnov Test Statistic	0.14	95% Percentile Bootstrap UCL	0.74
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	0.746
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.836
		97.5% Chebyshev(Mean, Sd) UCL	0.901
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	1.029
95% Approximate Gamma UCL	0.753		
95% Adjusted Gamma UCL	0.763		
Potential UCL to Use		Use 95% Student's-t UCL	0.748

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium (mg/kg)

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	9

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.95	Minimum of Log Data	-0.0513
Maximum	1.9	Maximum of Log Data	0.642
Mean	1.453	Mean of log Data	0.349
Median	1.4	SD of log Data	0.234
SD	0.324		
Coefficient of Variation	0.223		
Skewness	-0.156		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.931	Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.613	95% H-UCL	1.652
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.867
95% Adjusted-CLT UCL	1.597	97.5% Chebyshev (MVUE) UCL	2.046
95% Modified-t UCL	1.612	99% Chebyshev (MVUE) UCL	2.397

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	15.97	Data appear Normal at 5% Significance Level	
Theta Star	0.091		
nu star	415.2		
Approximate Chi Square Value (.05)	369	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	1.601
Adjusted Chi Square Value	362.8	95% Jackknife UCL	1.613
		95% Standard Bootstrap UCL	1.594
Anderson-Darling Test Statistic	0.391	95% Bootstrap-t UCL	1.604
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	1.593
Kolmogorov-Smirnov Test Statistic	0.168	95% Percentile Bootstrap UCL	1.595
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	1.588
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.844
		97.5% Chebyshev(Mean, Sd) UCL	2.014
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.346
95% Approximate Gamma UCL	1.635		
95% Adjusted Gamma UCL	1.663		

Potential UCL to Use		Use 95% Student's-t UCL	1.613

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	13
Raw Statistics		**Log-transformed Statistics**	
Minimum	943	Minimum of Log Data	6.849
Maximum	27600	Maximum of Log Data	10.23
Mean	8675	Mean of log Data	8.379
Median	2700	SD of log Data	1.255
SD	10028		
Coefficient of Variation	1.156		
Skewness	1.196		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.75	Shapiro Wilk Test Statistic	0.897
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	13632	95% H-UCL	31740
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	23243
95% Adjusted-CLT UCL	14236	97.5% Chebyshev (MVUE) UCL	29531
95% Modified-t UCL	13786	99% Chebyshev (MVUE) UCL	41882
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.708	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	12245		
nu star	18.42		
Approximate Chi Square Value (.05)	9.695	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	13250
Adjusted Chi Square Value	8.806	95% Jackknife UCL	13632
		95% Standard Bootstrap UCL	13115
Anderson-Darling Test Statistic	0.723	95% Bootstrap-t UCL	15112
Anderson-Darling 5% Critical Value	0.765	95% Hall's Bootstrap UCL	12545
Kolmogorov-Smirnov Test Statistic	0.236	95% Percentile Bootstrap UCL	13327
Kolmogorov-Smirnov 5% Critical Value	0.245	95% BCA Bootstrap UCL	14234
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	20799
		97.5% Chebyshev(Mean, Sd) UCL	26045
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	36349
95% Approximate Gamma UCL	16482		
95% Adjusted Gamma UCL	18147		
Potential UCL to Use		Use 95% Approximate Gamma UCL	16482

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	11

Raw Statistics		**Log-transformed Statistics**	
Minimum	12	Minimum of Log Data	2.485
Maximum	82	Maximum of Log Data	4.407
Mean	36.12	Mean of log Data	3.356
Median	19	SD of log Data	0.696
SD	26.05		
Coefficient of Variation	0.721		
Skewness	0.893		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.798	Shapiro Wilk Test Statistic	0.866
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	48.99	95% H-UCL	58.76
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	67.19
95% Adjusted-CLT UCL	49.91	97.5% Chebyshev (MVUE) UCL	80.8
95% Modified-t UCL	49.29	99% Chebyshev (MVUE) UCL	107.5

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.837	Data appear Lognormal at 5% Significance Level	
Theta Star	19.66		
nu star	47.75		
Approximate Chi Square Value (.05)	32.89	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	48
Adjusted Chi Square Value	31.14	95% Jackknife UCL	48.99
		95% Standard Bootstrap UCL	47.6
Anderson-Darling Test Statistic	0.925	95% Bootstrap-t UCL	52.13
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	46.46
Kolmogorov-Smirnov Test Statistic	0.282	95% Percentile Bootstrap UCL	47.69
Kolmogorov-Smirnov 5% Critical Value	0.239	95% BCA Bootstrap UCL	49.81
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	67.61
		97.5% Chebyshev(Mean, Sd) UCL	81.24
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	108
95% Approximate Gamma UCL	52.43		
95% Adjusted Gamma UCL	55.38		

Potential UCL to Use		Use 95% H-UCL	58.76

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt (mg/kg)

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	12

Raw Statistics		**Log-transformed Statistics**	
Minimum	5.9	Minimum of Log Data	1.775
Maximum	12	Maximum of Log Data	2.485
Mean	8.535	Mean of log Data	2.123
Median	8.2	SD of log Data	0.214
SD	1.832		
Coefficient of Variation	0.215		
Skewness	0.418		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.963	Shapiro Wilk Test Statistic	0.975
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	9.44	95% H-UCL	9.578
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	10.75
95% Adjusted-CLT UCL	9.434	97.5% Chebyshev (MVUE) UCL	11.71
95% Modified-t UCL	9.45	99% Chebyshev (MVUE) UCL	13.6

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	18.4	Data appear Normal at 5% Significance Level	
Theta Star	0.464		
nu star	478.4		
Approximate Chi Square Value (.05)	428.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	9.371
Adjusted Chi Square Value	422	95% Jackknife UCL	9.44
		95% Standard Bootstrap UCL	9.344
Anderson-Darling Test Statistic	0.208	95% Bootstrap-t UCL	9.499
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	9.439
Kolmogorov-Smirnov Test Statistic	0.128	95% Percentile Bootstrap UCL	9.373
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	9.385
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	10.75
		97.5% Chebyshev(Mean, Sd) UCL	11.71
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.59
95% Approximate Gamma UCL	9.524		
95% Adjusted Gamma UCL	9.676		

Potential UCL to Use		Use 95% Student's-t UCL	9.44

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	13

Raw Statistics		**Log-transformed Statistics**	
Minimum	6	Minimum of Log Data	1.792
Maximum	85	Maximum of Log Data	4.443
Mean	27.51	Mean of log Data	2.876
Median	12	SD of log Data	0.942
SD	28.34		
Coefficient of Variation	1.03		
Skewness	1.353		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.744	Shapiro Wilk Test Statistic	0.882
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	41.52	95% H-UCL	58.34
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	58.65
95% Adjusted-CLT UCL	43.59	97.5% Chebyshev (MVUE) UCL	72.6
95% Modified-t UCL	42.01	99% Chebyshev (MVUE) UCL	100

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.036	Data Follow Appr. Gamma Distribution at 5% Significance Level	
Theta Star	26.54		
nu star	26.94		
Approximate Chi Square Value (.05)	16.11	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	40.44
Adjusted Chi Square Value	14.92	95% Jackknife UCL	41.52
		95% Standard Bootstrap UCL	40.24
Anderson-Darling Test Statistic	0.902	95% Bootstrap-t UCL	52.35
Anderson-Darling 5% Critical Value	0.753	95% Hall's Bootstrap UCL	41.98
Kolmogorov-Smirnov Test Statistic	0.234	95% Percentile Bootstrap UCL	40.83
Kolmogorov-Smirnov 5% Critical Value	0.242	95% BCA Bootstrap UCL	42.03
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	61.77
		97.5% Chebyshev(Mean, Sd) UCL	76.59
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	105.7
95% Approximate Gamma UCL	46.01		
95% Adjusted Gamma UCL	49.66		

Potential UCL to Use		Use 95% Approximate Gamma UCL	46.01

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron (mg/kg)

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	12

Raw Statistics		**Log-transformed Statistics**	
Minimum	12700	Minimum of Log Data	9.449
Maximum	30700	Maximum of Log Data	10.33
Mean	21873	Mean of log Data	9.953
Median	20600	SD of log Data	0.298
SD	6209		
Coefficient of Variation	0.284		
Skewness	-0.021		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.924	Shapiro Wilk Test Statistic	0.925
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	24942	95% H-UCL	25903
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	29878
95% Adjusted-CLT UCL	24695	97.5% Chebyshev (MVUE) UCL	33330
95% Modified-t UCL	24941	99% Chebyshev (MVUE) UCL	40111

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	9.866	Data appear Normal at 5% Significance Level	
Theta Star	2217		
nu star	256.5		
Approximate Chi Square Value (.05)	220.4	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	24706
Adjusted Chi Square Value	215.7	95% Jackknife UCL	24942
		95% Standard Bootstrap UCL	24559
Anderson-Darling Test Statistic	0.433	95% Bootstrap-t UCL	24954
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	24576
Kolmogorov-Smirnov Test Statistic	0.173	95% Percentile Bootstrap UCL	24692
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	24831
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	29379
		97.5% Chebyshev(Mean, Sd) UCL	32627
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	39007
95% Approximate Gamma UCL	25454		
95% Adjusted Gamma UCL	26016		

Potential UCL to Use		
	Use 95% Student's-t UCL	24942

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	11
Raw Statistics		**Log-transformed Statistics**	
Minimum	7.2	Minimum of Log Data	1.974
Maximum	52	Maximum of Log Data	3.951
Mean	26.61	Mean of log Data	3.099
Median	23.5	SD of log Data	0.653
SD	15.9		
Coefficient of Variation	0.597		
Skewness	0.657		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.884	Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	34.47	95% H-UCL	42.41
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	49.09
95% Adjusted-CLT UCL	34.72	97.5% Chebyshev (MVUE) UCL	58.68
95% Modified-t UCL	34.6	99% Chebyshev (MVUE) UCL	77.5
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.286	Data appear Normal at 5% Significance Level	
Theta Star	11.64		
nu star	59.44		
Approximate Chi Square Value (.05)	42.71	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	33.86
Adjusted Chi Square Value	40.7	95% Jackknife UCL	34.47
		95% Standard Bootstrap UCL	33.42
Anderson-Darling Test Statistic	0.334	95% Bootstrap-t UCL	36.15
Anderson-Darling 5% Critical Value	0.74	95% Hall's Bootstrap UCL	34.02
Kolmogorov-Smirnov Test Statistic	0.148	95% Percentile Bootstrap UCL	33.55
Kolmogorov-Smirnov 5% Critical Value	0.238	95% BCA Bootstrap UCL	34.21
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	45.83
		97.5% Chebyshev(Mean, Sd) UCL	54.14
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	70.48
95% Approximate Gamma UCL	37.03		
95% Adjusted Gamma UCL	38.86		
Potential UCL to Use		Use 95% Student's-t UCL	34.47

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium (mg/kg)

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	11

Raw Statistics		**Log-transformed Statistics**	
Minimum	2220	Minimum of Log Data	7.705
Maximum	5590	Maximum of Log Data	8.629
Mean	3810	Mean of log Data	8.192
Median	3380	SD of log Data	0.343
SD	1263		
Coefficient of Variation	0.331		
Skewness	0.119		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.876	Shapiro Wilk Test Statistic	0.883
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	4435	95% H-UCL	4648
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	5417
95% Adjusted-CLT UCL	4399	97.5% Chebyshev (MVUE) UCL	6110
95% Modified-t UCL	4437	99% Chebyshev (MVUE) UCL	7472

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	7.41	Data appear Normal at 5% Significance Level	
Theta Star	514.2		
nu star	192.7		
Approximate Chi Square Value (.05)	161.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	4386
Adjusted Chi Square Value	157.5	95% Jackknife UCL	4435
		95% Standard Bootstrap UCL	4367
Anderson-Darling Test Statistic	0.703	95% Bootstrap-t UCL	4466
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	4345
Kolmogorov-Smirnov Test Statistic	0.211	95% Percentile Bootstrap UCL	4352
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	4398
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	5337
		97.5% Chebyshev(Mean, Sd) UCL	5998
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	7295
95% Approximate Gamma UCL	4544		
95% Adjusted Gamma UCL	4661		

Potential UCL to Use		Use 95% Student's-t UCL	4435

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese (mg/kg)

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	11

Raw Statistics		**Log-transformed Statistics**	
Minimum	319	Minimum of Log Data	5.765
Maximum	600	Maximum of Log Data	6.397
Mean	450	Mean of log Data	6.094
Median	450	SD of log Data	0.184
SD	81.34		
Coefficient of Variation	0.181		
Skewness	0.136		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.974	Shapiro Wilk Test Statistic	0.969
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	490.2	95% H-UCL	496.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	550.6
95% Adjusted-CLT UCL	488	97.5% Chebyshev (MVUE) UCL	594.1
95% Modified-t UCL	490.3	99% Chebyshev (MVUE) UCL	679.5

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	25.16	Data appear Normal at 5% Significance Level	
Theta Star	17.89		
nu star	654.1		
Approximate Chi Square Value (.05)	595.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	487.1
Adjusted Chi Square Value	587.8	95% Jackknife UCL	490.2
		95% Standard Bootstrap UCL	485.4
Anderson-Darling Test Statistic	0.211	95% Bootstrap-t UCL	490.3
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	488.6
Kolmogorov-Smirnov Test Statistic	0.121	95% Percentile Bootstrap UCL	488.7
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	485.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	548.3
		97.5% Chebyshev(Mean, Sd) UCL	590.9
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	674.5
95% Approximate Gamma UCL	494.1		
95% Adjusted Gamma UCL	500.7		

Potential UCL to Use		Use 95% Student's-t UCL	490.2

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	11
Raw Statistics		**Log-transformed Statistics**	
Minimum	8.5	Minimum of Log Data	2.14
Maximum	35	Maximum of Log Data	3.555
Mean	18.41	Mean of log Data	2.792
Median	15	SD of log Data	0.506
SD	9.635		
Coefficient of Variation	0.523		
Skewness	0.79		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.851	Shapiro Wilk Test Statistic	0.909
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	23.17	95% H-UCL	25.26
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	29.85
95% Adjusted-CLT UCL	23.43	97.5% Chebyshev (MVUE) UCL	34.83
95% Modified-t UCL	23.27	99% Chebyshev (MVUE) UCL	44.61
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.36	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	5.479		
nu star	87.35		
Approximate Chi Square Value (.05)	66.8	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	22.8
Adjusted Chi Square Value	64.25	95% Jackknife UCL	23.17
		95% Standard Bootstrap UCL	22.66
Anderson-Darling Test Statistic	0.578	95% Bootstrap-t UCL	24.2
Anderson-Darling 5% Critical Value	0.737	95% Hall's Bootstrap UCL	22.51
Kolmogorov-Smirnov Test Statistic	0.177	95% Percentile Bootstrap UCL	22.81
Kolmogorov-Smirnov 5% Critical Value	0.238	95% BCA Bootstrap UCL	22.92
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	30.06
		97.5% Chebyshev(Mean, Sd) UCL	35.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	45
95% Approximate Gamma UCL	24.07		
95% Adjusted Gamma UCL	25.03		
Potential UCL to Use		Use 95% Approximate Gamma UCL	24.07

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium (mg/kg)

General Statistics

Number of Valid Observations	13	Number of Distinct Observations	11

Raw Statistics		**Log-transformed Statistics**	
Minimum	1050	Minimum of Log Data	6.957
Maximum	2410	Maximum of Log Data	7.787
Mean	1756	Mean of log Data	7.428
Median	1670	SD of log Data	0.31
SD	518.6		
Coefficient of Variation	0.295		
Skewness	0.00842		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.891	Shapiro Wilk Test Statistic	0.894
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	2012	95% H-UCL	2094
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2423
95% Adjusted-CLT UCL	1993	97.5% Chebyshev (MVUE) UCL	2710
95% Modified-t UCL	2012	99% Chebyshev (MVUE) UCL	3275

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	9.154	Data appear Normal at 5% Significance Level	
Theta Star	191.8		
nu star	238		
Approximate Chi Square Value (.05)	203.3	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	1992
Adjusted Chi Square Value	198.7	95% Jackknife UCL	2012
		95% Standard Bootstrap UCL	1989
Anderson-Darling Test Statistic	0.554	95% Bootstrap-t UCL	2020
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	1972
Kolmogorov-Smirnov Test Statistic	0.177	95% Percentile Bootstrap UCL	1992
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	1969
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2383
		97.5% Chebyshev(Mean, Sd) UCL	2654
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3187
95% Approximate Gamma UCL	2056		
95% Adjusted Gamma UCL	2103		

Potential UCL to Use		Use 95% Student's-t UCL	2012

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Selenium (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	11

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.11	Minimum of Log Data	-2.207
Maximum	0.67	Maximum of Log Data	-0.4
Mean	0.346	Mean of log Data	-1.286
Median	0.23	SD of log Data	0.71
SD	0.228		
Coefficient of Variation	0.661		
Skewness	0.398		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.803	Shapiro Wilk Test Statistic	0.835
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.459	95% H-UCL	0.579
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.659
95% Adjusted-CLT UCL	0.457	97.5% Chebyshev (MVUE) UCL	0.794
95% Modified-t UCL	0.46	99% Chebyshev (MVUE) UCL	1.06

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.884	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.184		
nu star	48.98		
Approximate Chi Square Value (.05)	33.92	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	0.45
Adjusted Chi Square Value	32.14	95% Jackknife UCL	0.459
		95% Standard Bootstrap UCL	0.446
Anderson-Darling Test Statistic	1.056	95% Bootstrap-t UCL	0.468
Anderson-Darling 5% Critical Value	0.742	95% Hall's Bootstrap UCL	0.436
Kolmogorov-Smirnov Test Statistic	0.257	95% Percentile Bootstrap UCL	0.453
Kolmogorov-Smirnov 5% Critical Value	0.239	95% BCA Bootstrap UCL	0.455
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.622
		97.5% Chebyshev(Mean, Sd) UCL	0.741
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.976
95% Approximate Gamma UCL	0.499		
95% Adjusted Gamma UCL	0.527		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	0.622

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	13

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.035	Minimum of Log Data	-3.352
Maximum	0.14	Maximum of Log Data	-1.966
Mean	0.0707	Mean of log Data	-2.753
Median	0.063	SD of log Data	0.466
SD	0.035		
Coefficient of Variation	0.495		
Skewness	0.989		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.87	Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.088	95% H-UCL	0.0939
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.111
95% Adjusted-CLT UCL	0.0895	97.5% Chebyshev (MVUE) UCL	0.129
95% Modified-t UCL	0.0884	99% Chebyshev (MVUE) UCL	0.163

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.876	**Data appear Normal at 5% Significance Level**	
Theta Star	0.0182		
nu star	100.8		
Approximate Chi Square Value (.05)	78.62	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	0.0866
Adjusted Chi Square Value	75.84	95% Jackknife UCL	0.088
		95% Standard Bootstrap UCL	0.0858
Anderson-Darling Test Statistic	0.44	95% Bootstrap-t UCL	0.0939
Anderson-Darling 5% Critical Value	0.736	95% Hall's Bootstrap UCL	0.093
Kolmogorov-Smirnov Test Statistic	0.166	95% Percentile Bootstrap UCL	0.0877
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	0.0885
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.113
		97.5% Chebyshev(Mean, Sd) UCL	0.131
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.167
95% Approximate Gamma UCL	0.0906		
95% Adjusted Gamma UCL	0.0939		

Potential UCL to Use		Use 95% Student's-t UCL	0.088

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	12

Raw Statistics		**Log-transformed Statistics**	
Minimum	27	Minimum of Log Data	3.296
Maximum	68	Maximum of Log Data	4.22
Mean	52.46	Mean of log Data	3.919
Median	60	SD of log Data	0.313
SD	14.43		
Coefficient of Variation	0.275		
Skewness	-0.646		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.853	Shapiro Wilk Test Statistic	0.835
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	59.59	95% H-UCL	62.85
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	72.76
95% Adjusted-CLT UCL	58.28	97.5% Chebyshev (MVUE) UCL	81.46
95% Modified-t UCL	59.48	99% Chebyshev (MVUE) UCL	98.55

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	9.47	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5.54		
nu star	246.2		
Approximate Chi Square Value (.05)	210.9	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	59.04
Adjusted Chi Square Value	206.2	95% Jackknife UCL	59.59
		95% Standard Bootstrap UCL	58.86
Anderson-Darling Test Statistic	0.977	95% Bootstrap-t UCL	59.07
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	57.98
Kolmogorov-Smirnov Test Statistic	0.256	95% Percentile Bootstrap UCL	58.58
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	57.81
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	69.91
		97.5% Chebyshev(Mean, Sd) UCL	77.46
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	92.28
95% Approximate Gamma UCL	61.25		
95% Adjusted Gamma UCL	62.63		

Potential UCL to Use		
	Use 95% Student's-t UCL	59.59
	or 95% Modified-t UCL	59.48

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	11

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.1	Minimum of Log Data	-2.303
Maximum	0.24	Maximum of Log Data	-1.427
Mean	0.168	Mean of log Data	-1.814
Median	0.17	SD of log Data	0.261
SD	0.0421		
Coefficient of Variation	0.251		
Skewness	0.115		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.976	Shapiro Wilk Test Statistic	0.967
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.189	95% H-UCL	0.194
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.222
95% Adjusted-CLT UCL	0.188	97.5% Chebyshev (MVUE) UCL	0.245
95% Modified-t UCL	0.189	99% Chebyshev (MVUE) UCL	0.291

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	12.79	Data appear Normal at 5% Significance Level	
Theta Star	0.0131		
nu star	332.6		
Approximate Chi Square Value (.05)	291.3	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	0.187
Adjusted Chi Square Value	285.8	95% Jackknife UCL	0.189
		95% Standard Bootstrap UCL	0.186
Anderson-Darling Test Statistic	0.17	95% Bootstrap-t UCL	0.189
Anderson-Darling 5% Critical Value	0.733	95% Hall's Bootstrap UCL	0.189
Kolmogorov-Smirnov Test Statistic	0.107	95% Percentile Bootstrap UCL	0.187
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	0.187
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.219
		97.5% Chebyshev(Mean, Sd) UCL	0.241
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.284
95% Approximate Gamma UCL	0.192		
95% Adjusted Gamma UCL	0.196		

Potential UCL to Use		Use 95% Student's-t UCL	0.189

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	12
Raw Statistics		**Log-transformed Statistics**	
Minimum	15	Minimum of Log Data	2.708
Maximum	43	Maximum of Log Data	3.761
Mean	29.27	Mean of log Data	3.308
Median	28	SD of log Data	0.397
SD	10.7		
Coefficient of Variation	0.365		
Skewness	-0.057		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.891	Shapiro Wilk Test Statistic	0.883
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	34.56	95% H-UCL	37.19
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	43.73
95% Adjusted-CLT UCL	34.1	97.5% Chebyshev (MVUE) UCL	49.94
95% Modified-t UCL	34.55	99% Chebyshev (MVUE) UCL	62.14
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	5.755	Data appear Normal at 5% Significance Level	
Theta Star	5.086		
nu star	149.6		
Approximate Chi Square Value (.05)	122.4	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	34.15
Adjusted Chi Square Value	118.8	95% Jackknife UCL	34.56
		95% Standard Bootstrap UCL	33.96
Anderson-Darling Test Statistic	0.587	95% Bootstrap-t UCL	34.4
Anderson-Darling 5% Critical Value	0.735	95% Hall's Bootstrap UCL	33.71
Kolmogorov-Smirnov Test Statistic	0.195	95% Percentile Bootstrap UCL	33.73
Kolmogorov-Smirnov 5% Critical Value	0.237	95% BCA Bootstrap UCL	33.69
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	42.2
		97.5% Chebyshev(Mean, Sd) UCL	47.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	58.79
95% Approximate Gamma UCL	35.79		
95% Adjusted Gamma UCL	36.85		
Potential UCL to Use		Use 95% Student's-t UCL	34.56

Table D.3-1a
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc (mg/kg)

General Statistics			
Number of Valid Observations	13	Number of Distinct Observations	12
Raw Statistics		**Log-transformed Statistics**	
Minimum	45.5	Minimum of Log Data	3.818
Maximum	120	Maximum of Log Data	4.787
Mean	76.5	Mean of log Data	4.303
Median	73	SD of log Data	0.272
SD	20.93		
Coefficient of Variation	0.274		
Skewness	0.593		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.966	Shapiro Wilk Test Statistic	0.988
Shapiro Wilk Critical Value	0.866	Shapiro Wilk Critical Value	0.866
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	86.85	95% H-UCL	88.96
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	101.9
95% Adjusted-CLT UCL	87.07	97.5% Chebyshev (MVUE) UCL	112.8
95% Modified-t UCL	87.01	99% Chebyshev (MVUE) UCL	134.4
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	11.46	Data appear Normal at 5% Significance Level	
Theta Star	6.673		
nu star	298.1		
Approximate Chi Square Value (.05)	259.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0301	95% CLT UCL	86.05
Adjusted Chi Square Value	253.9	95% Jackknife UCL	86.85
		95% Standard Bootstrap UCL	85.57
Anderson-Darling Test Statistic	0.16	95% Bootstrap-t UCL	88.36
Anderson-Darling 5% Critical Value	0.734	95% Hall's Bootstrap UCL	88.89
Kolmogorov-Smirnov Test Statistic	0.131	95% Percentile Bootstrap UCL	86.27
Kolmogorov-Smirnov 5% Critical Value	0.236	95% BCA Bootstrap UCL	86.15
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	101.8
		97.5% Chebyshev(Mean, Sd) UCL	112.8
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	134.3
95% Approximate Gamma UCL	88.01		
95% Adjusted Gamma UCL	89.81		
Potential UCL to Use		Use 95% Student's-t UCL	86.85

Table D.3-1b
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony (mg/kg)

General Statistics

Number of Valid Data	13	Number of Detected Data	12
Number of Distinct Detected Data	10	Number of Non-Detect Data	1
		Percent Non-Detects	7.69%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.0355	Minimum Detected	-3.338
Maximum Detected	0.39	Maximum Detected	-0.942
Mean of Detected	0.187	Mean of Detected	-1.867
SD of Detected	0.111	SD of Detected	0.698
Minimum Non-Detect	0.0518	Minimum Non-Detect	-2.96
Maximum Non-Detect	0.0518	Maximum Non-Detect	-2.96

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.935	Shapiro Wilk Test Statistic	0.94
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value	0.859
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.175	Mean	-2.004
SD	0.115	SD	0.832
95% DL/2 (t) UCL	0.232	95% H-Stat (DL/2) UCL	0.353
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.168	Mean in Log Scale	-1.965
SD	0.122	SD in Log Scale	0.756
95% MLE (t) UCL	0.229	Mean in Original Scale	0.176
95% MLE (Tiku) UCL	0.229	SD in Original Scale	0.113
		95% Percentile Bootstrap UCL	0.228
		95% BCA Bootstrap UCL	0.231

Table D.3-1b
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	2.122
Theta Star	0.0884
nu star	50.92
A-D Test Statistic	0.266
5% A-D Critical Value	0.74
K-S Test Statistic	0.74
5% K-S Critical Value	0.248
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0.0171
Maximum	0.39
Mean	0.174
Median	0.13
SD	0.116
k star	1.496
Theta star	0.117
Nu star	38.89
AppChi2	25.6
95% Gamma Approximate UCL	0.265
95% Adjusted Gamma UCL	0.282

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Normal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.176
SD	0.11
SE of Mean	0.0317
95% KM (t) UCL	0.232
95% KM (z) UCL	0.228
95% KM (jackknife) UCL	0.231
95% KM (bootstrap t) UCL	0.24
95% KM (BCA) UCL	0.23
95% KM (Percentile Bootstrap) UCL	0.228
95% KM (Chebyshev) UCL	0.314
97.5% KM (Chebyshev) UCL	0.374
99% KM (Chebyshev) UCL	0.491
Potential UCLs to Use	
95% KM (t) UCL	0.232
95% KM (Percentile Bootstrap) UCL	0.228

Table D.3-1b
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury (mg/kg)

General Statistics

Number of Valid Data	13	Number of Detected Data	12
Number of Distinct Detected Data	12	Number of Non-Detect Data	1
		Percent Non-Detects	7.69%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.01	Minimum Detected	-4.605
Maximum Detected	0.27	Maximum Detected	-1.309
Mean of Detected	0.0745	Mean of Detected	-3.069
SD of Detected	0.0783	SD of Detected	1.022
Minimum Non-Detect	0.0077	Minimum Non-Detect	-4.867
Maximum Non-Detect	0.0077	Maximum Non-Detect	-4.867

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.789	Shapiro Wilk Test Statistic	0.964
5% Shapiro Wilk Critical Value	0.859	5% Shapiro Wilk Critical Value	0.859
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0691	Mean	-3.26
SD	0.0775	SD	1.198
95% DL/2 (t) UCL	0.107	95% H-Stat (DL/2) UCL	0.159
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0658	Mean in Log Scale	-3.263
SD	0.0787	SD in Log Scale	1.204
95% MLE (t) UCL	0.105	Mean in Original Scale	0.0691
95% MLE (Tiku) UCL	0.103	SD in Original Scale	0.0775
		95% Percentile Bootstrap UCL	0.105
		95% BCA Bootstrap UCL	0.117

Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**
k star (bias corrected)	0.955	Data appear Gamma Distributed at 5% Significance Level
Theta Star	0.078	
nu star	22.92	
A-D Test Statistic	0.39	**Nonparametric Statistics**
5% A-D Critical Value	0.752	Kaplan-Meier (KM) Method
K-S Test Statistic	0.752	Mean 0.0695
5% K-S Critical Value	0.251	SD 0.0741
Data appear Gamma Distributed at 5% Significance Level		SE of Mean 0.0215
		95% KM (t) UCL 0.108
Assuming Gamma Distribution		95% KM (z) UCL 0.105
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL 0.107
Minimum	1E-09	95% KM (bootstrap t) UCL 0.138
Maximum	0.27	95% KM (BCA) UCL 0.107
Mean	0.0688	95% KM (Percentile Bootstrap) UCL 0.106
Median	0.033	95% KM (Chebyshev) UCL 0.163
SD	0.0778	97.5% KM (Chebyshev) UCL 0.204
k star	0.343	99% KM (Chebyshev) UCL 0.283
Theta star	0.2	
Nu star	8.92	**Potential UCLs to Use**
AppChi2	3.279	95% KM (Chebyshev) UCL 0.163
95% Gamma Approximate UCL	0.187	
95% Adjusted Gamma UCL	0.218	

Note: DL/2 is not a recommended method.

Table D.3-1b
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Aroclor 1254 (ug/kg)

General Statistics

Number of Valid Data	10	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	1
		Percent Non-Detects	10.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	17	Minimum Detected	2.833
Maximum Detected	570	Maximum Detected	6.346
Mean of Detected	195.1	Mean of Detected	4.668
SD of Detected	202.7	SD of Detected	1.253
Minimum Non-Detect	5.1	Minimum Non-Detect	1.629
Maximum Non-Detect	5.1	Maximum Non-Detect	1.629

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough tp draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.822	Shapiro Wilk Test Statistic	0.937
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	175.9	Mean	4.295
SD	200.6	SD	1.67
95% DL/2 (t) UCL	292.1	95% H-Stat (DL/2) UCL	2981
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	164.3	Mean in Log Scale	4.36
SD	205.8	SD in Log Scale	1.531
95% MLE (t) UCL	283.6	Mean in Original Scale	176.1
95% MLE (Tiku) UCL	279.5	SD in Original Scale	200.3
		95% Percentile Bootstrap UCL	283.3
		95% BCA Bootstrap UCL	293.1

Table D.3-1b
EPC Calculation Results - SWMU 38 Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.713
Theta Star	273.7
nu star	12.83
A-D Test Statistic	0.394
5% A-D Critical Value	0.745
K-S Test Statistic	0.745
5% K-S Critical Value	0.287
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	570
Mean	175.6
Median	88
SD	200.8
k star	0.232
Theta star	757.6
Nu star	4.636
AppChi2	0.988
95% Gamma Approximate UCL	824.1
95% Adjusted Gamma UCL	1112

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Gamma Distributed at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	177.3
SD	189
SE of Mean	63.39
95% KM (t) UCL	293.5
95% KM (z) UCL	281.6
95% KM (jackknife) UCL	292.4
95% KM (bootstrap t) UCL	336
95% KM (BCA) UCL	287.9
95% KM (Percentile Bootstrap) UCL	285.6
95% KM (Chebyshev) UCL	453.6
97.5% KM (Chebyshev) UCL	573.2
99% KM (Chebyshev) UCL	808
Potential UCLs to Use	
95% KM (Chebyshev) UCL	453.6

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Full Data Sets

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Aluminum (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	23

Raw Statistics		**Log-transformed Statistics**	
Minimum	7820	Minimum of Log Data	8.964
Maximum	26400	Maximum of Log Data	10.18
Mean	16878	Mean of log Data	9.678
Median	17000	SD of log Data	0.354
SD	5302		
Coefficient of Variation	0.314		
Skewness	-0.236		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.943	Shapiro Wilk Test Statistic	0.908
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	18553	95% H-UCL	19209
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	21919
95% Adjusted-CLT UCL	18451	97.5% Chebyshev (MVUE) UCL	24066
95% Modified-t UCL	18546	99% Chebyshev (MVUE) UCL	28282

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	8.249	Data appear Normal at 5% Significance Level	
Theta Star	2046		
nu star	478.5		
Approximate Chi Square Value (.05)	428.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	18497
Adjusted Chi Square Value	425.9	95% Jackknife UCL	18553
		95% Standard Bootstrap UCL	18473
Anderson-Darling Test Statistic	0.815	95% Bootstrap-t UCL	18430
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	18437
Kolmogorov-Smirnov Test Statistic	0.152	95% Percentile Bootstrap UCL	18446
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL	18343
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	21170
		97.5% Chebyshev(Mean, Sd) UCL	23027
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	26674
95% Approximate Gamma UCL	18835		
95% Adjusted Gamma UCL	18959		

Potential UCL to Use		Use 95% Student's-t UCL	18553

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	18

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.635	Minimum of Log Data	-0.454
Maximum	5.1	Maximum of Log Data	1.629
Mean	1.728	Mean of log Data	0.411
Median	1.5	SD of log Data	0.507
SD	1.054		
Coefficient of Variation	0.61		
Skewness	2.045		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.75	Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	2.061	95% H-UCL	2.067
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2.44
95% Adjusted-CLT UCL	2.129	97.5% Chebyshev (MVUE) UCL	2.757
95% Modified-t UCL	2.073	99% Chebyshev (MVUE) UCL	3.38

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.476	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.497		
nu star	201.6		
Approximate Chi Square Value (.05)	169.7	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	2.05
Adjusted Chi Square Value	168	95% Jackknife UCL	2.061
		95% Standard Bootstrap UCL	2.041
Anderson-Darling Test Statistic	1.323	95% Bootstrap-t UCL	2.217
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	2.338
Kolmogorov-Smirnov Test Statistic	0.238	95% Percentile Bootstrap UCL	2.052
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL	2.154
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2.581
		97.5% Chebyshev(Mean, Sd) UCL	2.95
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	3.675
95% Approximate Gamma UCL	2.052		
95% Adjusted Gamma UCL	2.073		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	2.581

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	19

Raw Statistics		**Log-transformed Statistics**	
Minimum	75	Minimum of Log Data	4.317
Maximum	180	Maximum of Log Data	5.193
Mean	120.4	Mean of log Data	4.771
Median	120	SD of log Data	0.2
SD	23.93		
Coefficient of Variation	0.199		
Skewness	0.412		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.976	Shapiro Wilk Test Statistic	0.983
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	127.9	95% H-UCL	128.7
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	140.1
95% Adjusted-CLT UCL	128	97.5% Chebyshev (MVUE) UCL	148.6
95% Modified-t UCL	128	99% Chebyshev (MVUE) UCL	165.3

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	23.55	Data appear Normal at 5% Significance Level	
Theta Star	5.11		
nu star	1366		
Approximate Chi Square Value (.05)	1281	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	127.7
Adjusted Chi Square Value	1276	95% Jackknife UCL	127.9
		95% Standard Bootstrap UCL	127.3
Anderson-Darling Test Statistic	0.244	95% Bootstrap-t UCL	128.5
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	128.3
Kolmogorov-Smirnov Test Statistic	0.107	95% Percentile Bootstrap UCL	127.9
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	128.2
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	139.7
		97.5% Chebyshev(Mean, Sd) UCL	148.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	164.6
95% Approximate Gamma UCL	128.3		
95% Adjusted Gamma UCL	128.8		

Potential UCL to Use		Use 95% Student's-t UCL	127.9

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	27

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.31	Minimum of Log Data	-1.171
Maximum	0.93	Maximum of Log Data	-0.0726
Mean	0.622	Mean of log Data	-0.51
Median	0.63	SD of log Data	0.278
SD	0.159		
Coefficient of Variation	0.256		
Skewness	-0.0392		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.968	Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.672	95% H-UCL	0.686
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.765
95% Adjusted-CLT UCL	0.67	97.5% Chebyshev (MVUE) UCL	0.827
95% Modified-t UCL	0.672	99% Chebyshev (MVUE) UCL	0.948

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	13.01	**Data appear Normal at 5% Significance Level**	
Theta Star	0.0478		
nu star	754.3		
Approximate Chi Square Value (.05)	691.6	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	0.671
Adjusted Chi Square Value	688	95% Jackknife UCL	0.672
		95% Standard Bootstrap UCL	0.67
Anderson-Darling Test Statistic	0.483	95% Bootstrap-t UCL	0.675
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	0.67
Kolmogorov-Smirnov Test Statistic	0.155	95% Percentile Bootstrap UCL	0.668
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	0.673
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.751
		97.5% Chebyshev(Mean, Sd) UCL	0.807
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.916
95% Approximate Gamma UCL	0.678		
95% Adjusted Gamma UCL	0.682		

Potential UCL to Use		Use 95% Student's-t UCL	0.672

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	12

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.95	Minimum of Log Data	-0.0513
Maximum	2	Maximum of Log Data	0.693
Mean	1.532	Mean of log Data	0.41
Median	1.6	SD of log Data	0.193
SD	0.276		
Coefficient of Variation	0.18		
Skewness	-0.467		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.944	Shapiro Wilk Test Statistic	0.917
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1.619	95% H-UCL	1.636
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	1.775
95% Adjusted-CLT UCL	1.612	97.5% Chebyshev (MVUE) UCL	1.879
95% Modified-t UCL	1.619	99% Chebyshev (MVUE) UCL	2.085

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	26.36	Data appear Normal at 5% Significance Level	
Theta Star	0.0581		
nu star	1529		
Approximate Chi Square Value (.05)	1439	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	1.617
Adjusted Chi Square Value	1434	95% Jackknife UCL	1.619
		95% Standard Bootstrap UCL	1.613
Anderson-Darling Test Statistic	0.822	95% Bootstrap-t UCL	1.612
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	1.613
Kolmogorov-Smirnov Test Statistic	0.203	95% Percentile Bootstrap UCL	1.615
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	1.61
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	1.756
		97.5% Chebyshev(Mean, Sd) UCL	1.852
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2.042
95% Approximate Gamma UCL	1.628		
95% Adjusted Gamma UCL	1.634		

Potential UCL to Use		Use 95% Student's-t UCL	1.619

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	23

Raw Statistics		**Log-transformed Statistics**	
Minimum	943	Minimum of Log Data	6.849
Maximum	27600	Maximum of Log Data	10.23
Mean	5082	Mean of log Data	7.984
Median	2300	SD of log Data	0.909
SD	7351		
Coefficient of Variation	1.447		
Skewness	2.457		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.536	Shapiro Wilk Test Statistic	0.794
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	7404	95% H-UCL	6630
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	7956
95% Adjusted-CLT UCL	7993	97.5% Chebyshev (MVUE) UCL	9516
95% Modified-t UCL	7508	99% Chebyshev (MVUE) UCL	12580

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	0.96	Data do not follow a Discernable Distribution (0.05)	
Theta Star	5295		
nu star	55.66		
Approximate Chi Square Value (.05)	39.52	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	7327
Adjusted Chi Square Value	38.7	95% Jackknife UCL	7404
		95% Standard Bootstrap UCL	7283
Anderson-Darling Test Statistic	3.88	95% Bootstrap-t UCL	8533
Anderson-Darling 5% Critical Value	0.773	95% Hall's Bootstrap UCL	7152
Kolmogorov-Smirnov Test Statistic	0.389	95% Percentile Bootstrap UCL	7278
Kolmogorov-Smirnov 5% Critical Value	0.167	95% BCA Bootstrap UCL	8122
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11032
		97.5% Chebyshev(Mean, Sd) UCL	13607
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	18665
95% Approximate Gamma UCL	7158		
95% Adjusted Gamma UCL	7309		

Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	11032

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	21

Raw Statistics		**Log-transformed Statistics**	
Minimum	12	Minimum of Log Data	2.485
Maximum	82	Maximum of Log Data	4.407
Mean	28.64	Mean of log Data	3.214
Median	23	SD of log Data	0.495
SD	18.63		
Coefficient of Variation	0.651		
Skewness	2.015		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.695	Shapiro Wilk Test Statistic	0.874
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	34.52	95% H-UCL	33.71
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	39.7
95% Adjusted-CLT UCL	35.71	97.5% Chebyshev (MVUE) UCL	44.77
95% Modified-t UCL	34.74	99% Chebyshev (MVUE) UCL	54.72

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	3.356	Data do not follow a Discernable Distribution (0.05)	
Theta Star	8.534		
nu star	194.6		
Approximate Chi Square Value (.05)	163.4	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	34.33
Adjusted Chi Square Value	161.7	95% Jackknife UCL	34.52
		95% Standard Bootstrap UCL	34.22
Anderson-Darling Test Statistic	2.028	95% Bootstrap-t UCL	37.26
Anderson-Darling 5% Critical Value	0.751	95% Hall's Bootstrap UCL	34.95
Kolmogorov-Smirnov Test Statistic	0.234	95% Percentile Bootstrap UCL	34.12
Kolmogorov-Smirnov 5% Critical Value	0.164	95% BCA Bootstrap UCL	36.12
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	43.72
		97.5% Chebyshev(Mean, Sd) UCL	50.25
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	63.06
95% Approximate Gamma UCL	34.12		
95% Adjusted Gamma UCL	34.48		

Potential UCL to Use		Use 95% Student's-t UCL	34.52
		or 95% Modified-t UCL	34.74

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt (mg/kg)

General Statistics			
Number of Valid Observations	29	Number of Distinct Observations	20
Raw Statistics		**Log-transformed Statistics**	
Minimum	5.9	Minimum of Log Data	1.775
Maximum	13	Maximum of Log Data	2.565
Mean	9.519	Mean of log Data	2.231
Median	9.6	SD of log Data	0.22
SD	2.023		
Coefficient of Variation	0.213		
Skewness	0.0358		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.96	Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	10.16	95% H-UCL	10.25
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	11.23
95% Adjusted-CLT UCL	10.14	97.5% Chebyshev (MVUE) UCL	11.97
95% Modified-t UCL	10.16	99% Chebyshev (MVUE) UCL	13.42
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	19.9	Data appear Normal at 5% Significance Level	
Theta Star	0.478		
nu star	1154		
Approximate Chi Square Value (.05)	1076	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	10.14
Adjusted Chi Square Value	1072	95% Jackknife UCL	10.16
		95% Standard Bootstrap UCL	10.14
Anderson-Darling Test Statistic	0.34	95% Bootstrap-t UCL	10.18
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	10.17
Kolmogorov-Smirnov Test Statistic	0.124	95% Percentile Bootstrap UCL	10.12
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	10.12
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	11.16
		97.5% Chebyshev(Mean, Sd) UCL	11.86
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	13.26
95% Approximate Gamma UCL	10.21		
95% Adjusted Gamma UCL	10.25		
Potential UCL to Use		Use 95% Student's-t UCL	10.16

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper (mg/kg)

General Statistics			
Number of Valid Observations	29	Number of Distinct Observations	21
Raw Statistics		**Log-transformed Statistics**	
Minimum	6	Minimum of Log Data	1.792
Maximum	85	Maximum of Log Data	4.443
Mean	19.03	Mean of log Data	2.648
Median	13	SD of log Data	0.682
SD	20.24		
Coefficient of Variation	1.064		
Skewness	2.579		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.575	Shapiro Wilk Test Statistic	0.833
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	25.42	95% H-UCL	23.35
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	28.14
95% Adjusted-CLT UCL	27.13	97.5% Chebyshev (MVUE) UCL	32.68
95% Modified-t UCL	25.72	99% Chebyshev (MVUE) UCL	41.59
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	1.661	Data do not follow a Discernable Distribution (0.05)	
Theta Star	11.46		
nu star	96.31		
Approximate Chi Square Value (.05)	74.67	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	25.21
Adjusted Chi Square Value	73.54	95% Jackknife UCL	25.42
		95% Standard Bootstrap UCL	25.14
Anderson-Darling Test Statistic	2.897	95% Bootstrap-t UCL	31.68
Anderson-Darling 5% Critical Value	0.759	95% Hall's Bootstrap UCL	26.93
Kolmogorov-Smirnov Test Statistic	0.281	95% Percentile Bootstrap UCL	25.57
Kolmogorov-Smirnov 5% Critical Value	0.165	95% BCA Bootstrap UCL	27.06
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	35.41
		97.5% Chebyshev(Mean, Sd) UCL	42.5
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	56.42
95% Approximate Gamma UCL	24.54		
95% Adjusted Gamma UCL	24.92		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	35.41

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron (mg/kg)

General Statistics			
Number of Valid Observations	29	Number of Distinct Observations	24
Raw Statistics		**Log-transformed Statistics**	
Minimum	12700	Minimum of Log Data	9.449
Maximum	32200	Maximum of Log Data	10.38
Mean	24162	Mean of log Data	10.06
Median	25000	SD of log Data	0.266
SD	5817		
Coefficient of Variation	0.241		
Skewness	-0.44		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.931	Shapiro Wilk Test Statistic	0.905
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	26000	95% H-UCL	26514
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	29493
95% Adjusted-CLT UCL	25845	97.5% Chebyshev (MVUE) UCL	31776
95% Modified-t UCL	25985	99% Chebyshev (MVUE) UCL	36262
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	14.25	Data appear Normal at 5% Significance Level	
Theta Star	1695		
nu star	826.7		
Approximate Chi Square Value (.05)	761	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	25939
Adjusted Chi Square Value	757.2	95% Jackknife UCL	26000
		95% Standard Bootstrap UCL	25920
Anderson-Darling Test Statistic	0.86	95% Bootstrap-t UCL	25836
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	25860
Kolmogorov-Smirnov Test Statistic	0.167	95% Percentile Bootstrap UCL	25841
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	25781
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	28870
		97.5% Chebyshev(Mean, Sd) UCL	30908
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	34910
95% Approximate Gamma UCL	26249		
95% Adjusted Gamma UCL	26379		
Potential UCL to Use		Use 95% Student's-t UCL	26000

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead (mg/kg)

General Statistics			
Number of Valid Observations	29	Number of Distinct Observations	22
Raw Statistics		**Log-transformed Statistics**	
Minimum	5.5	Minimum of Log Data	1.705
Maximum	52	Maximum of Log Data	3.951
Mean	17.63	Mean of log Data	2.66
Median	12	SD of log Data	0.619
SD	13.4		
Coefficient of Variation	0.76		
Skewness	1.746		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.739	Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	21.86	95% H-UCL	21.99
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	26.35
95% Adjusted-CLT UCL	22.58	97.5% Chebyshev (MVUE) UCL	30.32
95% Modified-t UCL	22	99% Chebyshev (MVUE) UCL	38.11
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	2.307	Data do not follow a Discernable Distribution (0.05)	
Theta Star	7.642		
nu star	133.8		
Approximate Chi Square Value (.05)	108.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	21.72
Adjusted Chi Square Value	106.7	95% Jackknife UCL	21.86
		95% Standard Bootstrap UCL	21.73
Anderson-Darling Test Statistic	1.46	95% Bootstrap-t UCL	23.31
Anderson-Darling 5% Critical Value	0.755	95% Hall's Bootstrap UCL	22.19
Kolmogorov-Smirnov Test Statistic	0.218	95% Percentile Bootstrap UCL	21.77
Kolmogorov-Smirnov 5% Critical Value	0.164	95% BCA Bootstrap UCL	22.58
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	28.47
		97.5% Chebyshev(Mean, Sd) UCL	33.17
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	42.39
95% Approximate Gamma UCL	21.82		
95% Adjusted Gamma UCL	22.11		
Potential UCL to Use		Use 95% Chebyshev (Mean, Sd) UCL	28.47

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	26

Raw Statistics		**Log-transformed Statistics**	
Minimum	2220	Minimum of Log Data	7.705
Maximum	5590	Maximum of Log Data	8.629
Mean	4113	Mean of log Data	8.286
Median	4400	SD of log Data	0.281
SD	1050		
Coefficient of Variation	0.255		
Skewness	-0.406		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.909	Shapiro Wilk Test Statistic	0.886
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	4445	95% H-UCL	4541
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	5075
95% Adjusted-CLT UCL	4418	97.5% Chebyshev (MVUE) UCL	5487
95% Modified-t UCL	4443	99% Chebyshev (MVUE) UCL	6296

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	12.72	Data do not follow a Discernable Distribution (0.05)	
Theta Star	323.5		
nu star	737.5		
Approximate Chi Square Value (.05)	675.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	4434
Adjusted Chi Square Value	672	95% Jackknife UCL	4445
		95% Standard Bootstrap UCL	4431
Anderson-Darling Test Statistic	1.167	95% Bootstrap-t UCL	4432
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	4423
Kolmogorov-Smirnov Test Statistic	0.165	95% Percentile Bootstrap UCL	4427
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	4392
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	4963
		97.5% Chebyshev(Mean, Sd) UCL	5331
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	6054
95% Approximate Gamma UCL	4491		
95% Adjusted Gamma UCL	4515		

Potential UCL to Use		
	Use 95% Student's-t UCL	4445
	or 95% Modified-t UCL	4443

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	23

Raw Statistics		**Log-transformed Statistics**	
Minimum	273	Minimum of Log Data	5.609
Maximum	600	Maximum of Log Data	6.397
Mean	446	Mean of log Data	6.087
Median	450	SD of log Data	0.172
SD	72.57		
Coefficient of Variation	0.163		
Skewness	-0.276		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.988	Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	468.9	95% H-UCL	472.4
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	508.7
95% Adjusted-CLT UCL	467.4	97.5% Chebyshev (MVUE) UCL	535.8
95% Modified-t UCL	468.8	99% Chebyshev (MVUE) UCL	588.9

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	32.87	Data appear Normal at 5% Significance Level	
Theta Star	13.57		
nu star	1907		
Approximate Chi Square Value (.05)	1806	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	468.1
Adjusted Chi Square Value	1800	95% Jackknife UCL	468.9
		95% Standard Bootstrap UCL	467.3
Anderson-Darling Test Statistic	0.312	95% Bootstrap-t UCL	466.9
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	468.1
Kolmogorov-Smirnov Test Statistic	0.11	95% Percentile Bootstrap UCL	466.4
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	468
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	504.7
		97.5% Chebyshev(Mean, Sd) UCL	530.1
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	580.1
95% Approximate Gamma UCL	470.8		
95% Adjusted Gamma UCL	472.3		

Potential UCL to Use		Use 95% Student's-t UCL	468.9

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel (mg/kg)

General Statistics			
Number of Valid Observations	29	Number of Distinct Observations	17
Raw Statistics		**Log-transformed Statistics**	
Minimum	8.5	Minimum of Log Data	2.14
Maximum	35	Maximum of Log Data	3.555
Mean	16.17	Mean of log Data	2.713
Median	14	SD of log Data	0.364
SD	6.88		
Coefficient of Variation	0.426		
Skewness	1.668		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.797	Shapiro Wilk Test Statistic	0.921
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	18.34	95% H-UCL	18.28
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	20.91
95% Adjusted-CLT UCL	18.69	97.5% Chebyshev (MVUE) UCL	23.01
95% Modified-t UCL	18.41	99% Chebyshev (MVUE) UCL	27.13
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	6.565	Data do not follow a Discernable Distribution (0.05)	
Theta Star	2.463		
nu star	380.8		
Approximate Chi Square Value (.05)	336.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	18.27
Adjusted Chi Square Value	334.1	95% Jackknife UCL	18.34
		95% Standard Bootstrap UCL	18.3
Anderson-Darling Test Statistic	1.111	95% Bootstrap-t UCL	18.99
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	18.8
Kolmogorov-Smirnov Test Statistic	0.2	95% Percentile Bootstrap UCL	18.36
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL	18.66
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	21.74
		97.5% Chebyshev(Mean, Sd) UCL	24.15
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	28.88
95% Approximate Gamma UCL	18.29		
95% Adjusted Gamma UCL	18.43		
Potential UCL to Use		Use 95% Student's-t UCL	18.34
		or 95% Modified-t UCL	18.41

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	23

Raw Statistics		**Log-transformed Statistics**	
Minimum	1050	Minimum of Log Data	6.957
Maximum	2410	Maximum of Log Data	7.787
Mean	1798	Mean of log Data	7.466
Median	1880	SD of log Data	0.25
SD	421.1		
Coefficient of Variation	0.234		
Skewness	-0.208		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.94	Shapiro Wilk Test Statistic	0.924
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	1931	95% H-UCL	1960
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	2169
95% Adjusted-CLT UCL	1924	97.5% Chebyshev (MVUE) UCL	2329
95% Modified-t UCL	1931	99% Chebyshev (MVUE) UCL	2642

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	15.73	Data appear Normal at 5% Significance Level	
Theta Star	114.3		
nu star	912.2		
Approximate Chi Square Value (.05)	843.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	1927
Adjusted Chi Square Value	839.2	95% Jackknife UCL	1931
		95% Standard Bootstrap UCL	1926
Anderson-Darling Test Statistic	0.612	95% Bootstrap-t UCL	1925
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	1925
Kolmogorov-Smirnov Test Statistic	0.147	95% Percentile Bootstrap UCL	1919
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	1922
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	2139
		97.5% Chebyshev(Mean, Sd) UCL	2287
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	2576
95% Approximate Gamma UCL	1946		
95% Adjusted Gamma UCL	1955		

Potential UCL to Use		Use 95% Student's-t UCL	1931

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	24

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.033	Minimum of Log Data	-3.411
Maximum	0.14	Maximum of Log Data	-1.966
Mean	0.0587	Mean of log Data	-2.908
Median	0.051	SD of log Data	0.362
SD	0.0262		
Coefficient of Variation	0.446		
Skewness	1.992		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.759	Shapiro Wilk Test Statistic	0.898
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.0669	95% H-UCL	0.0661
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.0756
95% Adjusted-CLT UCL	0.0686	97.5% Chebyshev (MVUE) UCL	0.0832
95% Modified-t UCL	0.0672	99% Chebyshev (MVUE) UCL	0.098

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	6.398	Data do not follow a Discernable Distribution (0.05)	
Theta Star	0.00917		
nu star	371.1		
Approximate Chi Square Value (.05)	327.5	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	0.0667
Adjusted Chi Square Value	325	95% Jackknife UCL	0.0669
		95% Standard Bootstrap UCL	0.0665
Anderson-Darling Test Statistic	1.401	95% Bootstrap-t UCL	0.0696
Anderson-Darling 5% Critical Value	0.747	95% Hall's Bootstrap UCL	0.0714
Kolmogorov-Smirnov Test Statistic	0.187	95% Percentile Bootstrap UCL	0.0669
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL	0.0687
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.0799
		97.5% Chebyshev(Mean, Sd) UCL	0.089
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.107
95% Approximate Gamma UCL	0.0665		
95% Adjusted Gamma UCL	0.067		

Potential UCL to Use		
	Use 95% Student's-t UCL	0.0669
	or 95% Modified-t UCL	0.0672

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium (mg/kg)

General Statistics			
Number of Valid Observations	29	Number of Distinct Observations	19
Raw Statistics		**Log-transformed Statistics**	
Minimum	27	Minimum of Log Data	3.296
Maximum	75	Maximum of Log Data	4.317
Mean	56.38	Mean of log Data	4.007
Median	59	SD of log Data	0.239
SD	11.55		
Coefficient of Variation	0.205		
Skewness	-0.935		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.923	Shapiro Wilk Test Statistic	0.853
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	60.03	95% H-UCL	61.29
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	67.57
95% Adjusted-CLT UCL	59.51	97.5% Chebyshev (MVUE) UCL	72.35
95% Modified-t UCL	59.97	99% Chebyshev (MVUE) UCL	81.73
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	18.34	Data do not follow a Discernable Distribution (0.05)	
Theta Star	3.074		
nu star	1064		
Approximate Chi Square Value (.05)	989	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	59.91
Adjusted Chi Square Value	984.7	95% Jackknife UCL	60.03
		95% Standard Bootstrap UCL	59.76
Anderson-Darling Test Statistic	1.331	95% Bootstrap-t UCL	59.76
Anderson-Darling 5% Critical Value	0.744	95% Hall's Bootstrap UCL	59.52
Kolmogorov-Smirnov Test Statistic	0.178	95% Percentile Bootstrap UCL	59.79
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	59.43
Data not Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	65.73
		97.5% Chebyshev(Mean, Sd) UCL	69.77
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	77.72
95% Approximate Gamma UCL	60.64		
95% Adjusted Gamma UCL	60.9		
Potential UCL to Use		Use 95% Student's-t UCL	60.03
		or 95% Modified-t UCL	59.97

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	17

Raw Statistics		**Log-transformed Statistics**	
Minimum	0.1	Minimum of Log Data	-2.303
Maximum	0.25	Maximum of Log Data	-1.386
Mean	0.182	Mean of log Data	-1.734
Median	0.19	SD of log Data	0.265
SD	0.0451		
Coefficient of Variation	0.247		
Skewness	-0.152		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.95	Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	0.197	95% H-UCL	0.2
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	0.222
95% Adjusted-CLT UCL	0.196	97.5% Chebyshev (MVUE) UCL	0.24
95% Modified-t UCL	0.197	99% Chebyshev (MVUE) UCL	0.273

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	14.08	**Data appear Normal at 5% Significance Level**	
Theta Star	0.013		
nu star	816.4		
Approximate Chi Square Value (.05)	751.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	0.196
Adjusted Chi Square Value	747.4	95% Jackknife UCL	0.197
		95% Standard Bootstrap UCL	0.196
Anderson-Darling Test Statistic	0.449	95% Bootstrap-t UCL	0.197
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	0.196
Kolmogorov-Smirnov Test Statistic	0.115	95% Percentile Bootstrap UCL	0.196
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	0.196
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	0.219
		97.5% Chebyshev(Mean, Sd) UCL	0.235
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	0.266
95% Approximate Gamma UCL	0.198		
95% Adjusted Gamma UCL	0.199		

Potential UCL to Use		Use 95% Student's-t UCL	0.197

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium (mg/kg)

General Statistics

Number of Valid Observations	29	Number of Distinct Observations	23

Raw Statistics		**Log-transformed Statistics**	
Minimum	15	Minimum of Log Data	2.708
Maximum	50	Maximum of Log Data	3.912
Mean	34.12	Mean of log Data	3.477
Median	36	SD of log Data	0.349
SD	10.29		
Coefficient of Variation	0.302		
Skewness	-0.416		

Relevant UCL Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.937	Shapiro Wilk Test Statistic	0.891
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data appear Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	37.37	95% H-UCL	38.79
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	44.2
95% Adjusted-CLT UCL	37.11	97.5% Chebyshev (MVUE) UCL	48.49
95% Modified-t UCL	37.35	99% Chebyshev (MVUE) UCL	56.89

Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	8.637	Data appear Normal at 5% Significance Level	
Theta Star	3.95		
nu star	501		
Approximate Chi Square Value (.05)	450.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	37.26
Adjusted Chi Square Value	447.2	95% Jackknife UCL	37.37
		95% Standard Bootstrap UCL	37.21
Anderson-Darling Test Statistic	0.902	95% Bootstrap-t UCL	37.28
Anderson-Darling 5% Critical Value	0.746	95% Hall's Bootstrap UCL	37.25
Kolmogorov-Smirnov Test Statistic	0.135	95% Percentile Bootstrap UCL	37.05
Kolmogorov-Smirnov 5% Critical Value	0.163	95% BCA Bootstrap UCL	36.9
Data follow Appr. Gamma Distribution at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	42.45
		97.5% Chebyshev(Mean, Sd) UCL	46.05
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	53.13
95% Approximate Gamma UCL	37.98		
95% Adjusted Gamma UCL	38.22		

Potential UCL to Use		Use 95% Student's-t UCL	37.37

Table D.3-1c
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc (mg/kg)

General Statistics			
Number of Valid Observations	29	Number of Distinct Observations	22
Raw Statistics		**Log-transformed Statistics**	
Minimum	45	Minimum of Log Data	3.807
Maximum	120	Maximum of Log Data	4.787
Mean	67.24	Mean of log Data	4.179
Median	65	SD of log Data	0.243
SD	17.54		
Coefficient of Variation	0.261		
Skewness	1.228		
Relevant UCL Statistics			
Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.903	Shapiro Wilk Test Statistic	0.959
Shapiro Wilk Critical Value	0.926	Shapiro Wilk Critical Value	0.926
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% Student's-t UCL	72.78	95% H-UCL	72.9
95% UCLs (Adjusted for Skewness)		95% Chebyshev (MVUE) UCL	80.49
95% Adjusted-CLT UCL	73.39	97.5% Chebyshev (MVUE) UCL	86.25
95% Modified-t UCL	72.91	99% Chebyshev (MVUE) UCL	97.58
Gamma Distribution Test		**Data Distribution**	
k star (bias corrected)	15.32	Data appear Gamma Distributed at 5% Significance Level	
Theta Star	4.39		
nu star	888.3		
Approximate Chi Square Value (.05)	820.1	**Nonparametric Statistics**	
Adjusted Level of Significance	0.0407	95% CLT UCL	72.6
Adjusted Chi Square Value	816.2	95% Jackknife UCL	72.78
		95% Standard Bootstrap UCL	72.52
Anderson-Darling Test Statistic	0.475	95% Bootstrap-t UCL	73.77
Anderson-Darling 5% Critical Value	0.745	95% Hall's Bootstrap UCL	73.71
Kolmogorov-Smirnov Test Statistic	0.142	95% Percentile Bootstrap UCL	72.98
Kolmogorov-Smirnov 5% Critical Value	0.162	95% BCA Bootstrap UCL	73
Data appear Gamma Distributed at 5% Significance Level		95% Chebyshev(Mean, Sd) UCL	81.44
		97.5% Chebyshev(Mean, Sd) UCL	87.59
Assuming Gamma Distribution		99% Chebyshev(Mean, Sd) UCL	99.66
95% Approximate Gamma UCL	72.83		
95% Adjusted Gamma UCL	73.18		
Potential UCL to Use		Use 95% Approximate Gamma UCL	72.83

Table D.3-1d
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

General UCL Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Antimony (mg/kg)

General Statistics

Number of Valid Data	29	Number of Detected Data	23
Number of Distinct Detected Data	14	Number of Non-Detect Data	6
		Percent Non-Detects	20.69%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.0355	Minimum Detected	-3.338
Maximum Detected	0.39	Maximum Detected	-0.942
Mean of Detected	0.162	Mean of Detected	-1.959
SD of Detected	0.0899	SD of Detected	0.542
Minimum Non-Detect	0.0518	Minimum Non-Detect	-2.96
Maximum Non-Detect	0.0518	Maximum Non-Detect	-2.96

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.846	Shapiro Wilk Test Statistic	0.928
5% Shapiro Wilk Critical Value	0.914	5% Shapiro Wilk Critical Value	0.914
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.134	Mean	-2.31
SD	0.0974	SD	0.848
95% DL/2 (t) UCL	0.164	95% H-Stat (DL/2) UCL	0.203
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.123	Mean in Log Scale	-2.188
SD	0.112	SD in Log Scale	0.672
95% MLE (t) UCL	0.158	Mean in Original Scale	0.138
95% MLE (Tiku) UCL	0.16	SD in Original Scale	0.0926
		95% Percentile Bootstrap UCL	0.167
		95% BCA Bootstrap UCL	0.171

Table D.3-1d
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	3.335
Theta Star	0.0485
nu star	153.4
A-D Test Statistic	0.972
5% A-D Critical Value	0.749
K-S Test Statistic	0.749
5% K-S Critical Value	0.182
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	0.00826
Maximum	0.39
Mean	0.143
Median	0.12
SD	0.0899
k star	2.255
Theta star	0.0632
Nu star	130.8
AppChi2	105.4
95% Gamma Approximate UCL	0.177
95% Adjusted Gamma UCL	0.179

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data appear Lognormal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.136
SD	0.0935
SE of Mean	0.0178
95% KM (t) UCL	0.166
95% KM (z) UCL	0.165
95% KM (jackknife) UCL	0.163
95% KM (bootstrap t) UCL	0.168
95% KM (BCA) UCL	0.178
95% KM (Percentile Bootstrap) UCL	0.172
95% KM (Chebyshev) UCL	0.213
97.5% KM (Chebyshev) UCL	0.247
99% KM (Chebyshev) UCL	0.312
Potential UCLs to Use	
95% KM (BCA) UCL	0.178

Table D.3-1d
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury (mg/kg)

General Statistics

Number of Valid Data	29	Number of Detected Data	24
Number of Distinct Detected Data	20	Number of Non-Detect Data	5
		Percent Non-Detects	17.24%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.01	Minimum Detected	-4.605
Maximum Detected	0.27	Maximum Detected	-1.309
Mean of Detected	0.0489	Mean of Detected	-3.437
SD of Detected	0.0603	SD of Detected	0.834
Minimum Non-Detect	0.0077	Minimum Non-Detect	-4.867
Maximum Non-Detect	0.0077	Maximum Non-Detect	-4.867

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.612	Shapiro Wilk Test Statistic	0.9
5% Shapiro Wilk Critical Value	0.916	5% Shapiro Wilk Critical Value	0.916
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.0412	Mean	-3.803
SD	0.0574	SD	1.112
95% DL/2 (t) UCL	0.0593	95% H-Stat (DL/2) UCL	0.0452
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.0345	Mean in Log Scale	-3.766
SD	0.0639	SD in Log Scale	1.062
95% MLE (t) UCL	0.0547	Mean in Original Scale	0.0414
95% MLE (Tiku) UCL	0.0541	SD in Original Scale	0.0572
		95% Percentile Bootstrap UCL	0.0606
		95% BCA Bootstrap UCL	0.066

Table D.3-1d
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	1.195
Theta Star	0.041
nu star	57.34
A-D Test Statistic	1.806
5% A-D Critical Value	0.765
K-S Test Statistic	0.765
5% K-S Critical Value	0.182
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	0.27
Mean	0.0406
Median	0.022
SD	0.0578
k star	0.256
Theta star	0.159
Nu star	14.83
AppChi2	7.146
95% Gamma Approximate UCL	0.0842
95% Adjusted Gamma UCL	0.0881

Note: DL/2 is not a recommended method.

Data Distribution Test with Detected Values Only	
Data do not follow a Discernable Distribution (0.05)	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.0422
SD	0.0557
SE of Mean	0.0106
95% KM (t) UCL	0.0602
95% KM (z) UCL	0.0596
95% KM (jackknife) UCL	0.0599
95% KM (bootstrap t) UCL	0.0745
95% KM (BCA) UCL	0.0611
95% KM (Percentile Bootstrap) UCL	0.0603
95% KM (Chebyshev) UCL	0.0883
97.5% KM (Chebyshev) UCL	0.108
99% KM (Chebyshev) UCL	0.147
Potential UCLs to Use	
95% KM (Chebyshev) UCL	0.0883

Table D.3-1d
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Selenium (mg/kg)

General Statistics

Number of Valid Data	29	Number of Detected Data	28
Number of Distinct Detected Data	20	Number of Non-Detect Data	1
		Percent Non-Detects	3.45%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	0.11	Minimum Detected	-2.207
Maximum Detected	0.78	Maximum Detected	-0.248
Mean of Detected	0.354	Mean of Detected	-1.28
SD of Detected	0.231	SD of Detected	0.729
Minimum Non-Detect	0.089	Minimum Non-Detect	-2.419
Maximum Non-Detect	0.089	Maximum Non-Detect	-2.419

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.841	Shapiro Wilk Test Statistic	0.84
5% Shapiro Wilk Critical Value	0.924	5% Shapiro Wilk Critical Value	0.924
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.343	Mean	-1.343
SD	0.234	SD	0.793
95% DL/2 (t) UCL	0.417	95% H-Stat (DL/2) UCL	0.462
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.34	Mean in Log Scale	-1.34
SD	0.234	SD in Log Scale	0.786
95% MLE (t) UCL	0.414	Mean in Original Scale	0.343
95% MLE (Tiku) UCL	0.411	SD in Original Scale	0.234
		95% Percentile Bootstrap UCL	0.414
		95% BCA Bootstrap UCL	0.416

Table D.3-1d
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	2.016
Theta Star	0.175
nu star	112.9
A-D Test Statistic	1.797
5% A-D Critical Value	0.757
K-S Test Statistic	0.757
5% K-S Critical Value	0.167
Data not Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	1E-09
Maximum	0.78
Mean	0.341
Median	0.23
SD	0.236
k star	0.643
Theta star	0.531
Nu star	37.28
AppChi2	24.3
95% Gamma Approximate UCL	0.524
95% Adjusted Gamma UCL	0.538
Note: DL/2 is not a recommended method.	

Data Distribution Test with Detected Values Only	
Data do not follow a Discernable Distribution (0.05)	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	0.345
SD	0.227
SE of Mean	0.043
95% KM (t) UCL	0.418
95% KM (z) UCL	0.416
95% KM (jackknife) UCL	0.418
95% KM (bootstrap t) UCL	0.422
95% KM (BCA) UCL	0.412
95% KM (Percentile Bootstrap) UCL	0.416
95% KM (Chebyshev) UCL	0.532
97.5% KM (Chebyshev) UCL	0.614
99% KM (Chebyshev) UCL	0.773
Potential UCLs to Use	
95% KM (Chebyshev) UCL	0.532

Table D.3-1d
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Aroclor 1254 (ug/kg)

General Statistics

Number of Valid Data	18	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	9
		Percent Non-Detects	50.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	17	Minimum Detected	2.833
Maximum Detected	570	Maximum Detected	6.346
Mean of Detected	195.1	Mean of Detected	4.668
SD of Detected	202.7	SD of Detected	1.253
Minimum Non-Detect	5.1	Minimum Non-Detect	1.629
Maximum Non-Detect	5.4	Maximum Non-Detect	1.686

Note: Data have multiple DLs - Use of KM Method is recommended		Number treated as Non-Detect	9
For all methods (except KM, DL/2, and ROS Methods),		Number treated as Detected	9
Observations < Largest ND are treated as NDs		Single DL Non-Detect Percentage	50.00%

Warning: There are only 9 Detected Values in this data
Note: It should be noted that even though bootstrap may be performed on this data set
the resulting calculations may not be reliable enough tp draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

UCL Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.822	Shapiro Wilk Test Statistic	0.937
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data not Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	

Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	98.88	Mean	2.819
SD	170.7	SD	2.088
95% DL/2 (t) UCL	168.9	95% H-Stat (DL/2) UCL	491.1

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE yields a negative mean		Mean in Log Scale	2.904
		SD in Log Scale	2.083
		Mean in Original Scale	99.57
		SD in Original Scale	170.3
		95% Percentile Bootstrap UCL	167.2
		95% BCA Bootstrap UCL	184.3

Table D.3-1d
EPC Calculation Results - SWMU 38 Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	0.713
Theta Star	273.7
nu star	12.83
A-D Test Statistic	0.394
5% A-D Critical Value	0.745
K-S Test Statistic	0.745
5% K-S Critical Value	0.287
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics using Extrapolated Data	
Minimum	17
Maximum	570
Mean	195.1
Median	138.3
SD	151.1
k star	1.343
Theta star	145.3
Nu star	48.36
AppChi2	33.39
95% Gamma Approximate UCL	282.5
95% Adjusted Gamma UCL	293
Note: DL/2 is not a recommended method.	

Data Distribution Test with Detected Values Only	
Data appear Gamma Distributed at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	106.1
SD	161.8
SE of Mean	40.46
95% KM (t) UCL	176.4
95% KM (z) UCL	172.6
95% KM (jackknife) UCL	171.3
95% KM (bootstrap t) UCL	204.2
95% KM (BCA) UCL	186.9
95% KM (Percentile Bootstrap) UCL	182.1
95% KM (Chebyshev) UCL	282.4
97.5% KM (Chebyshev) UCL	358.7
99% KM (Chebyshev) UCL	508.6
Potential UCLs to Use	
95% KM (t) UCL	176.4

Table D.3-2a
PROUCL 4.0 - Summary of Background vs Site Means Comparison - SWMU 38 and AOC Q Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	Is Site Data Distribution Normal?	Is Background Data Distibution Normal?	Means Test for Comparison	Background Comparison Results (Y/N)
Aluminum	Yes	No	Mann-Whitney	**Y**
Antimony	Yes	--	--	--
Arsenic	No	No	Mann-Whitney	N
Barium	Yes	Yes	Mann-Whitney**	**Y**
Beryllium	Yes	No	Mann-Whitney	N
Cadmium	Yes	--	--	--
Calcium	No	No	Mann-Whitney	**Y**
Chromium	No	No	Mann-Whitney	N
Cobalt	Yes	No	Mann-Whitney	N
Copper	No	No	Mann-Whitney	**Y**
Iron	Yes	No	Mann-Whitney	N
Lead	Yes	No	Mann-Whitney	N
Magnesium	Yes	No	Mann-Whitney	**Y**
Manganese	Yes	No	Mann-Whitney	N
Mercury	No	--	--	--
Nickel	No	No	Mann-Whitney	**Y**
Potassium	Yes	No	Mann-Whitney	**Y**
Selenium	No	--	--	--
Silver	Yes	--	--	--
Sodium	No	--	--	--
Thallium	Yes	--	--	--
Vanadium	Yes	No	Mann-Whitney	N
Zinc	Yes	No	Mann-Whitney	**Y**

Notes:
** Data set(s) included non-detects therefore Mann-Whitney test used
-- = Insufficient Detections to Determine Distribution
N = Site <= Background
Y = Site > Background

Table D.3-2b
PROUCL 4.0 - Summary of Background vs Site Means Comparison - SWMU 38 and AOC Q Total Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	Is Site Data Distribution Normal?	Is Background Data Distibution Normal?	Means Test for Comparison	Background Comparison Results (Y/N)
Aluminum	Yes	No	Mann-Whitney	**Y**
Antimony	No	--	--	--
Arsenic	No	No	Mann-Whitney	N
Barium	Yes	No	Mann-Whitney	**Y**
Beryllium	Yes	No	Mann-Whitney	N
Cadmium	Yes	No	Mann-Whitney	**Y**
Calcium	No	No	Mann-Whitney	**Y**
Chromium	No	Yes	Mann-Whitney	N
Cobalt	Yes	No	Mann-Whitney	N
Copper	No	No	Mann-Whitney	**Y**
Iron	Yes	Yes	Paired-t test	N
Lead	No	No	Mann-Whitney	N
Magnesium	No	No	Mann-Whitney	**Y**
Manganese	Yes	No	Mann-Whitney	**Y**
Mercury	No	No	Mann-Whitney	N
Nickel	No	No	Mann-Whitney	**Y**
Potassium	Yes	No	Mann-Whitney	**Y**
Selenium	No	--	--	--
Silver	No	--	--	--
Sodium	No	--	--	--
Thallium	Yes	Yes	Mann-Whitney**	N
Vanadium	Yes	Yes	Paired-t test	N
Zinc	No	No	Mann-Whitney	**Y**

Notes:
** Data set(s) included non-detects therefore Mann-Whitney test used
-- = Insufficient Detections to Determine Distribution
N = Site <= Background
Y = Site > Background

Table D.3-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Chromium

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	27
Minimum	6.3
Maximum	53.3
Mean of Raw Data	21.09
Standard Deviation of Raw Data	10.5
Kstar	3.695
Mean of Log Transformed Data	2.922
Standard Deviation of Log Transformed Data	0.529

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.92
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.11
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.612
A-D Critical (0.95) Value	0.75
K-S Test Statistic	0.145
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.946
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.17
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.3-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	26
Minimum	7250
Maximum	63000
Mean of Raw Data	20108
Standard Deviation of Raw Data	11869
Kstar	3.069
Mean of Log Transformed Data	9.755
Standard Deviation of Log Transformed Data	0.57

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.846
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.139
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.612
A-D Critical (0.95) Value	0.752
K-S Test Statistic	0.151
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.932
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.153
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.3-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	26
Minimum	8.9
Maximum	225
Mean of Raw Data	26.96
Standard Deviation of Raw Data	41.34
Kstar	1.324
Mean of Log Transformed Data	2.913
Standard Deviation of Log Transformed Data	0.702

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.416
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.375
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	3.163
A-D Critical (0.95) Value	0.764
K-S Test Statistic	0.253
K-S Critical(0.95) Value	0.169

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.798
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.192
Lilliefors Critical (0.95) Value	0.167

Data not Lognormal at (0.05) Significance Level

Table D.3-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	27
Minimum	12.2
Maximum	101
Mean of Raw Data	33.89
Standard Deviation of Raw Data	17.78
Kstar	3.946
Mean of Log Transformed Data	3.405
Standard Deviation of Log Transformed Data	0.497

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.832
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.141
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.622
A-D Critical (0.95) Value	0.749
K-S Test Statistic	0.111
K-S Critical(0.95) Value	0.166

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.138
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.3-2c
Background Data Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Samples	28
Number of Unique Samples	28
Minimum	7.1
Maximum	216
Mean of Raw Data	41.21
Standard Deviation of Raw Data	40.24
Kstar	1.654
Mean of Log Transformed Data	3.421
Standard Deviation of Log Transformed Data	0.761

Normal Distribution Test Results

Shapiro Wilk Test Statistic	0.665
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.203
Lilliefors Critical (0.95) Value	0.167

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.54
A-D Critical (0.95) Value	0.76
K-S Test Statistic	0.105
K-S Critical(0.95) Value	0.168

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Shapiro Wilk Test Statistic	0.975
Shapiro Wilk Critical (0.95) Value	0.924
Lilliefors Test Statistic	0.1
Lilliefors Critical (0.95) Value	0.167

Data appear Lognormal at (0.05) Significance Level

Table D.3-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Calcium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Calcium Data	28	0	28	23	5	17.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	4.6	6.6	5.12	4.8	0.844
Statistics (Detects Only)	23	116	7340	1197	885	1440
Statistics (All: NDs treated as DL value)	28	4.6	7340	983.9	761.5	1380
Statistics (All: NDs treated as DL/2 value)	28	2.3	7340	983.5	761.5	1380
Statistics (Normal ROS Estimated Data)	28	-1605	7340	751.5	761.5	1625
Statistics (Gamma ROS Estimated Data)	28	0	7340	984.5	761.5	1380
Statistics (Lognormal ROS Estimated Data)	28	104.3	7340	1007	761.5	1364

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.506	1.368	794.6	6.72	0.84	0.125
Statistics (NDs = DL)	0.575	0.537	1712	5.81	2.128	0.366
Statistics (NDs = DL/2)	0.523	0.491	1879	5.686	2.383	0.419
Statistics (Gamma ROS Estimates)	0.178	0.183	5519	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.391	1.047	0.164

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.553	0.914	Data Not Normal
Lilliefors (Detects Only)	0.275	0.185	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.244	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.587	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.244	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.761	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.207	0.167	Data Not Normal

Table D.3-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.694	0.76	
Kolmogorov-Smirnov (Detects Only)	0.152	0.185	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.232	0.803	
Kolmogorov-Smirnov (NDs = DL)	0.192	0.174	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.47	0.808	
Kolmogorov-Smirnov (NDs = DL/2)	0.211	0.175	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	6.572	0.907	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.417	0.184	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.967	0.914	Data Appear Lognormal
Lilliefors (Detects Only)	0.0979	0.185	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.779	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.279	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.75	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.296	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.949	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.114	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cobalt Data	28	0	28	20	8	28.57%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	0.11	0.75	0.501	0.72	0.319
Statistics (Detects Only)	20	5.9	45.4	15.95	12.1	10.07
Statistics (All: NDs treated as DL value)	28	0.11	45.4	11.53	10.15	11.04
Statistics (All: NDs treated as DL/2 value)	28	0.055	45.4	11.46	10.15	11.11
Statistics (Normal ROS Estimated Data)	28	-10.02	45.4	9.494	10.15	13.45
Statistics (Gamma ROS Estimated Data)	28	3.774	45.4	13.39	10.15	9.473
Statistics (Lognormal ROS Estimated Data)	28	3.134	45.4	12.48	10.15	10.13

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	3.439	3.095	4.636	2.617	0.545	0.208
Statistics (NDs = DL)	0.701	0.65	16.45	1.583	1.793	1.132
Statistics (NDs = DL/2)	0.588	0.549	19.49	1.385	2.092	1.51
Statistics (Gamma ROS Estimates)	2.851	2.569	4.697	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.25	0.749	0.333

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.819	0.905	Data Not Normal
Lilliefors (Detects Only)	0.236	0.198	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.158	0.167	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.867	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.156	0.167	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.936	0.924	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.128	0.167	Data Appear Normal

Table D.3-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.596	0.747	
Kolmogorov-Smirnov (Detects Only)	0.167	0.195	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.122	0.79	
Kolmogorov-Smirnov (NDs = DL)	0.195	0.172	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.507	0.801	
Kolmogorov-Smirnov (NDs = DL/2)	0.221	0.174	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.785	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.155	0.167	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.96	0.905	Data Appear Lognormal
Lilliefors (Detects Only)	0.132	0.198	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.831	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.257	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.802	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.288	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.954	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.126	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Magnesium Data	28	0	28	25	3	10.71%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	4.7	5	4.833	4.8	0.153
Statistics (Detects Only)	25	158	20400	2498	913	4334
Statistics (All: NDs treated as DL value)	28	4.7	20400	2231	741	4161
Statistics (All: NDs treated as DL/2 value)	28	2.35	20400	2230	741	4161
Statistics (Normal ROS Estimated Data)	28	-5148	20400	1678	741	4743
Statistics (Gamma ROS Estimated Data)	28	0	20400	2230	741	4161
Statistics (Lognormal ROS Estimated Data)	28	56.13	20400	2236	741	4158

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.694	0.643	3600	6.951	1.272	0.183
Statistics (NDs = DL)	0.479	0.451	4657	6.375	2.075	0.325
Statistics (NDs = DL/2)	0.457	0.432	4879	6.301	2.257	0.358
Statistics (Gamma ROS Estimates)	0.198	0.201	11267	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.638	1.512	0.228

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.558	0.918	Data Not Normal
Lilliefors (Detects Only)	0.303	0.177	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL)	0.299	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.546	0.924	Data Not Normal
Lilliefors (NDs = DL/2)	0.299	0.167	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.729	0.924	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.267	0.167	Data Not Normal

Table D.3-2d
Background Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.247	0.789	
Kolmogorov-Smirnov (Detects Only)	0.183	0.182	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	0.674	0.815	
Kolmogorov-Smirnov (NDs = DL)	0.131	0.175	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.681	0.82	
Kolmogorov-Smirnov (NDs = DL/2)	0.141	0.176	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.847	0.898	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.366	0.183	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.95	0.918	Data Appear Lognormal
Lilliefors (Detects Only)	0.107	0.177	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.889	0.924	Data Not Lognormal
Lilliefors (NDs = DL)	0.195	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.856	0.924	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.22	0.167	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.973	0.924	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0849	0.167	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	75
Minimum	3620
Maximum	47900
Mean of Raw Data	14204
Standard Deviation of Raw Data	9433
Kstar	2.689
Mean of Log Transformed Data	9.371
Standard Deviation of Log Transformed Data	0.618

Normal Distribution Test Results

Lilliefors Test Statistic	0.15
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.604
A-D Critical (0.95) Value	0.76
K-S Test Statistic	0.0772
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0626
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.3-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	70
Minimum	6.3
Maximum	75.8
Mean of Raw Data	26.86
Standard Deviation of Raw Data	12.51
Kstar	4.382
Mean of Log Transformed Data	3.177
Standard Deviation of Log Transformed Data	0.501

Normal Distribution Test Results

Lilliefors Test Statistic	0.0734
Lilliefors Critical (0.95) Value	0.0997

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.591
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.0909
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.122
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.3-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	72
Minimum	7250
Maximum	67700
Mean of Raw Data	26963
Standard Deviation of Raw Data	11990
Kstar	4.441
Mean of Log Transformed Data	10.09
Standard Deviation of Log Transformed Data	0.508

Normal Distribution Test Results

Lilliefors Test Statistic	0.0648
Lilliefors Critical (0.95) Value	0.0997

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.831
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.082
K-S Critical(0.95) Value	0.101

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.115
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.3-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	70
Minimum	2.1
Maximum	256
Mean of Raw Data	22.04
Standard Deviation of Raw Data	39.85
Kstar	1.149
Mean of Log Transformed Data	2.615
Standard Deviation of Log Transformed Data	0.783

Normal Distribution Test Results

Lilliefors Test Statistic	0.344
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	7.671
A-D Critical (0.95) Value	0.777
K-S Test Statistic	0.245
K-S Critical(0.95) Value	0.103

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.147
Lilliefors Critical (0.95) Value	0.0997

Data not Lognormal at (0.05) Significance Level

Table D.3-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	78
Minimum	16.7
Maximum	2040
Mean of Raw Data	471.4
Standard Deviation of Raw Data	467.1
Kstar	1.087
Mean of Log Transformed Data	5.647
Standard Deviation of Log Transformed Data	1.118

Normal Distribution Test Results

Lilliefors Test Statistic	0.165
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.359
A-D Critical (0.95) Value	0.779
K-S Test Statistic	0.0515
K-S Critical(0.95) Value	0.103

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.093
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.3-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Samples	78
Number of Unique Samples	75
Minimum	12.2
Maximum	101
Mean of Raw Data	44.97
Standard Deviation of Raw Data	18.97
Kstar	5.086
Mean of Log Transformed Data	3.708
Standard Deviation of Log Transformed Data	0.466

Normal Distribution Test Results

Lilliefors Test Statistic	0.0902
Lilliefors Critical (0.95) Value	0.1

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	0.29
A-D Critical (0.95) Value	0.754
K-S Test Statistic	0.059
K-S Critical(0.95) Value	0.101

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0891
Lilliefors Critical (0.95) Value	0.1

Data appear Lognormal at (0.05) Significance Level

Table D.3-2e
Background Data Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Samples	79
Number of Unique Samples	76
Minimum	4.7
Maximum	598
Mean of Raw Data	54.94
Standard Deviation of Raw Data	87.15
Kstar	1.05
Mean of Log Transformed Data	3.478
Standard Deviation of Log Transformed Data	0.93

Normal Distribution Test Results

Lilliefors Test Statistic	0.291
Lilliefors Critical (0.95) Value	0.0997

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

A-D Test Statistic	3.363
A-D Critical (0.95) Value	0.78
K-S Test Statistic	0.145
K-S Critical(0.95) Value	0.103

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Lilliefors Test Statistic	0.0696
Lilliefors Critical (0.95) Value	0.0997

Data appear Lognormal at (0.05) Significance Level

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Arsenic

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Arsenic Data	79	0	79	76	3	3.80%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.09	0.12	0.103	0.1	0.0153
Statistics (Detects Only)	76	1.2	35.9	4.989	3.2	5.36
Statistics (All: NDs treated as DL value)	79	0.09	35.9	4.804	3.1	5.339
Statistics (All: NDs treated as DL/2 value)	79	0.045	35.9	4.802	3.1	5.341
Statistics (Normal ROS Estimated Data)	79	-5.169	35.9	4.604	3.1	5.608
Statistics (Gamma ROS Estimated Data)	79	0	35.9	4.8	3.1	5.343
Statistics (Lognormal ROS Estimated Data)	79	0.728	35.9	4.828	3.1	5.32

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.819	1.759	2.742	1.308	0.692	0.529
Statistics (NDs = DL)	1.401	1.356	3.429	1.172	0.968	0.826
Statistics (NDs = DL/2)	1.323	1.281	3.631	1.146	1.067	0.932
Statistics (Gamma ROS Estimates)	0.568	0.555	8.454	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.246	0.748	0.6

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.282	0.102	Data Not Normal
Lilliefors (NDs = DL)	0.279	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.279	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.263	0.0997	Data Not Normal

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.409	0.766	
Kolmogorov-Smirnov (Detects Only)	0.213	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.469	0.772	
Kolmogorov-Smirnov (NDs = DL)	0.182	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.587	0.774	
Kolmogorov-Smirnov (NDs = DL/2)	0.176	0.103	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.23	0.812	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.332	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.151	0.102	Data Not Lognormal
Lilliefors (NDs = DL)	0.159	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.187	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.134	0.0997	Data Not Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Beryllium Data	71	0	71	32	39	54.93%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	39	0.022	0.03	0.0286	0.03	0.00265
Statistics (Detects Only)	32	0.61	1.6	1.017	0.975	0.272
Statistics (All: NDs treated as DL value)	71	0.022	1.6	0.474	0.03	0.527
Statistics (All: NDs treated as DL/2 value)	71	0.011	1.6	0.466	0.015	0.534
Statistics (Normal ROS Estimated Data)	71	-0.475	1.6	0.59	0.557	0.472
Statistics (Gamma ROS Estimated Data)	71	0.61	1.6	1.031	1.052	0.198
Statistics (Lognormal ROS Estimated Data)	71	0.233	1.6	0.721	0.617	0.335

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	14.61	14	0.0696	-0.0179	0.268	-15
Statistics (NDs = DL)	0.519	0.507	0.913	-1.962	1.784	-0.909
Statistics (NDs = DL/2)	0.414	0.406	1.125	-2.343	2.13	-0.909
Statistics (Gamma ROS Estimates)	26.7	25.58	0.0386	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.429	0.456	-1.063

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.953	0.93	Data Appear Normal
Lilliefors (Detects Only)	0.118	0.157	Data Appear Normal
Lilliefors (NDs = DL)	0.349	0.105	Data Not Normal
Lilliefors (NDs = DL/2)	0.35	0.105	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0495	0.105	Data Appear Normal

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.268	0.746	
Kolmogorov-Smirnov (Detects Only)	0.0843	0.155	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	8.979	0.815	
Kolmogorov-Smirnov (NDs = DL)	0.36	0.112	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	9.326	0.838	
Kolmogorov-Smirnov (NDs = DL/2)	0.361	0.113	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.819	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0939	0.105	Data appear Approximate Gamma Distribution

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.967	0.93	Data Appear Lognormal
Lilliefors (Detects Only)	0.0849	0.157	Data Appear Lognormal
Lilliefors (NDs = DL)	0.356	0.105	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.358	0.105	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0725	0.105	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cadmium Data	79	0	79	13	66	83.54%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	66	0.02	0.05	0.0256	0.02	0.00861
Statistics (Detects Only)	13	0.57	2.5	1.152	1.1	0.585
Statistics (All: NDs treated as DL value)	79	0.02	2.5	0.211	0.02	0.479
Statistics (All: NDs treated as DL/2 value)	79	0.01	2.5	0.2	0.01	0.483
Statistics (Normal ROS Estimated Data)	79	-4.148	2.5	-1.016	-1.143	1.342
Statistics (Gamma ROS Estimated Data)	79	0.197	2.987	1.943	2.175	0.717
Statistics (Lognormal ROS Estimated Data)	79	0.0167	2.5	0.338	0.174	0.444

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	5.194	5.005	0.222	0.0424	0.448	10.55
Statistics (NDs = DL)	0.424	0.416	0.498	-3.093	1.437	-0.465
Statistics (NDs = DL/2)	0.329	0.325	0.609	-3.672	1.69	-0.46
Statistics (Gamma ROS Estimates)	5.206	5.016	0.373	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.649	1.046	-0.634

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.82	0.866	Data Not Normal
Lilliefors (Detects Only)	0.246	0.246	Data Not Normal
Lilliefors (NDs = DL)	0.467	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.477	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0689	0.0997	Data Appear Normal

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.512	0.736	
Kolmogorov-Smirnov (Detects Only)	0.181	0.237	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	17.17	0.836	
Kolmogorov-Smirnov (NDs = DL)	0.422	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	18.08	0.858	
Kolmogorov-Smirnov (NDs = DL/2)	0.448	0.109	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.804	0.754	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.164	0.101	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.934	0.866	Data Appear Lognormal
Lilliefors (Detects Only)	0.158	0.246	Data Appear Lognormal
Lilliefors (NDs = DL)	0.327	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.348	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0689	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Calcium Data	79	0	79	63	16	20.25%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	16	4.6	6.7	5.563	5.4	0.796
Statistics (Detects Only)	63	116	25700	1392	717	3322
Statistics (All: NDs treated as DL value)	79	4.6	25700	1111	534	3014
Statistics (All: NDs treated as DL/2 value)	79	2.3	25700	1111	534	3014
Statistics (Normal ROS Estimated Data)	79	-3726	25700	537.2	534	3423
Statistics (Gamma ROS Estimated Data)	79	0	25700	1110	534	3014
Statistics (Lognormal ROS Estimated Data)	79	60.37	25700	1129	534	3007

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.899	0.873	1548	6.588	0.949	0.144
Statistics (NDs = DL)	0.456	0.447	2437	5.599	2.149	0.384
Statistics (NDs = DL/2)	0.42	0.413	2643	5.459	2.409	0.441
Statistics (Gamma ROS Estimates)	0.131	0.135	8441	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.173	1.189	0.193

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.359	0.112	Data Not Normal
Lilliefors (NDs = DL)	0.357	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.357	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.289	0.0997	Data Not Normal

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.055	0.785	
Kolmogorov-Smirnov (Detects Only)	0.223	0.116	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.78	0.829	
Kolmogorov-Smirnov (NDs = DL)	0.146	0.107	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.129	0.837	
Kolmogorov-Smirnov (NDs = DL/2)	0.149	0.107	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	17.18	0.972	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.418	0.114	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.108	0.112	Data Appear Lognormal
Lilliefors (NDs = DL)	0.224	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.251	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0933	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Cobalt Data	79	0	79	56	23	29.11%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	23	0.11	0.84	0.587	0.73	0.286
Statistics (Detects Only)	56	5.9	130	22.23	13.3	23.94
Statistics (All: NDs treated as DL value)	79	0.11	130	15.93	11.4	22.41
Statistics (All: NDs treated as DL/2 value)	79	0.055	130	15.84	11.4	22.47
Statistics (Normal ROS Estimated Data)	79	-40.83	130	8.784	11.4	29.44
Statistics (Gamma ROS Estimated Data)	79	0	130	17.57	11.9	21.54
Statistics (Lognormal ROS Estimated Data)	79	1.86	130	16.76	11.4	21.87

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.78	1.721	12.49	2.795	0.701	0.251
Statistics (NDs = DL)	0.61	0.595	26.11	1.758	1.787	1.017
Statistics (NDs = DL/2)	0.523	0.511	30.31	1.556	2.08	1.337
Statistics (Gamma ROS Estimates)	0.504	0.494	34.83	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.331	0.947	0.406

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.263	0.118	Data Not Normal
Lilliefors (NDs = DL)	0.24	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.241	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.17	0.0997	Data Not Normal

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	3.203	0.765	
Kolmogorov-Smirnov (Detects Only)	0.162	0.121	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.127	0.807	
Kolmogorov-Smirnov (NDs = DL)	0.155	0.105	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.851	0.816	
Kolmogorov-Smirnov (NDs = DL/2)	0.171	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	9.036	0.818	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.36	0.106	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.13	0.118	Data Not Lognormal
Lilliefors (NDs = DL)	0.213	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.251	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0915	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Magnesium Data	79	0	79	72	7	8.86%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	3.8	5	4.686	4.8	0.402
Statistics (Detects Only)	72	139	58100	6394	1270	12925
Statistics (All: NDs treated as DL value)	79	3.8	58100	5828	1080	12466
Statistics (All: NDs treated as DL/2 value)	79	1.9	58100	5827	1080	12466
Statistics (Normal ROS Estimated Data)	79	-1911	58100	4438	1080	13862
Statistics (Gamma ROS Estimated Data)	79	0	58100	5827	1080	12466
Statistics (Lognormal ROS Estimated Data)	79	28.2	58100	5832	1080	12464

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.484	0.474	13216	7.443	1.571	0.211
Statistics (NDs = DL)	0.379	0.373	15366	6.92	2.257	0.326
Statistics (NDs = DL/2)	0.368	0.363	15828	6.859	2.409	0.351
Statistics (Gamma ROS Estimates)	0.198	0.199	29431	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	7.129	1.812	0.254

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.323	0.104	Data Not Normal
Lilliefors (NDs = DL)	0.321	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.29	0.0997	Data Not Normal

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	4.255	0.821	
Kolmogorov-Smirnov (Detects Only)	0.17	0.111	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.668	0.847	
Kolmogorov-Smirnov (NDs = DL)	0.136	0.108	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.542	0.849	
Kolmogorov-Smirnov (NDs = DL/2)	0.129	0.108	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	7.068	0.912	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.298	0.111	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0868	0.104	Data Appear Lognormal
Lilliefors (NDs = DL)	0.135	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.157	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0546	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Mercury Data	79	0	79	18	61	77.22%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	61	0.019	0.06	0.0484	0.06	0.0158
Statistics (Detects Only)	18	0.038	1.2	0.187	0.125	0.259
Statistics (All: NDs treated as DL value)	79	0.019	1.2	0.0799	0.06	0.135
Statistics (All: NDs treated as DL/2 value)	79	0.0095	1.2	0.0612	0.03	0.139
Statistics (Normal ROS Estimated Data)	79	-1.214	1.2	-0.361	-0.372	0.403
Statistics (Gamma ROS Estimated Data)	79	0.038	1.2	0.173	0.156	0.138
Statistics (Lognormal ROS Estimated Data)	79	0.0007952	1.2	0.0541	0.0171	0.141

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	1.552	1.501	0.12	-2.035	0.727	-0.358
Statistics (NDs = DL)	1.645	1.591	0.0485	-2.861	0.681	-0.238
Statistics (NDs = DL/2)	0.962	0.934	0.0636	-3.396	0.902	-0.266
Statistics (Gamma ROS Estimates)	3.073	2.965	0.0563	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-4.029	1.44	-0.357

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.442	0.897	Data Not Normal
Lilliefors (Detects Only)	0.384	0.209	Data Not Normal
Lilliefors (NDs = DL)	0.356	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.361	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.067	0.0997	Data Appear Normal

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.702	0.756	
Kolmogorov-Smirnov (Detects Only)	0.274	0.207	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	6.715	0.768	
Kolmogorov-Smirnov (NDs = DL)	0.33	0.102	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	8.44	0.784	
Kolmogorov-Smirnov (NDs = DL/2)	0.377	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.725	0.759	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.0728	0.101	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.871	0.897	Data Not Lognormal
Lilliefors (Detects Only)	0.193	0.209	Data Appear Lognormal
Lilliefors (NDs = DL)	0.269	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.321	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.062	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Potassium Data	79	0	79	67	12	15.19%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	201	271	223.1	217	20.78
Statistics (Detects Only)	67	123	10900	1690	694	2232
Statistics (All: NDs treated as DL value)	79	123	10900	1467	618	2120
Statistics (All: NDs treated as DL/2 value)	79	100.5	10900	1450	618	2131
Statistics (Normal ROS Estimated Data)	79	-1878	10900	1235	618	2322
Statistics (Gamma ROS Estimated Data)	79	0	10900	1433	618	2142
Statistics (Lognormal ROS Estimated Data)	79	104.7	10900	1456	618	2127

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	0.92	0.893	1837	6.798	1.115	0.164
Statistics (NDs = DL)	0.837	0.814	1752	6.586	1.143	0.174
Statistics (NDs = DL/2)	0.75	0.73	1933	6.481	1.273	0.196
Statistics (Gamma ROS Estimates)	0.163	0.165	8778	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	6.525	1.216	0.186

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.247	0.108	Data Not Normal
Lilliefors (NDs = DL)	0.263	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.263	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.21	0.0997	Data Not Normal

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
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Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.945	0.784	
Kolmogorov-Smirnov (Detects Only)	0.153	0.112	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.288	0.789	
Kolmogorov-Smirnov (NDs = DL)	0.171	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.192	0.793	
Kolmogorov-Smirnov (NDs = DL/2)	0.147	0.104	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	14.88	0.944	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.392	0.113	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Lilliefors (Detects Only)	0.0982	0.108	Data Appear Lognormal
Lilliefors (NDs = DL)	0.106	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.0732	0.0997	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0941	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Thallium Data	79	0	79	15	64	81.01%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	64	0.13	0.45	0.189	0.15	0.0931
Statistics (Detects Only)	15	1.3	5	2.527	2.2	0.932
Statistics (All: NDs treated as DL value)	79	0.13	5	0.633	0.16	1.007
Statistics (All: NDs treated as DL/2 value)	79	0.065	5	0.556	0.08	1.039
Statistics (Normal ROS Estimated Data)	79	-4.787	5	-0.573	-0.722	1.972
Statistics (Gamma ROS Estimated Data)	79	1.3	5	2.489	2.468	0.399
Statistics (Lognormal ROS Estimated Data)	79	0.155	5	0.998	0.707	0.884

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log C.V.
Statistics (Detects Only)	8.698	8.377	0.29	0.868	0.352	0.405
Statistics (NDs = DL)	0.753	0.733	0.841	-1.253	1.097	-0.876
Statistics (NDs = DL/2)	0.515	0.504	1.08	-1.814	1.358	-0.748
Statistics (Gamma ROS Estimates)	44.1	42.44	0.0564	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.291	0.738	-2.538

Normal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.893	0.881	Data Appear Normal
Lilliefors (Detects Only)	0.17	0.229	Data Appear Normal
Lilliefors (NDs = DL)	0.382	0.0997	Data Not Normal
Lilliefors (NDs = DL/2)	0.435	0.0997	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.0779	0.0997	Data Appear Normal

Table D.3-2f
Background Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.367	0.738	
Kolmogorov-Smirnov (Detects Only)	0.145	0.222	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	12.86	0.793	
Kolmogorov-Smirnov (NDs = DL)	0.361	0.104	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	14.62	0.817	
Kolmogorov-Smirnov (NDs = DL/2)	0.371	0.106	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	10.13	0.749	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.319	0.1	Data Not Gamma Distributed

Lognormal Distribution Test Results

	Test value	Crit. (0.95)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.959	0.881	Data Appear Lognormal
Lilliefors (Detects Only)	0.134	0.229	Data Appear Lognormal
Lilliefors (NDs = DL)	0.334	0.0997	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.34	0.0997	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0779	0.0997	Data Appear Lognormal

Note: DL/2 is not a recommended method.

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	7820
Maximum	26400
Mean of Raw Data	16217
Standard Deviation of Raw Data	6726
Kstar	4.513
Mean of Log Transformed Data	9.605
Standard Deviation of Log Transformed Data	0.45

Normal Distribution Test Results

Correlation Coefficient R	0.956
Shapiro Wilk Test Statistic	0.89
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.223
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.943
A-D Test Statistic	0.66
A-D Critical (0.95) Value	0.736
K-S Test Statistic	0.246
K-S Critical(0.95) Value	0.237

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.953
Shapiro Wilk Test Statistic	0.884
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.241
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	0.635
Maximum	5.1
Mean of Raw Data	2.029
Standard Deviation of Raw Data	1.505
Kstar	1.791
Mean of Log Transformed Data	0.47
Standard Deviation of Log Transformed Data	0.709

Normal Distribution Test Results

Correlation Coefficient R	0.919
Shapiro Wilk Test Statistic	0.833
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.279
Lilliefors Critical (0.95) Value	0.246

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.975
A-D Test Statistic	0.486
A-D Critical (0.95) Value	0.742
K-S Test Statistic	0.205
K-S Critical(0.95) Value	0.239

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.976
Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.158
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	87
Maximum	160
Mean of Raw Data	119
Standard Deviation of Raw Data	21.43
Kstar	26.12
Mean of Log Transformed Data	4.765
Standard Deviation of Log Transformed Data	0.179

Normal Distribution Test Results

Correlation Coefficient R	0.985
Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.174
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.99
A-D Test Statistic	0.2
A-D Critical (0.95) Value	0.733
K-S Test Statistic	0.151
K-S Critical(0.95) Value	0.236

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.991
Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.142
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	12
Minimum	0.465
Maximum	0.91
Mean of Raw Data	0.686
Standard Deviation of Raw Data	0.124
Kstar	25.58
Mean of Log Transformed Data	-0.392
Standard Deviation of Log Transformed Data	0.182

Normal Distribution Test Results

Correlation Coefficient R	0.973
Shapiro Wilk Test Statistic	0.949
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.164
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.977
A-D Test Statistic	0.306
A-D Critical (0.95) Value	0.733
K-S Test Statistic	0.14
K-S Critical(0.95) Value	0.236

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.976
Shapiro Wilk Test Statistic	0.959
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.133
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	9
Minimum	0.95
Maximum	1.9
Mean of Raw Data	1.453
Standard Deviation of Raw Data	0.324
Kstar	15.97
Mean of Log Transformed Data	0.349
Standard Deviation of Log Transformed Data	0.234

Normal Distribution Test Results

Correlation Coefficient R	0.975
Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.166
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.962
A-D Test Statistic	0.391
A-D Critical (0.95) Value	0.733
K-S Test Statistic	0.168
K-S Critical(0.95) Value	0.236

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.97
Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.159
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	13
Minimum	943
Maximum	27600
Mean of Raw Data	8675
Standard Deviation of Raw Data	10028
Kstar	0.708
Mean of Log Transformed Data	8.379
Standard Deviation of Log Transformed Data	1.255

Normal Distribution Test Results

Correlation Coefficient R	0.874
Shapiro Wilk Test Statistic	0.75
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.263
Lilliefors Critical (0.95) Value	0.246

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.943
A-D Test Statistic	0.723
A-D Critical (0.95) Value	0.765
K-S Test Statistic	0.236
K-S Critical(0.95) Value	0.245

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.961
Shapiro Wilk Test Statistic	0.897
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.187
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	12
Maximum	82
Mean of Raw Data	36.12
Standard Deviation of Raw Data	26.05
Kstar	1.837
Mean of Log Transformed Data	3.356
Standard Deviation of Log Transformed Data	0.696

Normal Distribution Test Results

Correlation Coefficient R	0.904
Shapiro Wilk Test Statistic	0.798
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.283
Lilliefors Critical (0.95) Value	0.246

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.945
A-D Test Statistic	0.925
A-D Critical (0.95) Value	0.742
K-S Test Statistic	0.282
K-S Critical(0.95) Value	0.239

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.942
Shapiro Wilk Test Statistic	0.866
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.261
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	12
Minimum	5.9
Maximum	12
Mean of Raw Data	8.535
Standard Deviation of Raw Data	1.832
Kstar	18.4
Mean of Log Transformed Data	2.123
Standard Deviation of Log Transformed Data	0.214

Normal Distribution Test Results

Correlation Coefficient R	0.985
Shapiro Wilk Test Statistic	0.963
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.145
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.991
A-D Test Statistic	0.208
A-D Critical (0.95) Value	0.733
K-S Test Statistic	0.128
K-S Critical(0.95) Value	0.236

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.992
Shapiro Wilk Test Statistic	0.975
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.126
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	13
Minimum	6
Maximum	85
Mean of Raw Data	27.51
Standard Deviation of Raw Data	28.34
Kstar	1.036
Mean of Log Transformed Data	2.876
Standard Deviation of Log Transformed Data	0.942

Normal Distribution Test Results

Correlation Coefficient R	0.868
Shapiro Wilk Test Statistic	0.744
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.31
Lilliefors Critical (0.95) Value	0.246

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.958
A-D Test Statistic	0.902
A-D Critical (0.95) Value	0.753
K-S Test Statistic	0.234
K-S Critical(0.95) Value	0.242

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.95
Shapiro Wilk Test Statistic	0.882
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.199
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	12
Minimum	12700
Maximum	30700
Mean of Raw Data	21873
Standard Deviation of Raw Data	6209
Kstar	9.866
Mean of Log Transformed Data	9.953
Standard Deviation of Log Transformed Data	0.298

Normal Distribution Test Results

Correlation Coefficient R	0.972
Shapiro Wilk Test Statistic	0.924
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.157
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.96
A-D Test Statistic	0.433
A-D Critical (0.95) Value	0.734
K-S Test Statistic	0.173
K-S Critical(0.95) Value	0.237

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.972
Shapiro Wilk Test Statistic	0.925
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.166
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	7.2
Maximum	52
Mean of Raw Data	26.61
Standard Deviation of Raw Data	15.9
Kstar	2.286
Mean of Log Transformed Data	3.099
Standard Deviation of Log Transformed Data	0.653

Normal Distribution Test Results

Correlation Coefficient R	0.951
Shapiro Wilk Test Statistic	0.884
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.16
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.955
A-D Test Statistic	0.334
A-D Critical (0.95) Value	0.74
K-S Test Statistic	0.148
K-S Critical(0.95) Value	0.238

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.975
Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.131
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	2220
Maximum	5590
Mean of Raw Data	3810
Standard Deviation of Raw Data	1263
Kstar	7.41
Mean of Log Transformed Data	8.192
Standard Deviation of Log Transformed Data	0.343

Normal Distribution Test Results

Correlation Coefficient R	0.949
Shapiro Wilk Test Statistic	0.876
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.182
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.942
A-D Test Statistic	0.703
A-D Critical (0.95) Value	0.734
K-S Test Statistic	0.211
K-S Critical(0.95) Value	0.237

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.953
Shapiro Wilk Test Statistic	0.883
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.211
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	319
Maximum	600
Mean of Raw Data	450
Standard Deviation of Raw Data	81.34
Kstar	25.16
Mean of Log Transformed Data	6.094
Standard Deviation of Log Transformed Data	0.184

Normal Distribution Test Results

Correlation Coefficient R	0.989
Shapiro Wilk Test Statistic	0.974
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.133
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.989
A-D Test Statistic	0.211
A-D Critical (0.95) Value	0.733
K-S Test Statistic	0.121
K-S Critical(0.95) Value	0.236

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.969
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.135
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	8.5
Maximum	35
Mean of Raw Data	18.41
Standard Deviation of Raw Data	9.635
Kstar	3.36
Mean of Log Transformed Data	2.792
Standard Deviation of Log Transformed Data	0.506

Normal Distribution Test Results

Correlation Coefficient R	0.933
Shapiro Wilk Test Statistic	0.851
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.209
Lilliefors Critical (0.95) Value	0.246

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.959
A-D Test Statistic	0.578
A-D Critical (0.95) Value	0.737
K-S Test Statistic	0.177
K-S Critical(0.95) Value	0.238

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.965
Shapiro Wilk Test Statistic	0.909
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.167
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	1050
Maximum	2410
Mean of Raw Data	1756
Standard Deviation of Raw Data	518.6
Kstar	9.154
Mean of Log Transformed Data	7.428
Standard Deviation of Log Transformed Data	0.31

Normal Distribution Test Results

Correlation Coefficient R	0.959
Shapiro Wilk Test Statistic	0.891
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.179
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.945
A-D Test Statistic	0.554
A-D Critical (0.95) Value	0.734
K-S Test Statistic	0.177
K-S Critical(0.95) Value	0.237

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.959
Shapiro Wilk Test Statistic	0.894
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.171
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Selenium

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	0.11
Maximum	0.67
Mean of Raw Data	0.346
Standard Deviation of Raw Data	0.228
Kstar	1.884
Mean of Log Transformed Data	-1.286
Standard Deviation of Log Transformed Data	0.71

Normal Distribution Test Results

Correlation Coefficient R	0.911
Shapiro Wilk Test Statistic	0.803
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.254
Lilliefors Critical (0.95) Value	0.246

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.909
A-D Test Statistic	1.056
A-D Critical (0.95) Value	0.742
K-S Test Statistic	0.257
K-S Critical(0.95) Value	0.239

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.928
Shapiro Wilk Test Statistic	0.835
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.241
Lilliefors Critical (0.95) Value	0.246

Data not Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	13
Minimum	0.035
Maximum	0.14
Mean of Raw Data	0.0707
Standard Deviation of Raw Data	0.035
Kstar	3.876
Mean of Log Transformed Data	-2.753
Standard Deviation of Log Transformed Data	0.466

Normal Distribution Test Results

Correlation Coefficient R	0.939
Shapiro Wilk Test Statistic	0.87
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.191
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.975
A-D Test Statistic	0.44
A-D Critical (0.95) Value	0.736
K-S Test Statistic	0.166
K-S Critical(0.95) Value	0.237

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.976
Shapiro Wilk Test Statistic	0.934
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.145
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	12
Minimum	27
Maximum	68
Mean of Raw Data	52.46
Standard Deviation of Raw Data	14.43
Kstar	9.47
Mean of Log Transformed Data	3.919
Standard Deviation of Log Transformed Data	0.313

Normal Distribution Test Results

Correlation Coefficient R	0.933
Shapiro Wilk Test Statistic	0.853
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.238
Lilliefors Critical (0.95) Value	0.246

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.896
A-D Test Statistic	0.977
A-D Critical (0.95) Value	0.734
K-S Test Statistic	0.256
K-S Critical(0.95) Value	0.237

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.92
Shapiro Wilk Test Statistic	0.835
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.251
Lilliefors Critical (0.95) Value	0.246

Data not Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	11
Minimum	0.1
Maximum	0.24
Mean of Raw Data	0.168
Standard Deviation of Raw Data	0.0421
Kstar	12.79
Mean of Log Transformed Data	-1.814
Standard Deviation of Log Transformed Data	0.261

Normal Distribution Test Results

Correlation Coefficient R	0.992
Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.0972
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.989
A-D Test Statistic	0.17
A-D Critical (0.95) Value	0.733
K-S Test Statistic	0.107
K-S Critical(0.95) Value	0.236

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.967
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.106
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	12
Minimum	15
Maximum	43
Mean of Raw Data	29.27
Standard Deviation of Raw Data	10.7
Kstar	5.755
Mean of Log Transformed Data	3.308
Standard Deviation of Log Transformed Data	0.397

Normal Distribution Test Results

Correlation Coefficient R	0.959
Shapiro Wilk Test Statistic	0.891
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.165
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.939
A-D Test Statistic	0.587
A-D Critical (0.95) Value	0.735
K-S Test Statistic	0.195
K-S Critical(0.95) Value	0.237

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.954
Shapiro Wilk Test Statistic	0.883
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.195
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2g
Goodness of Fit - Surface Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	12
Minimum	45.5
Maximum	120
Mean of Raw Data	76.5
Standard Deviation of Raw Data	20.93
Kstar	11.46
Mean of Log Transformed Data	4.303
Standard Deviation of Log Transformed Data	0.272

Normal Distribution Test Results

Correlation Coefficient R	0.983
Shapiro Wilk Test Statistic	0.966
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.163
Lilliefors Critical (0.95) Value	0.246

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.994
A-D Test Statistic	0.16
A-D Critical (0.95) Value	0.734
K-S Test Statistic	0.131
K-S Critical(0.95) Value	0.236

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.995
Shapiro Wilk Test Statistic	0.988
Shapiro Wilk Critical (0.95) Value	0.866
Lilliefors Test Statistic	0.114
Lilliefors Critical (0.95) Value	0.246

Data appear Lognormal at (0.05) Significance Level

Table D.3-2h
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Antimony

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	13	0	13	12	1	7.69%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	12	0.0355	0.39	0.187	0.15	0.111
Statistics (All: NDs treated as DL value)	13	0.0355	0.39	0.177	0.13	0.112
Statistics (All: NDs treated as DL/2 value)	13	0.0259	0.39	0.175	0.13	0.115
Statistics (Normal ROS Estimated Data)	13	-0.0126	0.39	0.172	0.13	0.12
Statistics (Gamma ROS Estimated Data)	13	0.0171	0.39	0.174	0.13	0.116
Statistics (Lognormal ROS Estimated Data)	13	0.0355	0.39	0.176	0.13	0.113

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	2.755	2.17	0.068	-1.867	0.698	-0.374
Statistics (NDs = DL)	2.435	1.924	0.0727	-1.951	0.734	-0.376
Statistics (NDs = DL/2)	2.065	1.64	0.0847	-2.004	0.832	-0.415
Statistics (Gamma ROS Estimates)	1.878	1.496	0.0929	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.965	0.756	-0.385

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.972	0.968	0.972	0.983

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.935	0.859	Data Appear Normal
Lilliefors (Detects Only)	0.198	0.256	Data Appear Normal
Shapiro-Wilks (NDs = DL)	0.925	0.866	Data Appear Normal
Lilliefors (NDs = DL)	0.201	0.246	Data Appear Normal
Shapiro-Wilks (NDs = DL/2)	0.934	0.866	Data Appear Normal
Lilliefors (NDs = DL/2)	0.191	0.246	Data Appear Normal
Shapiro-Wilks (Normal ROS Estimates)	0.959	0.866	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.176	0.246	Data Appear Normal

Table D.3-2h
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.978	0.979	0.974	0.971

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.266	0.74	
Kolmogorov-Smirnov (Detects Only)	0.149	0.248	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.261	0.741	
Kolmogorov-Smirnov (NDs = DL)	0.133	0.239	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.279	0.743	
Kolmogorov-Smirnov (NDs = DL/2)	0.163	0.239	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.28	0.745	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.178	0.24	Data Appear Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.969	0.978	0.965	0.974

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.94	0.859	Data Appear Lognormal
Lilliefors (Detects Only)	0.191	0.256	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.948	0.866	Data Appear Lognormal
Lilliefors (NDs = DL)	0.178	0.246	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.924	0.866	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.214	0.246	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.938	0.866	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.188	0.246	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Table D.3-2h
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	13	0	13	12	1	7.69%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	12	0.01	0.27	0.0745	0.0445	0.0783
Statistics (All: NDs treated as DL value)	13	0.0077	0.27	0.0694	0.033	0.0772
Statistics (All: NDs treated as DL/2 value)	13	0.00385	0.27	0.0691	0.033	0.0775
Statistics (Normal ROS Estimated Data)	13	-0.102	0.27	0.0609	0.033	0.0895
Statistics (Gamma ROS Estimated Data)	13	1E-09	0.27	0.0688	0.033	0.0778
Statistics (Lognormal ROS Estimated Data)	13	0.00372	0.27	0.0691	0.033	0.0775

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.199	0.974	0.0621	-3.069	1.022	-0.333
Statistics (NDs = DL)	1.064	0.87	0.0652	-3.207	1.098	-0.342
Statistics (NDs = DL/2)	0.984	0.808	0.0702	-3.26	1.198	-0.367
Statistics (Gamma ROS Estimates)	0.379	0.343	0.181	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-3.263	1.204	-0.369

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.885	0.877	0.882	0.937

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.789	0.859	Data Not Normal
Lilliefors (Detects Only)	0.273	0.256	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.777	0.866	Data Not Normal
Lilliefors (NDs = DL)	0.266	0.246	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.785	0.866	Data Not Normal
Lilliefors (NDs = DL/2)	0.264	0.246	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.902	0.866	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.229	0.246	Data Appear Normal

Table D.3-2h
Goodness of Fit - Surface Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.989	0.989	0.991	0.985

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.39	0.752	
Kolmogorov-Smirnov (Detects Only)	0.178	0.251	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.381	0.756	
Kolmogorov-Smirnov (NDs = DL)	0.172	0.243	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.276	0.758	
Kolmogorov-Smirnov (NDs = DL/2)	0.156	0.243	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.259	0.814	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.292	0.254	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.987	0.989	0.992	0.992

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.964	0.859	Data Appear Lognormal
Lilliefors (Detects Only)	0.131	0.256	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.968	0.866	Data Appear Lognormal
Lilliefors (NDs = DL)	0.124	0.246	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.983	0.866	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.0914	0.246	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.983	0.866	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0902	0.246	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Full Data Sets without Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Aluminum

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	23
Minimum	7820
Maximum	26400
Mean of Raw Data	16878
Standard Deviation of Raw Data	5302
Kstar	8.249
Mean of Log Transformed Data	9.678
Standard Deviation of Log Transformed Data	0.354

Normal Distribution Test Results

Correlation Coefficient R	0.979
Shapiro Wilk Test Statistic	0.943
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.136
Lilliefors Critical (0.95) Value	0.165

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.958
A-D Test Statistic	0.815
A-D Critical (0.95) Value	0.746
K-S Test Statistic	0.152
K-S Critical(0.95) Value	0.163

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.96
Shapiro Wilk Test Statistic	0.908
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.152
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Arsenic

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	18
Minimum	0.635
Maximum	5.1
Mean of Raw Data	1.728
Standard Deviation of Raw Data	1.054
Kstar	3.476
Mean of Log Transformed Data	0.411
Standard Deviation of Log Transformed Data	0.507

Normal Distribution Test Results

Correlation Coefficient R	0.861
Shapiro Wilk Test Statistic	0.75
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.304
Lilliefors Critical (0.95) Value	0.165

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.933
A-D Test Statistic	1.323
A-D Critical (0.95) Value	0.751
K-S Test Statistic	0.238
K-S Critical(0.95) Value	0.163

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.961
Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.2
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Barium

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	19
Minimum	75
Maximum	180
Mean of Raw Data	120.4
Standard Deviation of Raw Data	23.93
Kstar	23.55
Mean of Log Transformed Data	4.771
Standard Deviation of Log Transformed Data	0.2

Normal Distribution Test Results

Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.976
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.127
Lilliefors Critical (0.95) Value	0.165

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.992
A-D Test Statistic	0.244
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.107
K-S Critical(0.95) Value	0.162

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.991
Shapiro Wilk Test Statistic	0.983
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.12
Lilliefors Critical (0.95) Value	0.165

Data appear Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Beryllium

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	27
Minimum	0.31
Maximum	0.93
Mean of Raw Data	0.622
Standard Deviation of Raw Data	0.159
Kstar	13.01
Mean of Log Transformed Data	-0.51
Standard Deviation of Log Transformed Data	0.278

Normal Distribution Test Results

Correlation Coefficient R	0.988
Shapiro Wilk Test Statistic	0.968
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.12
Lilliefors Critical (0.95) Value	0.165

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.98
A-D Test Statistic	0.483
A-D Critical (0.95) Value	0.745
K-S Test Statistic	0.155
K-S Critical(0.95) Value	0.162

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.971
Shapiro Wilk Test Statistic	0.939
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.174
Lilliefors Critical (0.95) Value	0.165

Data appear Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cadmium

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	12
Minimum	0.95
Maximum	2
Mean of Raw Data	1.532
Standard Deviation of Raw Data	0.276
Kstar	26.36
Mean of Log Transformed Data	0.41
Standard Deviation of Log Transformed Data	0.193

Normal Distribution Test Results

Correlation Coefficient R	0.976
Shapiro Wilk Test Statistic	0.944
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.183
Lilliefors Critical (0.95) Value	0.165

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.961
A-D Test Statistic	0.822
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.203
K-S Critical(0.95) Value	0.162

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.961
Shapiro Wilk Test Statistic	0.917
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.209
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Calcium

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	23
Minimum	943
Maximum	27600
Mean of Raw Data	5082
Standard Deviation of Raw Data	7351
Kstar	0.96
Mean of Log Transformed Data	7.984
Standard Deviation of Log Transformed Data	0.909

Normal Distribution Test Results

Correlation Coefficient R	0.727
Shapiro Wilk Test Statistic	0.536
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.42
Lilliefors Critical (0.95) Value	0.165

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.903
A-D Test Statistic	3.88
A-D Critical (0.95) Value	0.773
K-S Test Statistic	0.389
K-S Critical(0.95) Value	0.167

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.893
Shapiro Wilk Test Statistic	0.794
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.329
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chromium

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	21
Minimum	12
Maximum	82
Mean of Raw Data	28.64
Standard Deviation of Raw Data	18.63
Kstar	3.356
Mean of Log Transformed Data	3.214
Standard Deviation of Log Transformed Data	0.495

Normal Distribution Test Results

Correlation Coefficient R	0.832
Shapiro Wilk Test Statistic	0.695
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.294
Lilliefors Critical (0.95) Value	0.165

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.916
A-D Test Statistic	2.028
A-D Critical (0.95) Value	0.751
K-S Test Statistic	0.234
K-S Critical(0.95) Value	0.164

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.937
Shapiro Wilk Test Statistic	0.874
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.193
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Cobalt

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	20
Minimum	5.9
Maximum	13
Mean of Raw Data	9.519
Standard Deviation of Raw Data	2.023
Kstar	19.9
Mean of Log Transformed Data	2.231
Standard Deviation of Log Transformed Data	0.22

Normal Distribution Test Results

Correlation Coefficient R	0.987
Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.113
Lilliefors Critical (0.95) Value	0.165

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.982
A-D Test Statistic	0.34
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.124
K-S Critical(0.95) Value	0.162

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.985
Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.122
Lilliefors Critical (0.95) Value	0.165

Data appear Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Copper

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	21
Minimum	6
Maximum	85
Mean of Raw Data	19.03
Standard Deviation of Raw Data	20.24
Kstar	1.661
Mean of Log Transformed Data	2.648
Standard Deviation of Log Transformed Data	0.682

Normal Distribution Test Results

Correlation Coefficient R	0.752
Shapiro Wilk Test Statistic	0.575
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.363
Lilliefors Critical (0.95) Value	0.165

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.892
A-D Test Statistic	2.897
A-D Critical (0.95) Value	0.759
K-S Test Statistic	0.281
K-S Critical(0.95) Value	0.165

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.914
Shapiro Wilk Test Statistic	0.833
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.223
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Iron

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	24
Minimum	12700
Maximum	32200
Mean of Raw Data	24162
Standard Deviation of Raw Data	5817
Kstar	14.25
Mean of Log Transformed Data	10.06
Standard Deviation of Log Transformed Data	0.266

Normal Distribution Test Results

Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.159
Lilliefors Critical (0.95) Value	0.165

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.95
A-D Test Statistic	0.86
A-D Critical (0.95) Value	0.745
K-S Test Statistic	0.167
K-S Critical(0.95) Value	0.162

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.958
Shapiro Wilk Test Statistic	0.905
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.164
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Lead

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	22
Minimum	5.5
Maximum	52
Mean of Raw Data	17.63
Standard Deviation of Raw Data	13.4
Kstar	2.307
Mean of Log Transformed Data	2.66
Standard Deviation of Log Transformed Data	0.619

Normal Distribution Test Results

Correlation Coefficient R	0.862
Shapiro Wilk Test Statistic	0.739
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.262
Lilliefors Critical (0.95) Value	0.165

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.947
A-D Test Statistic	1.46
A-D Critical (0.95) Value	0.755
K-S Test Statistic	0.218
K-S Critical(0.95) Value	0.164

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.961
Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.182
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Magnesium

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	26
Minimum	2220
Maximum	5590
Mean of Raw Data	4113
Standard Deviation of Raw Data	1050
Kstar	12.72
Mean of Log Transformed Data	8.286
Standard Deviation of Log Transformed Data	0.281

Normal Distribution Test Results

Correlation Coefficient R	0.963
Shapiro Wilk Test Statistic	0.909
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.144
Lilliefors Critical (0.95) Value	0.165

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.939
A-D Test Statistic	1.167
A-D Critical (0.95) Value	0.745
K-S Test Statistic	0.165
K-S Critical(0.95) Value	0.162

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.95
Shapiro Wilk Test Statistic	0.886
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.169
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Manganese

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	23
Minimum	273
Maximum	600
Mean of Raw Data	446
Standard Deviation of Raw Data	72.57
Kstar	32.87
Mean of Log Transformed Data	6.087
Standard Deviation of Log Transformed Data	0.172

Normal Distribution Test Results

Correlation Coefficient R	0.992
Shapiro Wilk Test Statistic	0.988
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.0888
Lilliefors Critical (0.95) Value	0.165

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.986
A-D Test Statistic	0.312
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.11
K-S Critical(0.95) Value	0.162

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.977
Shapiro Wilk Test Statistic	0.96
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.121
Lilliefors Critical (0.95) Value	0.165

Data appear Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Nickel

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	17
Minimum	8.5
Maximum	35
Mean of Raw Data	16.17
Standard Deviation of Raw Data	6.88
Kstar	6.565
Mean of Log Transformed Data	2.713
Standard Deviation of Log Transformed Data	0.364

Normal Distribution Test Results

Correlation Coefficient R	0.893
Shapiro Wilk Test Statistic	0.797
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.257
Lilliefors Critical (0.95) Value	0.165

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.941
A-D Test Statistic	1.111
A-D Critical (0.95) Value	0.747
K-S Test Statistic	0.2
K-S Critical(0.95) Value	0.163

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.963
Shapiro Wilk Test Statistic	0.921
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.175
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Potassium

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	23
Minimum	1050
Maximum	2410
Mean of Raw Data	1798
Standard Deviation of Raw Data	421.1
Kstar	15.73
Mean of Log Transformed Data	7.466
Standard Deviation of Log Transformed Data	0.25

Normal Distribution Test Results

Correlation Coefficient R	0.98
Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.128
Lilliefors Critical (0.95) Value	0.165

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.965
A-D Test Statistic	0.612
A-D Critical (0.95) Value	0.745
K-S Test Statistic	0.147
K-S Critical(0.95) Value	0.162

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.97
Shapiro Wilk Test Statistic	0.924
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.15
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Silver

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	24
Minimum	0.033
Maximum	0.14
Mean of Raw Data	0.0587
Standard Deviation of Raw Data	0.0262
Kstar	6.398
Mean of Log Transformed Data	-2.908
Standard Deviation of Log Transformed Data	0.362

Normal Distribution Test Results

Correlation Coefficient R	0.868
Shapiro Wilk Test Statistic	0.759
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.247
Lilliefors Critical (0.95) Value	0.165

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.929
A-D Test Statistic	1.401
A-D Critical (0.95) Value	0.747
K-S Test Statistic	0.187
K-S Critical(0.95) Value	0.163

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.949
Shapiro Wilk Test Statistic	0.898
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.158
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sodium

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	19
Minimum	27
Maximum	75
Mean of Raw Data	56.38
Standard Deviation of Raw Data	11.55
Kstar	18.34
Mean of Log Transformed Data	4.007
Standard Deviation of Log Transformed Data	0.239

Normal Distribution Test Results

Correlation Coefficient R	0.961
Shapiro Wilk Test Statistic	0.923
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.144
Lilliefors Critical (0.95) Value	0.165

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.936
A-D Test Statistic	1.331
A-D Critical (0.95) Value	0.744
K-S Test Statistic	0.178
K-S Critical(0.95) Value	0.162

Data not Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.921
Shapiro Wilk Test Statistic	0.853
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.197
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Thallium

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	17
Minimum	0.1
Maximum	0.25
Mean of Raw Data	0.182
Standard Deviation of Raw Data	0.0451
Kstar	14.08
Mean of Log Transformed Data	-1.734
Standard Deviation of Log Transformed Data	0.265

Normal Distribution Test Results

Correlation Coefficient R	0.984
Shapiro Wilk Test Statistic	0.95
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.108
Lilliefors Critical (0.95) Value	0.165

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.969
A-D Test Statistic	0.449
A-D Critical (0.95) Value	0.745
K-S Test Statistic	0.115
K-S Critical(0.95) Value	0.162

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.975
Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.126
Lilliefors Critical (0.95) Value	0.165

Data appear Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Vanadium

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	23
Minimum	15
Maximum	50
Mean of Raw Data	34.12
Standard Deviation of Raw Data	10.29
Kstar	8.637
Mean of Log Transformed Data	3.477
Standard Deviation of Log Transformed Data	0.349

Normal Distribution Test Results

Correlation Coefficient R	0.976
Shapiro Wilk Test Statistic	0.937
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.127
Lilliefors Critical (0.95) Value	0.165

Data appear Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.948
A-D Test Statistic	0.902
A-D Critical (0.95) Value	0.746
K-S Test Statistic	0.135
K-S Critical(0.95) Value	0.163

Data follow Appr. Gamma Distribution at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.951
Shapiro Wilk Test Statistic	0.891
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.143
Lilliefors Critical (0.95) Value	0.165

Data not Lognormal at (0.05) Significance Level

Table D.3-2i
Goodness of Fit - Total Soil
ProUCL 4.0 for Full Data Sets
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Zinc

Raw Statistics

Number of Valid Observations	29
Number of Distinct Observations	22
Minimum	45
Maximum	120
Mean of Raw Data	67.24
Standard Deviation of Raw Data	17.54
Kstar	15.32
Mean of Log Transformed Data	4.179
Standard Deviation of Log Transformed Data	0.243

Normal Distribution Test Results

Correlation Coefficient R	0.949
Shapiro Wilk Test Statistic	0.903
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.178
Lilliefors Critical (0.95) Value	0.165

Data not Normal at (0.05) Significance Level

Gamma Distribution Test Results

Correlation Coefficient R	0.974
A-D Test Statistic	0.475
A-D Critical (0.95) Value	0.745
K-S Test Statistic	0.142
K-S Critical(0.95) Value	0.162

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal Distribution Test Results

Correlation Coefficient R	0.981
Shapiro Wilk Test Statistic	0.959
Shapiro Wilk Critical (0.95) Value	0.926
Lilliefors Test Statistic	0.13
Lilliefors Critical (0.95) Value	0.165

Data appear Lognormal at (0.05) Significance Level

Table D.3-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	0.95

Antimony

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	29	0	29	23	6	20.69%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.0518	0.0518	0.0518	0.0518	7.601E-18
Statistics (Detects Only)	23	0.0355	0.39	0.162	0.13	0.0899
Statistics (All: NDs treated as DL value)	29	0.0355	0.39	0.139	0.12	0.0917
Statistics (All: NDs treated as DL/2 value)	29	0.0259	0.39	0.134	0.12	0.0974
Statistics (Normal ROS Estimated Data)	29	-0.0837	0.39	0.125	0.12	0.11
Statistics (Gamma ROS Estimated Data)	29	0.00826	0.39	0.143	0.12	0.0899
Statistics (Lognormal ROS Estimated Data)	29	0.0307	0.39	0.138	0.12	0.0926

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	3.802	3.431	0.0425	-1.959	0.542	-0.276
Statistics (NDs = DL)	2.748	2.487	0.0506	-2.166	0.633	-0.292
Statistics (NDs = DL/2)	1.833	1.666	0.0729	-2.31	0.848	-0.367
Statistics (Gamma ROS Estimates)	2.489	2.255	0.0573	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-2.188	0.672	-0.307

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.918	0.92	0.936	0.973

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.846	0.914	Data Not Normal
Lilliefors (Detects Only)	0.247	0.185	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.844	0.926	Data Not Normal
Lilliefors (NDs = DL)	0.229	0.165	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.87	0.926	Data Not Normal
Lilliefors (NDs = DL/2)	0.204	0.165	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.949	0.926	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.171	0.165	Data Not Normal

Table D.3-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.966	0.977	0.979	0.974

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.972	0.749	
Kolmogorov-Smirnov (Detects Only)	0.202	0.182	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	0.803	0.754	
Kolmogorov-Smirnov (NDs = DL)	0.152	0.164	Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	0.958	0.759	
Kolmogorov-Smirnov (NDs = DL/2)	0.176	0.165	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.868	0.755	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.171	0.164	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.959	0.975	0.947	0.984

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.928	0.914	Data Appear Lognormal
Lilliefors (Detects Only)	0.176	0.185	Data Appear Lognormal
Shapiro-Wilks (NDs = DL)	0.942	0.926	Data Appear Lognormal
Lilliefors (NDs = DL)	0.139	0.165	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.88	0.926	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.227	0.165	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.958	0.926	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.157	0.165	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Table D.3-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Mercury

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	29	0	29	24	5	17.24%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	0.0077	0.0077	0.0077	0.0077	0
Statistics (Detects Only)	24	0.01	0.27	0.0489	0.0275	0.0603
Statistics (All: NDs treated as DL value)	29	0.0077	0.27	0.0418	0.022	0.0569
Statistics (All: NDs treated as DL/2 value)	29	0.00385	0.27	0.0412	0.022	0.0574
Statistics (Normal ROS Estimated Data)	29	-0.0997	0.27	0.0289	0.022	0.0711
Statistics (Gamma ROS Estimated Data)	29	1E-09	0.27	0.0406	0.022	0.0578
Statistics (Lognormal ROS Estimated Data)	29	0.00279	0.27	0.0414	0.022	0.0572

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.334	1.219	0.0367	-3.437	0.834	-0.243
Statistics (NDs = DL)	1.119	1.026	0.0374	-3.683	0.934	-0.254
Statistics (NDs = DL/2)	0.948	0.873	0.0434	-3.803	1.112	-0.292
Statistics (Gamma ROS Estimates)	0.26	0.256	0.156	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-3.766	1.062	-0.282

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.771	0.76	0.771	0.902

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.612	0.916	Data Not Normal
Lilliefors (Detects Only)	0.341	0.181	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.597	0.926	Data Not Normal
Lilliefors (NDs = DL)	0.341	0.165	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.615	0.926	Data Not Normal
Lilliefors (NDs = DL/2)	0.336	0.165	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.837	0.926	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.259	0.165	Data Not Normal

Table D.3-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.934	0.936	0.948	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.806	0.765	
Kolmogorov-Smirnov (Detects Only)	0.277	0.182	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	1.645	0.771	
Kolmogorov-Smirnov (NDs = DL)	0.238	0.167	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.142	0.776	
Kolmogorov-Smirnov (NDs = DL/2)	0.215	0.168	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	4.197	0.873	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.362	0.178	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.949	0.964	0.973	0.986

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.9	0.916	Data Not Lognormal
Lilliefors (Detects Only)	0.21	0.181	Data Not Lognormal
Shapiro-Wilks (NDs = DL)	0.921	0.926	Data Not Lognormal
Lilliefors (NDs = DL)	0.155	0.165	Data Appear Lognormal
Shapiro-Wilks (NDs = DL/2)	0.938	0.926	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.136	0.165	Data Appear Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.972	0.926	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.142	0.165	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Table D.3-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Selenium

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	29	0	29	28	1	3.45%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	28	0.11	0.78	0.354	0.29	0.231
Statistics (All: NDs treated as DL value)	29	0.089	0.78	0.344	0.23	0.232
Statistics (All: NDs treated as DL/2 value)	29	0.0445	0.78	0.343	0.23	0.234
Statistics (Normal ROS Estimated Data)	29	-0.2	0.78	0.334	0.23	0.249
Statistics (Gamma ROS Estimated Data)	29	1E-09	0.78	0.341	0.23	0.236
Statistics (Lognormal ROS Estimated Data)	29	0.0486	0.78	0.343	0.23	0.234

	K Hat	K Star	Theta Hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	2.232	2.024	0.158	-1.28	0.729	-0.57
Statistics (NDs = DL)	2.123	1.927	0.162	-1.319	0.747	-0.566
Statistics (NDs = DL/2)	1.982	1.8	0.173	-1.343	0.793	-0.59
Statistics (Gamma ROS Estimates)	0.691	0.643	0.494	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.34	0.786	-0.586

Normal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.928	0.927	0.934	0.95

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.841	0.924	Data Not Normal
Lilliefors (Detects Only)	0.238	0.167	Data Not Normal
Shapiro-Wilks (NDs = DL)	0.84	0.926	Data Not Normal
Lilliefors (NDs = DL)	0.243	0.165	Data Not Normal
Shapiro-Wilks (NDs = DL/2)	0.855	0.926	Data Not Normal
Lilliefors (NDs = DL/2)	0.24	0.165	Data Not Normal
Shapiro-Wilks (Normal ROS Estimates)	0.899	0.926	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.215	0.165	Data Not Normal

Table D.3-2j
Goodness of Fit - Total Soil
ProUCL 4.0 for Data Sets with Non-Detects
SWMUs 35, 37, 38 and AOC Q RFI Report
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Gamma Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.928	0.93	0.929	0.871

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.797	0.757	
Kolmogorov-Smirnov (Detects Only)	0.22	0.167	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	1.8	0.757	
Kolmogorov-Smirnov (NDs = DL)	0.221	0.165	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.545	0.757	
Kolmogorov-Smirnov (NDs = DL/2)	0.207	0.165	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.075	0.79	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.323	0.17	Data Not Gamma Distributed

Lognormal Distribution Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.93	0.936	0.947	0.947

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilks (Detects Only)	0.84	0.924	Data Not Lognormal
Lilliefors (Detects Only)	0.204	0.167	Data Not Lognormal
Shapiro-Wilks (NDs = DL)	0.855	0.926	Data Not Lognormal
Lilliefors (NDs = DL)	0.202	0.165	Data Not Lognormal
Shapiro-Wilks (NDs = DL/2)	0.886	0.926	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.18	0.165	Data Not Lognormal
Shapiro-Wilks (Lognormal ROS Estimates)	0.885	0.926	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.183	0.165	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Aluminum(site)

Background Data: Aluminum(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	13	28
Number of Distinct Observations	11	28
Minimum	7820	3620
Maximum	26400	20100
Mean	16217	8300
Median	14500	6705
SD	6726	4279
SE of Mean	1866	808.6

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	400.5
WMW Test U-Stat	309.5
WMW Critical Value (0.050)	278
Approximate P-Value	0.00018677

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Arsenic(site)

Background Data: Arsenic(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	13	28
Number of Distinct Observations	11	24
Minimum	0.635	1.5
Maximum	5.1	10.2
Mean	2.029	3.732
Median	1.4	2.75
SD	1.505	2.33
SE of Mean	0.417	0.44

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	171
WMW Test U-Stat	80
WMW Critical Value (0.050)	278
Approximate P-Value	0.998

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Barium(site)

Background Data: Barium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	13	28
Number of Non-Detect Data	0	4
Number of Detect Data	13	24
Minimum Non-Detect	N/A	0.36
Maximum Non-Detect	N/A	1
Percent Non detects	0.00%	14.29%
Minimum Detected	87	23.4
Maximum Detected	160	174
Mean of Detected Data	119	75.55
Median of Detected Data	120	61.85
SD of Detected Data	21.43	43.2

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	393.5
WMW Test U-Stat	302.5
WMW Critical Value (0.050)	278
Approximate P-Value	0.00038691

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Beryllium(site)

Background Data: Beryllium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	13	28
Number of Non-Detect Data	0	13
Number of Detect Data	13	15
Minimum Non-Detect	N/A	0.022
Maximum Non-Detect	N/A	0.03
Percent Non detects	0.00%	46.43%
Minimum Detected	0.465	0.61
Maximum Detected	0.91	1.5
Mean of Detected Data	0.686	0.887
Median of Detected Data	0.68	0.87
SD of Detected Data	0.124	0.246

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.03 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	303.5
WMW Test U-Stat	212.5
WMW Critical Value (0.050)	278
Approximate P-Value	0.2

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Calcium(site)

Background Data: Calcium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	13	28
Number of Distinct Observations	13	27
Minimum	943	4.6
Maximum	27600	7340
Mean	8675	983.9
Median	2700	761.5
SD	10028	1380
SE of Mean	2781	260.8

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	420
WMW Test U-Stat	329
WMW Critical Value (0.050)	278
Approximate P-Value	2.0266E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Chromium(site)

Background Data: Chromium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	13	28
Number of Distinct Observations	11	27
Minimum	12	6.3
Maximum	82	53.3
Mean	36.12	21.09
Median	19	22.4
SD	26.05	10.5
SE of Mean	7.226	1.985

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	331
WMW Test U-Stat	240
WMW Critical Value (0.050)	278
Approximate P-Value	0.0536

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cobalt(site)

Background Data: Cobalt(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	13	28
Number of Non-Detect Data	0	8
Number of Detect Data	13	20
Minimum Non-Detect	N/A	0.11
Maximum Non-Detect	N/A	0.75
Percent Non detects	0.00%	28.57%
Minimum Detected	5.9	5.9
Maximum Detected	12	45.4
Mean of Detected Data	8.535	15.95
Median of Detected Data	8.2	12.1
SD of Detected Data	1.832	10.07

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.75 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	243.5
WMW Test U-Stat	152.5
WMW Critical Value (0.050)	278
Approximate P-Value	0.8

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Copper(site)

Background Data: Copper(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	13	28
Number of Non-Detect Data	0	2
Number of Detect Data	13	26
Minimum Non-Detect	N/A	0.17
Maximum Non-Detect	N/A	0.17
Percent Non detects	0.00%	7.14%
Minimum Detected	6	2.2
Maximum Detected	85	13.6
Mean of Detected Data	27.51	6.919
Median of Detected Data	12	5.35
SD of Detected Data	28.34	3.696

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	401
WMW Test U-Stat	310
WMW Critical Value (0.050)	278
Approximate P-Value	0.00017705

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Iron(site)

Background Data: Iron(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	13	28
Number of Distinct Observations	12	26
Minimum	12700	7250
Maximum	30700	63000
Mean	21873	20108
Median	20600	19750
SD	6209	11869
SE of Mean	1722	2243

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	309
WMW Test U-Stat	218
WMW Critical Value (0.050)	278
Approximate P-Value	0.16

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Lead(site)

Background Data: Lead(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	13	28
Number of Distinct Observations	11	26
Minimum	7.2	8.9
Maximum	52	225
Mean	26.61	26.96
Median	23.5	15.15
SD	15.9	41.34
SE of Mean	4.409	7.813

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	316.5
WMW Test U-Stat	225.5
WMW Critical Value (0.050)	278
Approximate P-Value	0.114

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Magnesium(site)

Background Data: Magnesium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	13	28
Number of Non-Detect Data	0	3
Number of Detect Data	13	25
Minimum Non-Detect	N/A	4.7
Maximum Non-Detect	N/A	5
Percent Non detects	0.00%	10.71%
Minimum Detected	2220	158
Maximum Detected	5590	20400
Mean of Detected Data	3810	2498
Median of Detected Data	3380	913
SD of Detected Data	1263	4334

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 5 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	394
WMW Test U-Stat	303
WMW Critical Value (0.050)	278
Approximate P-Value	0.00036774

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Manganese(site)

Background Data: Manganese(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	13	28
Number of Distinct Observations	11	28
Minimum	319	43
Maximum	600	2040
Mean	450	695.9
Median	450	490
SD	81.34	591.5
SE of Mean	22.56	111.8

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	254
WMW Test U-Stat	163
WMW Critical Value (0.050)	278
Approximate P-Value	0.708

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Nickel(site)

Background Data: Nickel(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	13	28
Number of Non-Detect Data	0	11
Number of Detect Data	13	17
Minimum Non-Detect	N/A	0.21
Maximum Non-Detect	N/A	1.3
Percent Non detects	0.00%	39.29%
Minimum Detected	8.5	4.6
Maximum Detected	35	18.1
Mean of Detected Data	18.41	9.935
Median of Detected Data	15	9.4
SD of Detected Data	9.635	4.294

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.3 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	407.5
WMW Test U-Stat	316.5
WMW Critical Value (0.050)	278
Approximate P-Value	0.00008694

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Potassium(site)

Background Data: Potassium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	13	28
Number of Non-Detect Data	0	6
Number of Detect Data	13	22
Minimum Non-Detect	N/A	201
Maximum Non-Detect	N/A	271
Percent Non detects	0.00%	21.43%
Minimum Detected	1050	166
Maximum Detected	2410	2350
Mean of Detected Data	1756	735.4
Median of Detected Data	1670	509.5
SD of Detected Data	518.6	632.6

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 271 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	421
WMW Test U-Stat	330
WMW Critical Value (0.050)	278
Approximate P-Value	1.7946E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Vanadium(site)

Background Data: Vanadium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	13	28
Number of Distinct Observations	12	27
Minimum	15	12.2
Maximum	43	101
Mean	29.27	33.89
Median	28	33.8
SD	10.7	17.78
SE of Mean	2.967	3.36

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	251.5
WMW Test U-Stat	160.5
WMW Critical Value (0.050)	278
Approximate P-Value	0.731

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

Table D.3-2k
Background Versus Site Means Comparison - Surface Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Zinc(site)

Background Data: Zinc(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	13	28
Number of Distinct Observations	12	28
Minimum	45.5	7.1
Maximum	120	216
Mean	76.5	41.21
Median	73	29.7
SD	20.93	40.24
SE of Mean	5.806	7.605

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	413
WMW Test U-Stat	322
WMW Critical Value (0.050)	278
Approximate P-Value	4.6471E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Aluminum(site)

Background Data: Aluminum(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	29	79
Number of Distinct Observations	23	75
Minimum	7820	3620
Maximum	26400	47900
Mean	16878	14204
Median	17000	12100
SD	5302	9433
SE of Mean	984.6	1061

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1960
WMW Test U-Stat	2.624
WMW Critical Value (0.050)	1.645
P-Value	0.00435

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Arsenic(site)

Background Data: Arsenic(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	0	3
Number of Detect Data	29	76
Minimum Non-Detect	N/A	0.09
Maximum Non-Detect	N/A	0.12
Percent Non detects	0.00%	3.80%
Minimum Detected	0.635	1.2
Maximum Detected	5.1	35.9
Mean of Detected Data	1.728	4.989
Median of Detected Data	1.5	3.2
SD of Detected Data	1.054	5.36

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.12 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	786
WMW Test U-Stat	-5.511
WMW Critical Value (0.050)	1.645
P-Value	1

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Barium(site)

Background Data: Barium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	0	16
Number of Detect Data	29	63
Minimum Non-Detect	N/A	0.36
Maximum Non-Detect	N/A	1.1
Percent Non detects	0.00%	20.25%
Minimum Detected	75	23.4
Maximum Detected	180	174
Mean of Detected Data	120.4	68.4
Median of Detected Data	120	56.7
SD of Detected Data	23.93	40.39

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.1 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2437
WMW Test U-Stat	5.93
WMW Critical Value (0.050)	1.645
P-Value	1.5109E-09

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Beryllium(site)

Background Data: Beryllium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	0	39
Number of Detect Data	29	40
Minimum Non-Detect	N/A	0.022
Maximum Non-Detect	N/A	0.03
Percent Non detects	0.00%	49.37%
Minimum Detected	0.31	0.61
Maximum Detected	0.93	5.4
Mean of Detected Data	0.622	1.449
Median of Detected Data	0.63	1.1
SD of Detected Data	0.159	1.086

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.03 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1654
WMW Test U-Stat	0.503
WMW Critical Value (0.050)	1.645
P-Value	0.308

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cadmium(site)

Background Data: Cadmium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	0	66
Number of Detect Data	29	13
Minimum Non-Detect	N/A	0.02
Maximum Non-Detect	N/A	0.05
Percent Non detects	0.00%	83.54%
Minimum Detected	0.95	0.57
Maximum Detected	2	2.5
Mean of Detected Data	1.532	1.152
Median of Detected Data	1.6	1.1
SD of Detected Data	0.276	0.585

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.05 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2650
WMW Test U-Stat	7.407
WMW Critical Value (0.050)	1.645
P-Value	6.462E-14

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Calcium(site)

Background Data: Calcium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	0	16
Number of Detect Data	29	63
Minimum Non-Detect	N/A	4.6
Maximum Non-Detect	N/A	6.7
Percent Non detects	0.00%	20.25%
Minimum Detected	943	116
Maximum Detected	27600	25700
Mean of Detected Data	5082	1392
Median of Detected Data	2300	717
SD of Detected Data	7351	3322

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 6.7 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2551
WMW Test U-Stat	6.724
WMW Critical Value (0.050)	1.645
P-Value	8.832E-12

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Chromium(site)

Background Data: Chromium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	29	79
Number of Distinct Observations	21	70
Minimum	12	6.3
Maximum	82	75.8
Mean	28.64	26.86
Median	23	26
SD	18.63	12.51
SE of Mean	3.46	1.408

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1483
WMW Test U-Stat	-0.679
WMW Critical Value (0.050)	1.645
P-Value	0.752

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Cobalt(site)

Background Data: Cobalt(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	0	23
Number of Detect Data	29	56
Minimum Non-Detect	N/A	0.11
Maximum Non-Detect	N/A	0.84
Percent Non detects	0.00%	29.11%
Minimum Detected	5.9	5.9
Maximum Detected	13	130
Mean of Detected Data	9.519	22.23
Median of Detected Data	9.6	13.3
SD of Detected Data	2.023	23.94

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.84 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1442
WMW Test U-Stat	-0.964
WMW Critical Value (0.050)	1.645
P-Value	0.832

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Copper(site)

Background Data: Copper(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	0	2
Number of Detect Data	29	77
Minimum Non-Detect	N/A	0.17
Maximum Non-Detect	N/A	0.17
Percent Non detects	0.00%	2.53%
Minimum Detected	6	1.6
Maximum Detected	85	38.7
Mean of Detected Data	19.03	12.25
Median of Detected Data	13	9.1
SD of Detected Data	20.24	9.397

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1922
WMW Test U-Stat	2.36
WMW Critical Value (0.050)	1.645
P-Value	0.00913

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

Area of Concern Data: Iron(site)

Background Data: Iron(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	29	79
Number of Distinct Observations	24	72
Minimum	12700	7250
Maximum	32200	67700
Mean	24162	26963
Median	25000	25200
SD	5817	11990
SE of Mean	1080	1349

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	106	-1.205	1.659	0.884
Satterthwaite (Unequal Variance)	97.9	-1.621	1.661	0.946

Pooled SD 10710.702

Conclusion with Alpha = 0.050

* Student t (Pooled) Test: Do Not Reject H0, Conclude Site <= Background
* Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background

Test of Equality of Variances

Numerator DF	Denominator DF	F-Test Value	P-Value
78	28	4.248	0

Conclusion with Alpha = 0.05

* Two variances are not equal

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Lead(site)

Background Data: Lead(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	29	79
Number of Distinct Observations	22	70
Minimum	5.5	2.1
Maximum	52	256
Mean	17.63	22.04
Median	12	12
SD	13.4	39.85
SE of Mean	2.488	4.483

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1637
WMW Test U-Stat	0.385
WMW Critical Value (0.050)	1.645
P-Value	0.35

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Magnesium(site)

Background Data: Magnesium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	0	7
Number of Detect Data	29	72
Minimum Non-Detect	N/A	3.8
Maximum Non-Detect	N/A	5
Percent Non detects	0.00%	8.86%
Minimum Detected	2220	139
Maximum Detected	5590	58100
Mean of Detected Data	4113	6394
Median of Detected Data	4400	1270
SD of Detected Data	1050	12925

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 5 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2092
WMW Test U-Stat	3.542
WMW Critical Value (0.050)	1.645
P-Value	0.00019832

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Manganese(site)

Background Data: Manganese(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	29	79
Number of Distinct Observations	23	78
Minimum	273	16.7
Maximum	600	2040
Mean	446	471.4
Median	450	359
SD	72.57	467.1
SE of Mean	13.48	52.55

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1826
WMW Test U-Stat	1.698
WMW Critical Value (0.050)	1.645
P-Value	0.0447

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Mercury(site)

Background Data: Mercury(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	5	61
Number of Detect Data	24	18
Minimum Non-Detect	0.0077	0.019
Maximum Non-Detect	0.0077	0.06
Percent Non detects	17.24%	77.22%
Minimum Detected	0.01	0.038
Maximum Detected	0.27	1.2
Mean of Detected Data	0.0489	0.187
Median of Detected Data	0.0275	0.125
SD of Detected Data	0.0603	0.259

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.06 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1542
WMW Test U-Stat	-0.274
WMW Critical Value (0.050)	1.645
P-Value	0.608

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Nickel(site)

Background Data: Nickel(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	0	18
Number of Detect Data	29	61
Minimum Non-Detect	N/A	0.21
Maximum Non-Detect	N/A	1.4
Percent Non detects	0.00%	22.78%
Minimum Detected	8.5	4.6
Maximum Detected	35	94.2
Mean of Detected Data	16.17	17.95
Median of Detected Data	14	13.2
SD of Detected Data	6.88	15.68

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 1.4 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1941
WMW Test U-Stat	2.492
WMW Critical Value (0.050)	1.645
P-Value	0.00635

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Potassium(site)

Background Data: Potassium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	0	12
Number of Detect Data	29	67
Minimum Non-Detect	N/A	201
Maximum Non-Detect	N/A	271
Percent Non detects	0.00%	15.19%
Minimum Detected	1050	123
Maximum Detected	2410	10900
Mean of Detected Data	1798	1690
Median of Detected Data	1880	694
SD of Detected Data	421.1	2232

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 271 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2194
WMW Test U-Stat	4.246
WMW Critical Value (0.050)	1.645
P-Value	1.0885E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Thallium(site)

Background Data: Thallium(bkd)

Raw Statistics

	Site	Background
Number of Valid Data	29	79
Number of Non-Detect Data	0	64
Number of Detect Data	29	15
Minimum Non-Detect	N/A	0.13
Maximum Non-Detect	N/A	0.45
Percent Non detects	0.00%	81.01%
Minimum Detected	0.1	1.3
Maximum Detected	0.25	5
Mean of Detected Data	0.182	2.527
Median of Detected Data	0.19	2.2
SD of Detected Data	0.0451	0.932

Wilcoxon-Mann-Whitney Site vs Background Test

All observations <= 0.45 (Max DL) are ranked the same

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	1363
WMW Test U-Stat	-1.511
WMW Critical Value (0.050)	1.645
P-Value	0.935

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

t-Test Site vs Background Comparison for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean Less Than or Equal to Background Mean (Form 1)
Alternative Hypothesis	Site or AOC Mean Greater Than the Background Mean

Area of Concern Data: Vanadium(site)

Background Data: Vanadium(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	29	79
Number of Distinct Observations	23	76
Minimum	15	12.2
Maximum	50	114
Mean	34.12	45.84
Median	36	41.4
SD	10.29	20.38
SE of Mean	1.911	2.293

Site vs Background Two-Sample t-Test

H0: Mu of Site - Mu of Background <= 0

Method	DF	t-Test Value	Critical t (0.050)	P-Value
Pooled (Equal Variance)	106	-2.955	1.659	0.998
Satterthwaite (Unequal Variance)	95.6	-3.926	1.661	1

Pooled SD 18.266

Conclusion with Alpha = 0.050

* Student t (Pooled) Test: Do Not Reject H0, Conclude Site <= Background
* Satterthwaite Test: Do Not Reject H0, Conclude Site <= Background

Test of Equality of Variances

Numerator DF	Denominator DF	F-Test Value	P-Value
78	28	3.923	0

Conclusion with Alpha = 0.05

* Two variances are not equal

Table D.3-2l
Background Versus Site Means Comparison - Total Soil
ProUCL 4.0
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Full Data Sets without NDs

User Selected Options

From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Zinc(site)

Background Data: Zinc(bkd)

Raw Statistics

	Site	Background
Number of Valid Observations	29	79
Number of Distinct Observations	22	76
Minimum	45	4.7
Maximum	120	598
Mean	67.24	54.94
Median	65	30.2
SD	17.54	87.15
SE of Mean	3.258	9.805

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	2262
WMW Test U-Stat	4.721
WMW Critical Value (0.050)	1.645
P-Value	1.1748E-06

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

APPENDIX E

HUMAN HEALTH RISK ASSESSMENT

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APPENDIX E.1

SWMU 35 HHRA
RAGS D TABLES AND IRON "MARGIN OF EXPOSURE" EVALUATION

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Table E.1-1
Selection of Exposure Pathways - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil	Surface Soil	Surface Soil	Maintenance Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
						Dermal Absorption	Quant	Receptor could come into contact with surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
		Air	Ambient Air Above Surface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil. [1]
	Subsurface Soil	Subsurface Soil	Subsurface Soil	Maintenance Worker	Adult	Ingestion	None	Receptor is not likely to ingest subsurface soil from the site since maintenance does not include excavation.
						Dermal Absorption	None	Receptor is not likely to come in contact with subsurface soil from the site since maintenance does not include excavation.
		Air	Ambient Air Above Subsurface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	None	Receptor is not likely to inhale particulates from ambient air above the subsurface soil since maintenance activities do not include excavation. [1]
	Groundwater [2]	Groundwater	Groundwater	Maintenance Worker	Adult	Ingestion	None	Receptor is not likely to ingest groundwater from the site during maintenance activities.
						Dermal Absorption	None	Receptor is not likely to contact groundwater from the site during maintenance activities.
		Air	Upward Migration of Vapors from Groundwater (Outdoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
			Upward Migration of Vapors from Groundwater (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors.
			Vapors while Showering	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
Future	Surface Soil	Surface Soil	Surface Soil	Maintenance Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
						Dermal Absorption	Quant	Receptor could come into contact with surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
				Commerical/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil while working on site.
						Dermal Absorption	Quant	Receptor could contact surface soil while working on site.
				Construction Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil from the site during construction activities.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil from the site during construction activities.
				Resident	Child	Ingestion	Quant	Receptor could ingest surface soil while living on site.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil while living on site.
					Adult	Ingestion	Quant	Receptor could ingest surface soil while living on site.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil while living on site.
					Child/Adult	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to surface soil. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
		Air	Ambient Air Above Surface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while working on site. [1]
				Commerical/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while working on site. [1]
				Construction Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while working on site. [1]
				Resident	Child	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while living on site. [1]
					Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while living on site. [1]
					Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to surface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]

Table E.1-1
Selection of Exposure Pathways - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Cont.	Surface Soil Cont.	Air Cont.	Upward Migration of Vapors from Soil (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into building. [1]
				Construction Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Resident	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [1]
					Child	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [1]
					Child/Adult	Inhalation	None	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to surface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]
	Subsurface Soil	Subsurface Soil	Subsurface Soil	Maintenance Worker	Adult	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction activities while conducting routine maintenance activities.
						Dermal Absorption	Quant	Receptor could come in contact with subsurface soil when mixed with surface soil from construction activities while conducting routine maintenance activities.
				Commerical/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a commercial/industrial facility.
						Dermal Absorption	Quant	Receptor could contact subsurface soil when mixed with surface soil from construction of a commercial/industrial facility.
				Construction Worker	Adult	Ingestion	Quant	Receptor could ingest subsurface soil from the site while during construction activities.
						Dermal Absorption	Quant	Receptor could come into contact with subsurface soil from the site during construction activities.
				Resident	Child	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a residence.
						Dermal Absorption	Quant	Receptor could come in contact with subsurface soil when mixed with surface soil from construction of a residence.
					Adult	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a residence.
						Dermal Absorption	Quant	Receptor could come in contact with subsurface soil when mixed with surface soil from construction of a residence.
					Child/Adult	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to subsurface soil. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
		Air	Ambient Air Above Subsurface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction activities while conducting routine maintenance activities. [1]
				Commerical/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a commercial/industrial facility. [1]
				Construction Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil during construction activities. [1]
				Resident	Child	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a residence. [1]
					Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a residence. [1]
					Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to subsurface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]

Table E.1-1
Selection of Exposure Pathways - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Cont.	Subsurface Soil Cont.	Air Cont.	Upward Migration of Vapors from Soil (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into building.[1]
				Construction Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Resident	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [1]
					Child	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence.[1]
					Child/Adult	Inhalation	None	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to subsurface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]
	Groundwater [2]	Groundwater	Groundwater	Maintenance Worker	Adult	Ingestion	None	Receptor is not likely to ingest groundwater from the site during maintenance activities.
						Dermal Absorption	None	Receptor is not likely to contact groundwater from the site during maintenance activities.
				Commercial/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply for industrial process.
				Construction Worker	Adult	Ingestion	None	Due to the depth to groundwater (approximately 20-25 ft bgs), the receptor is not likely to ingest groundwater during excavation activities.
						Dermal Absorption	None	Due to the depth to groundwater (approximately 20-25 ft bgs), the receptor is not likely to contact groundwater during excavation activities.
				Resident	Adult	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply.
					Child	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply.
					Child/Adult	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
		Air	Upward Migration of Vapors from Groundwater (Outdoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
				Construction Worker	Adult	Inhalation	Quant	Receptor could inhale vapors that migrated upward from groundwater to during excavation activities.
				Resident	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
					Child	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
					Child/Adult	Inhalation	None	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.[2]
			Upward Migration of Vapors from Groundwater (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors.
				Commercial/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into building.
				Construction Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors.
				Resident	Adult	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into residence.
					Child	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into residence.

Table E.1-1
Selection of Exposure Pathways - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Cont.	Groundwater Cont.	Air Cont.	Upward Migration of Vapors from Groundwater (Indoors) Cont.	Resident Cont.	Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.[2]
			Vapors while Showering	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
				Construction Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
				Resident	Adult	Inhalation	Quant	Receptor could inhale vapors from groundwater while showering.
					Child	Inhalation	None	Receptor is assumed not to shower.
					Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. Since the shower scenario applies only to the adult resident, the lifetime resident exposure will be equivalent to that of the adult resident.[2]

Notes:
[1] VOCs not identified as COPCs in soil; therefore, vapors via inhalation pathway not assessed

[2] Groundwater from the surface aquifer is not currently used at the sites for potable or non-potable water supply.

Table E.1-2.1
SWMU 35 COPC Determination - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Surface Soil

Exposure point	CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Screening Toxicity Value (N/C)		Potential ARAR/TBC Value		Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Surface Soil		**TAL Metals**														
	7429-90-5	Aluminum	17,000	25,000	mg/kg	35SB7A	10/10	2.1 - 210	25,000	7,821	N	102,200	N	IND	Y	**ARES**
	7440-36-0	Antimony	0.0365	1.1	mg/kg	35SB7A	9/10	0.042 - 0.042	1.1	3.13	N	40.88	N	IND	N	BSL
	7440-38-2	Arsenic	1.5	10	mg/kg	35SB10A	10/10	0.071 - 0.071	10	0.426	C	1.91	C	IND	Y	***ARES/IND***
	7440-39-3	Barium	82	180	mg/kg	35SB9A	10/10	0.17 - 0.17	180	1,564	N	20,440	N	IND	N	BSL
	7440-41-7	Beryllium	0.59	1.1	mg/kg	35SB6A	10/10	0.021 - 0.021	1.1	15.64	N	204.4	N	IND	N	BSL
	7440-43-9	Cadmium	1.2	2.2	mg/kg	35SB7A	10/10	0.11 - 0.11	2.2	3.911	N	51.1	N	IND	N	BSL
	7440-70-2	Calcium	5,300	87,000	mg/kg	35SB10A	10/10	4.2 - 4.2	87,000	--	--	1,095,000	--	RDA	N	BSL
	7440-47-3	Chromium [1]	23	160	mg/kg	35SB10A	10/10	0.72 - 0.72	160	23.46	N	306.6	N	IND	Y	**ARES**
	7440-48-4	Cobalt	5.1	11.5	mg/kg	35SB5A DUP AVG	10/10	0.37 - 0.37	11.5	--	--	--	--	--	Y	NSV
	7440-50-8	Copper	12	200	mg/kg	35SB7A	10/10	0.044 - 0.22	200	312.9	N	4,088	N	IND	N	BSL
	7439-89-6	Iron	19,000	31,000	mg/kg	35SB2A	10/10	0.48 - 240	31,000	5,475	N	71,540	N	IND	Y	**ARES**
	7439-92-1	Lead [2]	25	750	mg/kg	35SB7A	10/10	0.022 - 0.45	750	400	--	750	--	AL	Y	**ARES**
	7439-95-4	Magnesium	3,300	14,000	mg/kg	35SB10A	10/10	5 - 5	14,000	--	--	156,400	--	RDA	N	BSL
	7439-96-5	Manganese	260	675	mg/kg	35SB4A DUP AVG	10/10	0.16 - 1.6	675	156.4	N	2,044	N	IND	Y	**ARES**
	7439-97-6	Mercury [3]	0.044	0.83	mg/kg	35SB7A	10/10	0.0075 - 0.0075	0.83	2.35	--	30.66	--	IND	N	BSL
	7440-02-0	Nickel	12	45	mg/kg	35SB6A	10/10	0.036 - 0.036	45	156.4	N	2,044	N	IND	N	BSL
	7440-09-7	Potassium	1,300	1,700	mg/kg	35SB3A	10/10	5.3 - 5.3	1,700	--	--	2,607,000	--	RDA	N	BSL
	7782-49-2	Selenium	0.16	0.37	mg/kg	35SB2A	10/10	0.089 - 0.089	0.37	39.11	N	511	N	IND	N	BSL
	7440-22-4	Silver	0.067	25	mg/kg	35SB7A	10/10	0.013 - 0.013	25	39.11	N	511	N	IND	N	BSL
	7440-23-5	Sodium	31	85	mg/kg	35SB10A	10/10	13 - 13	85	--	--	625,700	--	RDA	N	BSL
	7440-28-0	Thallium	0.059	0.235	mg/kg	35SB5A DUP AVG	10/10	0.0049 - 0.0049	0.235	0.548	N	7.154	N	IND	N	BSL
	7440-62-2	Vanadium	21	43.5	mg/kg	35SB4A DUP AVG	10/10	0.034 - 0.034	43.5	7.821	N	102.2	N	IND	Y	**ARES**
	7440-66-6	Zinc	60	280	mg/kg	35SB9A	10/10	1 - 1	280	2,346	N	30,660	N	IND	N	BSL
		TCL Pesticides/PCBs														
	50-29-3	4,4'-DDT	1.5E-03	1.5E-03	mg/kg	35SB1A	1/10	0.0011 - 0.002	1.5E-03	1.9E+00	C	8.4E+00	C	IND	N	BSL
	1024-57-3	Heptachlor epoxide	6.5E-03	6.5E-03	mg/kg	35SB2A	1/10	0.00046 - 0.00082	6.5E-03	7.0E-02	C	3.1E-01	C	IND	N	BSL
	11097-69-1	Aroclor 1254 [4]	3.2E-02	1.7E+00	mg/kg	35SB6A	10/10	0.0049 - 0.015	1.7E+00	1.6E-01	N	1.4E+00	C	IND	Y	***ARES/IND***
	11096-82-5	Aroclor 1260	8.0E-01	8.0E-01	mg/kg	35SB6A	1/10	0.018 - 0.054	8.0E-01	3.2E-01	C	1.4E+00	C	IND	Y	**ARES**
		TCL VOCs														
	78-93-3	2-Butanone	1.4E-02	1.7E-02	mg/kg	35SB1A	4/10	0.0027 - 0.033	1.7E-02	4.7E+03	N	6.1E+04	N	IND	N	BSL
	67-64-1	Acetone	9.6E-02	2.4E-01	mg/kg	35SB10A	9/10	0.0047 - 0.12	2.4E-01	7.0E+03	N	9.2E+04	N	IND	N	BSL
	75-15-0	Carbon disulfide	3.1E-03	6.2E-03	mg/kg	35SB5A DUP AVG	4/10	0.00029 - 0.028	6.2E-03	7.8E+02	N	1.0E+04	N	IND	N	BSL
	79-20-9	Methyl acetate	3.1E-03	2.0E-01	mg/kg	35SB2A	9/10	0.00092 - 0.016	2.0E-01	7.8E+03	N	1.0E+05	N	IND	N	BSL
	75-09-2	Methylene chloride	5.5E-03	5.5E-03	mg/kg	35SB1A	1/10	0.0044 - 0.016	5.5E-03	8.5E+01	C	3.8E+02	C	IND	N	BSL
	108-88-3	Toluene	2.5E-02	5.5E-02	mg/kg	35SB5A DUP AVG	2/10	0.00044 - 0.0071	5.5E-02	6.3E+02	N	8.2E+03	N	IND	N	BSL
		TCL SVOCs														
	100-52-7	Benzaldehyde	3.1E-01	4.6E+00	mg/kg	35SB6A	2/10	0.15 - 26	4.6E+00	7.8E+02	N	1.0E+04	N	IND	N	BSL
	56-55-3	Benzo(a)anthracene	3.9E-03	1.0E-01	mg/kg	35SB8A	7/10	0.0031 - 0.53	1.0E-01	2.2E-01	C	3.9E+00	C	IND	N	BSL
	50-32-8	Benzo(a)pyrene	5.5E-03	1.8E-02	mg/kg	35SB3A	2/10	0.006 - 1	1.8E-02	2.2E-02	C	3.9E-01	C	IND	N	BSL
	205-99-2	Benzo(b)fluoranthene	9.3E-03	2.9E-02	mg/kg	35SB3A	2/10	0.005 - 0.84	2.9E-02	2.2E-01	C	3.9E+00	C	IND	N	BSL
	207-08-9	Benzo(k)fluoranthene	1.8E-02	1.8E-02	mg/kg	35SB3A	1/10	0.0042 - 0.71	1.8E-02	2.2E+00	C	3.9E+01	C	IND	N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	1.6E-02	5.4E-01	mg/kg	35SB6A	5/10	0.0076 - 1.3	5.4E-01	4.6E+01	C	2.0E+02	C	IND	N	BSL
	86-74-8	Carbazole	7.4E-03	7.4E-03	mg/kg	35SB3A	1/10	0.0029 - 0.49	7.4E-03	3.2E+01	C	1.4E+02	C	IND	N	BSL
	218-01-9	Chrysene	7.0E-03	5.7E-02	mg/kg	35SB6A	4/10	0.0028 - 0.47	5.7E-02	2.2E+01	C	3.9E+02	C	IND	N	BSL
	84-74-2	Di-n-butylphthalate	1.1E-02	4.9E+00	mg/kg	35SB5A DUP AVG	10/10	0.007 - 1.2	4.9E+00	7.8E+02	N	1.0E+04	N	IND	N	BSL
	84-66-2	Diethylphthalate	4.0E-03	3.0E-02	mg/kg	35SB2A	3/10	0.0022 - 0.37	3.0E-02	6.3E+03	N	8.2E+04	N	IND	N	BSL
	91-20-3	Naphthalene	3.7E-03	3.7E-03	mg/kg	35SB3A	1/10	0.0014 - 0.23	3.7E-03	1.6E+02	N	2.0E+03	N	IND	N	BSL
	86-30-6	N-Nitrosodiphenylamine	2.5E-01	2.5E-01	mg/kg	35SB6A	1/10	0.0047 - 0.79	2.5E-01	1.3E+02	C	5.8E+02	C	IND	N	BSL
	129-00-0	Pyrene	1.9E-03	1.9E-01	mg/kg	35SB7A	8/10	0.0019 - 0.31	1.9E-01	2.3E+02	N	3.1E+03	N	IND	N	BSL
		Explosives														
	118-96-7	2,4,6-Trinitrotoluene [5]	3.1E-01	3.1E-01	mg/kg	35SB6A	1/10	0.15 - 0.15	3.1E-01	7.8E+00	N	1.0E+02	N	IND	N	BSL
	121-14-2	2,4-Dinitrotoluene	5.2E-01	5.2E-01	mg/kg	35SB5A DUP AVG	1/10	0.1 - 0.1	5.2E-01	1.6E+01	N	2.0E+02	N	IND	N	BSL
	--	Dinitrotoluene Mix	5.2E-01	5.2E-01	mg/kg	35SB5A DUP AVG	1/10	--	5.2E-01	9.4E-01	C	4.2E+00	C	IND	N	BSL
	2691-41-0	HMX	5.9E-01	7.0E+00	mg/kg	35SB7A	6/10	0.066 - 0.066	7.0E+00	3.9E+02	N	5.1E+03	N	IND	N	BSL
		Nitroglycerin														
	55-63-0	Nitroglycerin	1.1E+01	1.1E+01	mg/kg	35SB6A	1/10	0.39 - 0.39	1.1E+01	7.8E-01	N	1.0E+01	N	IND	Y	***ARES/IND***

Table E.1-2.1
SWMU 35 COPC Determination - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

COPC = Chemical of Potential Concern
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
mg/kg = Milligram Per Kilogram
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
(N/C) = Noncarcinogenic/Carcinogenic per EPA RBC Table (October 2007)
-- = No Value Available
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = Noncarcinogenic Residential and Industrial RBC values for 2,4,6-Trinitrotoluene were used for screening

ARAR = Applicable, Relevant, and Appropriate Requirement
TBC = To-Be-Considered
IND = Adjusted Industrial RBC
AL = USEPA Action Level
RDA = Recommended Daily Allowance

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table E.1-2.2
SWMU 35 COPC Determination - Total Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure point	CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Screening Toxicity Value (N/C)		Potential ARAR/TBC Value		Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Total Soil		**TAL Metals**														
	7429-90-5	Aluminum	12,000	25,000	mg/kg	35SB7A	22/22	2.1 - 210	25,000	7,821	N	102,200	N	IND	Y	**ARES**
	7440-36-0	Antimony	0.0365	1.1	mg/kg	35SB7A	16/22	0.042 - 0.042	1.1	3.13	N	40.88	N	IND	N	BSL
	7440-38-2	Arsenic	0.82	10	mg/kg	35SB10A	22/22	0.071 - 0.071	10	0.426	C	1.91	C	IND	Y	***ARES/IND***
	7440-39-3	Barium	60	180	mg/kg	35SB9A	22/22	0.17 - 0.17	180	1,564	N	20,440	N	IND	N	BSL
	7440-41-7	Beryllium	0.54	1.1	mg/kg	35SB6A	22/22	0.021 - 0.021	1.1	15.6	N	204.4	N	IND	N	BSL
	7440-43-9	Cadmium	0.97	2.2	mg/kg	35SB7A	22/22	0.11 - 0.11	2.2	3.911	N	51.1	N	IND	N	BSL
	7440-70-2	Calcium	1,500	89,000	mg/kg	35SB8C	22/22	4.2 - 4.2	89,000	--	--	1,095,000	--	RDA	N	BSL
	7440-47-3	Chromium [1]	21	160	mg/kg	35SB10A	22/22	0.72 - 0.72	160	23.46	N	306.6	N	IND	Y	**ARES**
	7440-48-4	Cobalt	5.1	12	mg/kg	35SB9B	22/22	0.37 - 0.37	12	--	--	--	--	--	Y	NSV
	7440-50-8	Copper	10	200	mg/kg	35SB7A	22/22	0.044 - 0.22	200	312.9	N	4,088	N	IND	N	BSL
	7439-89-6	Iron	17,000	31,000	mg/kg	35SB2A	22/22	0.48 - 240	31,000	5,475	N	71,540	N	IND	Y	**ARES**
	7439-92-1	Lead [2]	9.6	750	mg/kg	35SB7A	22/22	0.022 - 0.45	750	400	--	750	--	USEPA	Y	**ARES**
	7439-95-4	Magnesium	3,300	44,000	mg/kg	35SB8C	22/22	5 - 50	44,000	--	--	156,400	--	RDA	N	BSL
	7439-96-5	Manganese	230	675	mg/kg	35SB4A DUP AVG	22/22	0.16 - 1.6	675	156.4	N	2,044	N	IND	Y	**ARES**
	7439-97-6	Mercury [3]	0.021	0.83	mg/kg	35SB7A	22/22	0.0075 - 0.0075	0.83	2.35	--	30.66	--	IND	N	BSL
	7440-02-0	Nickel	11	45	mg/kg	35SB6A	22/22	0.036 - 0.036	45	156.4	N	2,044	N	IND	N	BSL
	7440-09-7	Potassium	1,300	3,100	mg/kg	35SB8C	22/22	5.3 - 5.3	3,100	--	--	2,607,000	--	RDA	N	BSL
	7782-49-2	Selenium	0.12	0.37	mg/kg	35SB2A	21/22	0.089 - 0.089	0.37	39.11	N	511	N	IND	N	BSL
	7440-22-4	Silver	0.048	25	mg/kg	35SB7A	22/22	0.013 - 0.013	25	39.11	N	511	N	IND	N	BSL
	7440-23-5	Sodium	31	110	mg/kg	35SB7C	22/22	13 - 13	110	--	--	625,700	--	RDA	N	BSL
	7440-28-0	Thallium	0.059	0.235	mg/kg	35SB5A DUP AVG	22/22	0.0049 - 0.0049	0.235	0.548	N	7.154	N	IND	N	BSL
	7440-62-2	Vanadium	21	43.5	mg/kg	35SB4A DUP AVG	22/22	0.034 - 0.034	43.5	7.821	N	102.2	N	IND	Y	**ARES**
	7440-66-6	Zinc	41	280	mg/kg	35SB9A	22/22	1 - 1	280	2,346	N	30,660	N	IND	N	BSL
		TCL Pesticides/PCBs														
	50-29-3	4,4'-DDT	1.5E-03	1.5E-03	mg/kg	35SB1A	1/22	0.0011 - 0.002	1.5E-03	1.9E+00	C	8.4E+00	C	IND	N	BSL
	1024-57-3	Heptachlor epoxide	6.5E-03	6.5E-03	mg/kg	35SB2A	1/22	0.00046 - 0.00082	6.5E-03	7.0E-02	C	3.1E-01	C	IND	N	BSL
	11097-69-1	Aroclor 1254 [4]	1.6E-02	1.7E+00	mg/kg	35SB6A	17/22	0.0049 - 0.015	1.7E+00	1.6E-01	N	1.4E+00	C	IND	Y	***ARES/IND***
	11096-82-5	Aroclor 1260	8.0E-01	8.0E-01	mg/kg	35SB6A	1/22	0.018 - 0.054	8.0E-01	3.2E-01	C	1.4E+00	C	IND	Y	**ARES**
		TCL VOCs														
	78-93-3	2-Butanone	7.4E-03	1.7E-02	mg/kg	35SB1A	8/22	0.0027 - 0.033	1.7E-02	4.7E+03	N	6.1E+04	N	IND	N	BSL
	67-64-1	Acetone	1.1E-02	2.4E-01	mg/kg	35SB10A	21/22	0.0047 - 0.12	2.4E-01	7.0E+03	N	9.2E+04	N	IND	N	BSL
	71-43-2	Benzene	2.0E-04	2.0E-04	mg/kg	35SB7C	1/22	0.00014 - 0.012	2.0E-04	1.2E+01	C	5.2E+01	C	IND	N	BSL
	75-15-0	Carbon disulfide	3.0E-03	6.2E-03	mg/kg	35SB5A DUP AVG	14/22	0.00029 - 0.028	6.2E-03	7.8E+02	N	1.0E+04	N	IND	N	BSL
	67-66-3	Chloroform	2.0E-04	2.2E-04	mg/kg	35SB8B	4/22	0.00016 - 0.0061	2.2E-04	7.8E+01	N	1.0E+03	N	IND	N	BSL
	79-20-9	Methyl acetate	2.1E-03	2.0E-01	mg/kg	35SB2A	14/22	0.00092 - 0.016	2.0E-01	7.8E+03	N	1.0E+05	N	IND	N	BSL
	75-09-2	Methylene chloride	5.5E-03	5.5E-03	mg/kg	35SB1A	1/22	0.0044 - 0.016	5.5E-03	8.5E+01	C	3.8E+02	C	IND	N	BSL
	108-88-3	Toluene	2.5E-02	5.5E-02	mg/kg	35SB5A DUP AVG	2/22	0.00044 - 0.0071	5.5E-02	6.3E+02	N	8.2E+03	N	IND	N	BSL
		TCL SVOCs														
	120-12-7	Anthracene	8.1E-04	8.1E-04	mg/kg	35SB8B	1/22	0.00049 - 0.42	8.1E-04	2.3E+03	N	3.1E+04	N	IND	N	BSL
	100-52-7	Benzaldehyde	7.4E-02	4.6E+00	mg/kg	35SB6A	3/22	0.03 - 26	4.6E+00	7.8E+02	N	1.0E+04	N	IND	N	BSL
	56-55-3	Benzo(a)anthracene	8.0E-04	1.0E-01	mg/kg	35SB7A	16/22	0.00061 - 0.53	1.0E-01	2.2E-01	C	3.9E+00	C	IND	N	BSL
	50-32-8	Benzo(a)pyrene	1.6E-03	1.8E-02	mg/kg	35SB3A	3/22	0.0012 - 1	1.8E-02	2.2E-02	C	3.9E-01	C	IND	N	BSL
	205-99-2	Benzo(b)fluoranthene	1.1E-03	2.9E-02	mg/kg	35SB3A	5/22	0.00097 - 0.84	2.9E-02	2.2E-01	C	3.9E+00	C	IND	N	BSL
	207-08-9	Benzo(k)fluoranthene	1.9E-03	1.8E-02	mg/kg	35SB3A	4/22	0.00082 - 0.71	1.8E-02	2.2E+00	C	3.9E+01	C	IND	N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	9.7E-03	5.4E-01	mg/kg	35SB6A	17/22	0.0015 - 1.3	5.4E-01	4.6E+01	C	2.0E+02	C	IND	N	BSL
	85-68-7	Butyl Benzyl Phthalate	3.2E-03	3.2E-03	mg/kg	35SB5B	1/22	0.0024 - 2.1	3.2E-03	1.6E+03	N	2.0E+04	N	IND	N	BSL
	86-74-8	Carbazole	1.6E-03	7.4E-03	mg/kg	35SB3A	2/22	0.00057 - 0.49	7.4E-03	3.2E+01	C	1.4E+02	C	IND	N	BSL
	218-01-9	Chrysene	2.8E-03	5.7E-02	mg/kg	35SB6A	8/22	0.00054 - 0.47	5.7E-02	2.2E+01	C	3.9E+02	C	IND	N	BSL
	84-74-2	Di-n-butylphthalate	4.1E-03	4.9E+00	mg/kg	35SB5A DUP AVG	20/22	0.0014 - 1.2	4.9E+00	7.8E+02	N	1.0E+04	N	IND	N	BSL
	84-66-2	Diethylphthalate	1.2E-03	3.0E-02	mg/kg	35SB2A	11/22	0.00042 - 0.37	3.0E-02	6.3E+03	N	8.2E+04	N	IND	N	BSL
	131-11-3	Dimethylphthalate	8.1E-04	8.1E-04	mg/kg	35SB8B	1/22	0.00039 - 0.33	8.1E-04	--	--	--	--	IND	Y	NSV
	91-20-3	Naphthalene	4.1E-04	3.7E-03	mg/kg	35SB3A	5/22	0.00027 - 0.23	3.7E-03	1.6E+02	N	2.0E+03	N	IND	N	BSL
	86-30-6	N-Nitrosodiphenylamine	3.7E-03	2.5E-01	mg/kg	35SB6A	6/22	0.00091 - 0.79	2.5E-01	1.3E+02	C	5.8E+02	C	IND	N	BSL
	87-86-5	Pentachlorophenol	9.1E-02	9.1E-02	mg/kg	35SB7C	1/22	0.0042 - 3.6	9.1E-02	5.3E+00	C	2.4E+01	C	IND	N	BSL
	129-00-0	Pyrene	4.0E-04	1.9E-01	mg/kg	35SB7A	18/22	0.00036 - 0.31	1.9E-01	2.3E+02	N	3.1E+03	N	IND	N	BSL
		Explosives														
	118-96-7	2,4,6-Trinitrotoluene [5]	3.1E-01	3.1E-01	mg/kg	35SB6A	1/22	0.15 - 0.15	3.1E-01	7.8E+00	N	1.0E+02	N	--	N	BSL
	121-14-2	2,4-Dinitrotoluene	5.2E-01	5.2E-01	mg/kg	35SB5A DUP AVG	1/22	0.1 - 0.1	5.2E-01	1.6E+01	N	2.0E+02	N	IND	N	BSL
	--	Dinitrotoluene Mix	5.2E-01	5.2E-01	mg/kg	35SB5A DUP AVG	1/22	--	5.2E-01	9.4E-01	C	4.2E+00	C	IND	N	BSL
	2691-41-0	HMX	5.1E-01	7.0E+00	mg/kg	35SB7A	7/22	0.066 - 0.066	7.0E+00	3.9E+02	N	5.1E+03	N	IND	N	BSL
		Nitroglycerin														
	55-63-0	Nitroglycerin	1.1E+01	1.1E+01	mg/kg	35SB6A	1/22	0.39 - 0.39	1.1E+01	7.8E-01	N	1.0E+01	N	IND	Y	***ARES/IND***

Table E.1-2.2
SWMU 35 COPC Determination - Total Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

COPC = Chemical of Potential Concern
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
mg/kg = Milligram Per Kilogram
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
(N/C) = Noncarcinogenic/Carcinogenic per EPA RBC Table (October 2007)
C/N* =
-- = No Value Available
[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = Noncarcinogenic Residential and Industrial RBC values for 2,4,6-Trinitrotoluene were used for screening

ARAR = Applicable, Relevant, and Appropriate Requirement
TBC = To-Be-Considered
IND = Adjusted Industrial RBC
AL = USEPA Action Level
RDA = Recommended Daily Allowance

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table E.1-2.3
Non-detected Chemicals MDL Screening for SWMU 35 - Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
TAL Metals (mg/kg)								
Antimony	7440-36-0	mg/kg	6	22	0.042	0.042	3.13	N
Selenium	7782-49-2	mg/kg	1	22	0.089	0.089	39.11	N
Pesticides/PCBs (ug/kg)								
4,4'-DDD	72-54-8	ug/kg	22	22	1.2	2.2	2.7E+03	N
4,4'-DDE	72-55-9	ug/kg	22	22	0.99	1.8	1.9E+03	N
4,4'-DDT	50-29-3	ug/kg	21	22	1.1	2	1.9E+03	N
Aldrin	309-00-2	ug/kg	22	22	0.6	1.1	3.8E+01	N
alpha-BHC	319-84-6	ug/kg	22	22	0.39	0.69	1.0E+02	N
alpha-Chlordane[1]	5103-71-9	ug/kg	22	22	0.75	1.3	1.8E+03	N
beta-BHC	319-85-7	ug/kg	22	22	0.74	1.3	3.5E+02	N
delta-BHC [2]	319-86-8	ug/kg	22	22	1	1.8	1.0E+02	N
Dieldrin	60-57-1	ug/kg	22	22	0.51	0.91	4.0E+01	N
Endosulfan I	959-98-8	ug/kg	22	22	0.99	1.8	4.7E+04	N
Endosulfan II	33213-65-9	ug/kg	22	22	0.94	1.7	4.7E+04	N
Endosulfan Sulfate[3]	1031-07-8	ug/kg	22	22	1.1	2	4.7E+04	N
Endrin	72-20-8	ug/kg	22	22	0.59	1.1	2.3E+03	N
Endrin Aldehyde[4]	7421-93-4	ug/kg	22	22	1.1	2.1	2.3E+03	N
Endrin Ketone[4]	53494-70-5	ug/kg	22	22	1.1	2	2.3E+03	N
gamma-BHC (Lindane)	58-89-9	ug/kg	22	22	0.71	1.3	4.9E+02	N
gamma-Chlordane[1]	5103-74-2	ug/kg	22	22	0.52	0.93	1.8E+03	N
Heptachlor	76-44-8	ug/kg	22	22	1.3	2.4	1.4E+02	N
Heptachlor Epoxide	1024-57-3	ug/kg	21	22	0.46	0.82	7.0E+01	N
Methoxychlor	72-43-5	ug/kg	22	22	1.4	2.5	3.9E+04	N
Toxaphene	8001-35-2	ug/kg	22	22	25	44	5.8E+02	N
Aroclor 1016	12674-11-2	ug/kg	22	22	4.6	14	5.5E+02	N
Aroclor 1221	11104-28-2	ug/kg	22	22	8.2	25	3.2E+02	N
Aroclor 1232	11141-16-5	ug/kg	22	22	9.3	29	3.2E+02	N
Aroclor 1242	53469-21-9	ug/kg	22	22	18	55	3.2E+02	N
Aroclor 1248	12672-29-6	ug/kg	22	22	5.8	18	3.2E+02	N
Aroclor 1254 [5]	11097-69-1	ug/kg	5	22	5	5.5	1.6E+02	N
Aroclor 1260	11096-82-5	ug/kg	21	22	18	31	3.2E+02	N
Aroclor 1262	37324-23-5	ug/kg	22	22	5.7	18	--	NS
Aroclor 1268	11100-14-4	ug/kg	22	22	4.9	15	--	NS
TCL VOCs (ug/kg)								
Acetone	67-64-1	ug/kg	1	22	110	110	7.0E+06	N
1,1,1-Trichloroethane	71-55-6	ug/kg	22	22	0.23	11	1.6E+07	N
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	22	22	0.22	9.9	3.2E+03	N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/kg	22	22	0.37	14	2.3E+08	N
1,1,2-Trichloroethane	79-00-5	ug/kg	22	22	0.76	20	1.1E+04	N
1,1-Dichloroethane	75-34-3	ug/kg	22	22	0.21	7.5	1.6E+06	N
1,1-Dichloroethene	75-35-4	ug/kg	22	22	0.41	14	3.9E+05	N
1,2,3-Trichlorobenzene	87-61-6	ug/kg	22	22	0.23	13	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/kg	22	22	0.27	16	7.8E+04	N
1,2-Dibromo-3-chloropropane	96-12-8	ug/kg	22	22	0.9	29	2.0E+02	N
1,2-Dibromoethane	106-93-4	ug/kg	22	22	0.93	22	3.2E+02	N
1,2-Dichlorobenzene	95-50-1	mg/kg	22	22	0.27	6.5	7.0E+05	N
1,2-Dichloroethane	107-06-2	mg/kg	22	22	0.33	15	7.0E+03	N
1,2-Dichloropropane	78-87-5	ug/kg	22	22	1	10	9.4E+03	N
1,3-Dichlorobenzene	541-73-1	ug/kg	22	22	0.26	12	2.3E+04	N
1,4-Dichlorobenzene	106-46-7	ug/kg	22	22	0.24	13	2.7E+04	N
2-Butanone	78-93-3	ug/kg	14	22	2.8	33	4.7E+06	N
2-Hexanone	591-78-6	ug/kg	22	22	3.3	42	--	NS
4-Methyl-2-pentanone	108-10-1	ug/kg	22	22	2.1	38	--	NS
Benzene	71-43-2	ug/kg	21	22	0.14	12	1.2E+04	N
Bromochloromethane	74-97-5	ug/kg	22	22	0.14	19	--	NS
Bromodichloromethane	75-27-4	ug/kg	22	22	0.27	19	1.0E+04	N
Bromoform	75-25-2	ug/kg	22	22	0.53	23	8.1E+04	N
Bromomethane	74-83-9	ug/kg	22	22	1.3	19	1.1E+04	N
Carbon Disulfide	75-15-0	ug/kg	8	22	0.3	28	7.8E+05	N
Carbon Tetrachloride	56-23-5	ug/kg	22	22	0.32	15	4.9E+03	N
Chlorobenzene	108-90-7	ug/kg	22	22	0.22	12	1.6E+05	N
Chloroethane	75-00-3	ug/kg	22	22	0.39	20	2.2E+05	N
Chloroform	67-66-3	ug/kg	18	22	0.16	6.1	7.8E+04	N
Chloromethane	74-87-3	ug/kg	22	22	0.27	5.9	--	NS
cis-1,2-Dichloroethene	156-59-2	ug/kg	22	22	0.18	16	7.8E+04	N
cis-1,3-Dichloropropene[6]	10061-01-5	ug/kg	22	22	0.28	14	6.4E+03	N
Cyclohexane	110-82-7	ug/kg	22	22	0.76	14	--	NS
Dibromochloromethane	124-48-1	ug/kg	22	22	0.39	14	7.6E+03	N
Dichlorodifluoromethane	75-71-8	ug/kg	22	22	0.36	17	1.6E+06	N
Ethylbenzene	100-41-4	ug/kg	22	22	0.14	13	7.8E+05	N
Isopropylbenzene	98-82-8	ug/kg	22	22	0.14	12	7.8E+05	N
Methyl Acetate	79-20-9	ug/kg	8	22	0.96	1	7.8E+06	N

Table E.1-2.3
Non-detected Chemicals MDL Screening for SWMU 35 - Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
Methyl tert-Butyl Ether	1634-04-4	ug/kg	22	22	0.26	9.5	1.6E+05	N
Methylcyclohexane	108-87-2	ug/kg	22	22	0.88	15	--	NS
Methylene Chloride	75-09-2	ug/kg	21	22	4.4	16	8.5E+04	N
Styrene	100-42-5	ug/kg	22	22	0.24	11	1.6E+06	N
Tetrachloroethene	127-18-4	ug/kg	22	22	0.49	15	1.2E+03	N
Toluene	108-88-3	ug/kg	20	22	0.44	7.1	6.3E+05	N
trans-1,2-Dichloroethene	156-60-5	ug/kg	22	22	0.25	16	1.6E+05	N
trans-1,3-Dichloropropene[6]	10061-02-6	ug/kg	22	22	0.92	15	6.4E+03	N
Trichloroethene	79-01-6	ug/kg	22	22	0.62	17	1.6E+03	N
Trichlorofluoromethane	75-69-4	ug/kg	22	22	0.24	18	2.3E+06	N
Vinyl Chloride	75-01-4	ug/kg	22	22	0.5	17	9.0E+01	N
Xylenes	1330-20-7	ug/kg	22	22	0.65	35	1.6E+06	N
TCL SVOCs (ug/kg)								
1,1'-Biphenyl	92-52-4	ug/kg	22	22	0.52	450	3.9E+05	N
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/kg	22	22	0.91	790	2.3E+03	N
2,3,4,6-Tetrachlorophenol	58-90-2	ug/kg	22	22	19	16,000	2.3E+05	N
2,4,5-Trichlorophenol	95-95-4	ug/kg	22	22	6.8	5,900	7.8E+05	N
2,4,6-Trichlorophenol[7]	88-06-2	ug/kg	22	22	5.2	4,500	7.8E+03	N
2,4-Dichlorophenol	120-83-2	ug/kg	22	22	7.5	6,500	2.3E+04	N
2,4-Dimethylphenol	105-67-9	ug/kg	22	22	6.5	5,600	1.6E+05	N
2,4-Dinitrophenol	51-28-5	ug/kg	22	22	38	33,000	1.6E+04	**Y**
2,4-Dinitrotoluene	121-14-2	ug/kg	22	22	15	13,000	1.6E+04	N
2,6-Dinitrotoluene	606-20-2	ug/kg	22	22	1.8	1,600	7.8E+03	N
2-Chloronaphthalene	91-58-7	ug/kg	22	22	0.49	430	6.3E+05	N
2-Chlorophenol	95-57-8	ug/kg	22	22	0.44	380	3.9E+04	N
2-Methylnaphthalene	91-57-6	ug/kg	22	22	0.54	470	3.1E+04	N
2-Methylphenol	95-48-7	ug/kg	22	22	9.3	8,000	3.9E+05	N
2-Nitroaniline	88-74-4	ug/kg	22	22	15	13,000	--	NS
2-Nitrophenol	88-75-5	ug/kg	22	22	14	12,000	--	NS
3,3'-Dichlorobenzidine	91-94-1	ug/kg	22	22	89	77,000	1.4E+03	**Y**
3-Nitroaniline	99-09-2	ug/kg	22	22	13	11,000	--	NS
4,6-Dinitro-2-methylphenol	534-52-1	ug/kg	22	22	41	36,000	--	NS
4-Bromophenyl-PhenylEther	101-55-3	ug/kg	22	22	1.4	1,200	--	NS
4-Chloro-3-methylphenol[8]	59-50-7	ug/kg	22	22	2	1,800	3.9E+05	N
4-Chloroaniline	106-47-8	ug/kg	22	22	22	19,000	3.1E+04	N
4-Chlorophenyl-PhenylEther	7005-72-3	ug/kg	22	22	0.51	440	--	NS
4-Methylphenol	106-44-5	ug/kg	22	22	10	9,000	3.9E+04	N
4-Nitroaniline	100-01-6	ug/kg	22	22	26	23,000	--	NS
4-Nitrophenol	100-02-7	ug/kg	22	22	13	11,000	--	NS
Acetophenone	98-86-2	ug/kg	22	22	7.7	6,600	7.8E+05	N
Atrazine	1912-24-9	ug/kg	22	22	1.7	1,500	2.9E+03	N
Benzaldehyde	100-52-7	ug/kg	19	22	30	26,000	7.8E+05	N
Bis(2-chloroethoxy)methane	111-91-1	ug/kg	22	22	0.91	790	--	NS
Bis(2-chloroethyl)Ether	111-44-4	ug/kg	22	22	1	890	5.8E+02	**Y**
Bis(2-ethylhexyl)Phthalate	117-81-7	ug/kg	5	22	7.6	1,300	4.6E+04	N
Bis(2-chloroisopropyl)Ether	39638-32-9	ug/kg	22	22	0.36	310	--	NS
Butylbenzylphthalate	85-68-7	ug/kg	21	22	2.4	2,100	1.6E+06	N
Caprolactam	105-60-2	ug/kg	22	22	26	23,000	--	NS
Carbazole	86-74-8	ug/kg	20	22	0.57	490	--	NS
Di-n-butylphthalate	84-74-2	ug/kg	2	22	7	7	--	NS
Di-n-octylphthalate	117-84-0	ug/kg	22	22	11	9,700	--	NS
Dibenzofuran	132-64-9	ug/kg	22	22	0.3	260	--	NS
Diethylphthalate	84-66-2	ug/kg	11	22	2.2	370	--	NS
Dimethylphthalate	131-11-3	ug/kg	21	22	0.39	330	--	NS
Hexachlorobenzene	118-74-1	ug/kg	22	22	0.91	790	4.0E+02	**Y**
Hexachlorobutadiene[8]	87-68-3	ug/kg	22	22	0.79	680	7.8E+03	N
Hexachlorocyclopentadiene	77-47-4	ug/kg	22	22	4.5	3,900	4.7E+04	N
Hexachloroethane[9]	67-72-1	ug/kg	22	22	0.91	790	7.8E+03	N
Isophorone	78-59-1	ug/kg	22	22	0.46	400	6.7E+05	N
N-Nitrosodi-n-propylamine	621-64-7	ug/kg	22	22	0.81	700	9.1E+01	**Y**
N-Nitrosodiphenylamine	86-30-6	ug/kg	16	22	0.91	790	1.3E+05	N
Nitrobenzene	98-95-3	ug/kg	22	22	1.7	1,500	3.9E+03	N
Pentachlorophenol	87-86-5	ug/kg	21	22	4.2	3,600	5.3E+03	N
Phenol	108-95-2	ug/kg	22	22	0.8	690	2.3E+06	N
PAHs (ug/kg)								
Acenaphthene	83-32-9	ug/kg	22	22	0.46	400	4.7E+05	N
Acenaphthylene[10]	208-96-8	ug/kg	22	22	0.68	590	2.3E+05	N
Anthracene	120-12-7	ug/kg	21	22	0.49	420	2.3E+06	N
Benzo(a)anthracene	56-55-3	ug/kg	6	22	3.1	530	2.2E+02	**Y**
Benzo(a)pyrene	50-32-8	ug/kg	19	22	1.2	1,000	2.2E+01	**Y**
Benzo(b)fluoranthene	205-99-2	ug/kg	17	22	1	840	2.2E+02	**Y**
Benzo(g,h,i)perylene[10]	191-24-2	ug/kg	22	22	2.6	2,300	2.3E+05	N
Benzo(k)fluoranthene	207-08-9	ug/kg	18	22	0.86	710	2.2E+03	N

Table E.1-2.3
Non-detected Chemicals MDL Screening for SWMU 35 - Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
Chrysene	218-01-9	ug/kg	14	22	0.54	470	2.2E+04	N
Dibenz(a,h)anthracene	53-70-3	ug/kg	22	22	0.61	530	2.2E+01	**Y**
Fluoranthene	206-44-0	ug/kg	22	22	4.3	3,700	3.1E+05	N
Fluorene	86-73-7	ug/kg	22	22	0.32	280	3.1E+05	N
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	22	22	0.8	690	2.2E+02	**Y**
Naphthalene	91-20-3	ug/kg	17	22	0.28	230	1.6E+05	N
Phenanthrene[10]	85-01-8	ug/kg	22	22	4.1	3,600	2.3E+05	N
Pyrene	129-00-0	ug/kg	4	22	1.9	310	2.3E+05	N
Explosives (mg/kg)								
1,3,5-Trinitrobenzene	99-35-4	mg/kg	22	22	0.074	0.074	2.3E+02	N
1,3-Dinitrobenzene	99-65-0	mg/kg	22	22	0.076	0.076	7.8E-01	N
2,4,6-Trinitrotoluene[11]	118-96-7	mg/kg	21	22	0.15	0.15	3.9E+00	N
2,4-Dinitrotoluene	121-14-2	mg/kg	21	22	0.1	0.1	1.6E+01	N
2,6-Dinitrotoluene	606-20-2	mg/kg	22	22	0.2	0.2	7.8E+00	N
2-Amino-4,6-dinitrotoluene	355-72-78-2	mg/kg	22	22	0.22	0.22	1.6E+01	N
2-Nitrotoluene	88-72-2	mg/kg	22	22	0.17	0.17	7.8E+01	N
3-Nitrotoluene	99-08-1	mg/kg	22	22	0.21	2.5	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	mg/kg	22	22	0.3	0.3	1.6E+01	N
4-Nitrotoluene[12]	99-99-0	mg/kg	22	22	0.2	0.2	3.1E+01	N
HMX	2691-41-0	mg/kg	15	22	0.066	0.066	3.9E+02	N
Nitrobenzene	98-95-3	mg/kg	22	22	0.03	0.03	3.9E+00	N
RDX	121-82-4	mg/kg	22	22	0.048	0.048	5.8E+00	N
Tetryl	479-45-8	mg/kg	22	22	0.065	0.065	3.1E+01	N
Nitroglycerin/PETN (mg/kg)								
Nitroglycerin	55-63-0	mg/kg	21	22	0.39	0.39	7.8E-01	N
PETN	78-11-5	mg/kg	22	22	0.23	0.23	--	NS

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
ug/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
PETN = Pentaerythritol Tetranitrate
MDL = Method Detection Limit
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
R-RBC = Residential RBC
SL = Screening Level

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

[1] = Chlordane RBC value was used
[3] = Alpha-BHC RBC value was used
[3] = Endosulfan RBC value was used
[4] = Endrin RBC value was used
[5] = Noncarcinogenic RBC value for Aroclor 1254 was used
[6] = 1,3-Dichloropropene RBC value was used
[7] = Noncarcinogenic RBC value for 2,4,6-Trichlorophenol was used
[8] = 3-Methylphenol RBC value was used
[9] = Noncarcinogenic RBC value for Hexachlorobutadiene was used
[10] = Noncarcinogenic RBC value for Hexachloroethane was used
[11] = Pyrene RBC value was used
[12] = Noncarcinogenic RBC value for 2,4,6-Trinitrotoluene was used
[13] = Noncarcinogenic RBC value for 4-Nitrotoluene was used

Table E.1-2.4
Groundwater COPC Selection - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted Tap Water RBC[A]	MCL	COPC Flag (Y/N)	Rationale for Selection or Deletion
Perchlorate													
Perchlorate	14797-73-0	0.13	0.25	ug/L	35MW1	2/2	0.08 - 0.08	0.25	N	2.555	--	N	BSL
TAL Metals													
Aluminum, Total	7429-90-5	140	420	ug/L	35MW1	2/2	44 - 44	420	N	3,650	--	N	BSL
Antimony, Total	7429-90-5	0.69	0.69	ug/L	35MW2	1/2	0.44 - 0.44	0.69	N	3,650	6	N	BSL
Barium, Dissolved	7440-39-3	43	95	ug/L	35MW1	2/2	0.52 - 0.52	95	N	730	2,000	N	BSL
Barium, Total	7440-39-3	48	100	ug/L	35MW1	2/2	0.52 - 0.52	100	N	730	2,000	N	BSL
Cadmium, Total	7440-43-9	0.064	0.064	ug/L	35MW2	1/2	0.062 - 0.062	0.064	N	1.825	5	N	BSL
Calcium, Dissolved	7440-70-2	85,000	130,000	ug/L	35MW2	2/2	40 - 40	130,000	--	1,095,000	--	N	BSL
Calcium, Total	7440-70-2	87,000	140,000	ug/L	35MW2	2/2	40 - 40	140,000	--	1,095,000	--	N	BSL
Chromium, Dissolved[1]	7440-47-3	1.2	1.5	ug/L	35MW2	2/2	0.31 - 0.31	1.5	C	10.95	100	N	BSL
Chromium, Total[1]	7440-47-3	4.9	5.2	ug/L	35MW2	2/2	0.31 - 0.31	5.2	C	10.95	100	N	BSL
Cobalt, Dissolved	7440-48-4	0.72	1.4	ug/L	35MW1	2/2	0.096 - 0.096	1.4	--	--	--	Y	NSV
Cobalt, Total	7440-48-4	1.9	2.2	ug/L	35MW1	2/2	0.096 - 0.096	2.2	--	--	--	Y	NSV
Copper, Dissolved	7440-50-8	0.52	1.2	ug/L	35MW2	2/2	0.33 - 0.33	1.2	N	146	1,300	N	BSL
Copper, Total	7440-50-8	0.85	2	ug/L	35MW2	2/2	0.33 - 0.33	2	N	146	1,300	N	BSL
Iron, Dissolved	7439-89-6	12	12	ug/L	35MW1	2/2	5.7 - 5.7	12	N	2,555	--	N	BSL
Iron, Total	7439-89-6	200	370	ug/L	35MW1	2/2	5.7 - 5.7	370	N	2,555	--	N	BSL
Lead, Total[2]	7439-92-1	0.33	0.41	ug/L	35MW2	2/2	0.33 - 0.33	0.41	--	15	--	N	BSL
Magnesium, Dissolved	7439-95-4	34,000	35,000	ug/L	35MW2	2/2	38 - 38	35,000	--	156,400	--	N	BSL
Magnesium, Total	7439-95-4	35,000	37,000	ug/L	35MW2	2/2	38 - 38	37,000	--	156,400	--	N	BSL
Manganese, Dissolved	7439-96-5	16	91	ug/L	35MW1	2/2	0.43 - 0.43	91	N	73	--	Y	**ARBC**
Manganese, Total	7439-96-5	21	81	ug/L	35MW1	2/2	0.43 - 0.43	81	N	73	--	Y	**ARBC**
Nickel, Dissolved	7440-02-0	2.4	2.4	ug/L	35MW1	2/2	0.28 - 0.28	2.4	N	73	--	N	BSL
Nickel, Total	7440-02-0	3.1	3.3	ug/L	35MW1	2/2	0.28 - 0.28	3.3	N	73	--	N	BSL
Potassium, Dissolved	7440-09-7	1,200	1,500	ug/L	35MW1	2/2	54 - 54	1,500	--	2,607,000	--	N	BSL
Potassium, Total	7440-09-7	1,400	1,600	ug/L	35MW1	2/2	54 - 54	1,600	--	2,607,000	--	N	BSL
Silver, Total	7440-22-4	0.12	0.12	ug/L	35MW2	1/2	0.12 - 0.12	0.12	N	18.25	--	N	BSL
Sodium, Dissolved	7440-23-5	7,600	9,100	ug/L	35MW1	2/2	84 - 84	9,100	--	625,700	--	N	BSL
Sodium, Total	7440-23-5	8,300	9,400	ug/L	35MW1	2/2	84 - 84	9,400	--	625,700	--	N	BSL
Vanadium, Dissolved	7440-62-2	1.1	1.1	ug/L	35MW1	2/2	0.83 - 0.83	1.1	N	3.65	--	N	BSL
Vanadium, Total	7440-62-2	1.1	1.4	ug/L	35MW1	2/2	0.83 - 0.83	1.4	N	3.65	--	N	BSL
Zinc, Dissolved	7440-66-6	8.8	9.2	ug/L	35MW2	2/2	0.84 - 0.84	9.2	N	1,095	--	N	BSL
Zinc, Total	7440-66-6	9.8	15	ug/L	35MW2	2/2	0.84 - 0.84	15	N	1,095	--	N	BSL
TCL VOCs													
Chloroform	67-66-3	0.36	0.36	ug/L	35MW1	1/2	0.061 - 0.061	0.36	C	0.155	80	Y	**ARBC**
Toluene	108-88-3	0.13	0.13	ug/L	35MW1	1/2	0.072 - 0.072	0.13	N	227.1	1,000	N	BSL
TCL SVOCs													
Anthracene	120-12-7	0.019	0.019	ug/L	35MW2	1/2	0.014 - 0.014	0.019	N	182.5	--	N	BSL
Bis(2-ethylhexyl) Phthalate	117-81-7	0.54	0.54	ug/L	35MW1	2/2	0.41 - 0.41	0.54	C	4.784	--	N	BSL
Butyl Benzyl Phthalate	85-68-7	0.26	0.26	ug/L	35MW1	2/2	0.029 - 0.029	0.26	N	730	--	N	BSL
Fluoranthene	206-44-0	0.019	0.019	ug/L	35MW2	1/2	0.016 - 0.016	0.019	N	146	--	N	BSL
Isophorone	78-59-1	0.066	0.075	ug/L	35MW1	2/2	0.031 - 0.031	0.075	C	70.5	--	N	BSL
Phenanthrene[4]	85-01-8	0.019	0.019	ug/L	35MW1	2/2	0.015 - 0.015	0.019	N	18.25	--	N	BSL
Explosives													
HMX	2691-41-0	0.88	1	ug/L	35MW1	2/2	0.2 - 0.2	1	N	182.5	--	N	BSL

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
RDA = Recommended Daily Allowance

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2007)
N = Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level
DUP AVG = averaged result for duplicate samples

ARBC = Above Tap Water RBC
BSL = Below Tap Water RBC/MCL
NSV = No Screening Value
[A] = RDAs used as screening values for nutrients
[1] = Chromium VI RBC used for screening
[2] = USEPA Action Level used for screening
[3] = Chlordane RBC used for screening
[4] = Pyrene RBC used for screening

Table E.1-2.5
SWMU 35 Groundwater Non-detects Screening
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adj. Tap Water RBC	Maximum MDL Exceeds SL
TAL Metals								
Aluminum, Dissolved	7429-90-5	ug/L	4	4	44	44	3,650	N
Aluminum, Total	7429-90-5	ug/L	1	4	44	44	3,650	N
Antimony, Dissolved	7440-36-0	ug/L	4	4	0.44	0.44	1.46	N
Antimony, Total	7440-36-0	ug/L	3	4	0.44	0.44	1.46	N
Arsenic, Dissolved	7440-38-2	ug/L	4	4	0.74	0.74	0.0446	**Y**
Arsenic, Total	7440-38-2	ug/L	4	4	0.74	0.74	0.0446	**Y**
Beryllium, Dissolved	7440-41-7	ug/L	4	4	0.31	0.31	7.3	N
Beryllium, Total	7440-41-7	ug/L	4	4	0.31	0.31	7.3	N
Cadmium, Dissolved	7440-43-9	ug/L	3	4	0.062	0.062	1.825	N
Cadmium, Total	7440-43-9	ug/L	3	4	0.062	0.062	1.825	N
Iron, Dissolved	7439-89-6	ug/L	1	4	5.7	5.7	2,555	N
Lead, Dissolved [1]	7439-92-1	ug/L	3	4	0.33	0.33	15	N
Lead, Total [1]	7439-92-1	ug/L	2	4	0.33	0.33	15	N
Mercury, Dissolved [2]	7439-97-6	ug/L	4	4	0.046	0.046	0.37	N
Mercury, Total [2]	7439-97-6	ug/L	4	4	0.046	0.046	0.37	N
Selenium, Dissolved	7782-49-2	ug/L	4	4	0.92	0.92	18.25	N
Selenium, Total	7782-49-2	ug/L	4	4	0.92	0.92	18.25	N
Silver, Dissolved	7440-22-4	ug/L	4	4	0.12	0.12	18.25	N
Silver, Total	7440-22-4	ug/L	3	4	0.12	0.12	18.25	N
Thallium, Dissolved	7440-28-0	ug/L	4	4	0.17	0.17	0.256	N
Thallium, Total	7440-28-0	ug/L	4	4	0.17	0.17	0.256	N
Vanadium, Dissolved	7440-62-2	ug/L	2	4	0.83	0.83	3.65	N
Vanadium, Total	7440-62-2	ug/L	2	4	0.83	0.83	3.65	N
Pesticides/PCBs								
4,4'-DDD	72-54-8	ug/L	4	4	0.0019	0.0019	0.279	N
4,4'-DDE	72-55-9	ug/L	4	4	0.0027	0.0027	0.197	N
4,4'-DDT	50-29-3	ug/L	4	4	0.002	0.002	0.197	N
Aldrin	309-00-2	ug/L	4	4	0.0079	0.0079	0.00394	**Y**
alpha-BHC	319-84-6	ug/L	4	4	0.0019	0.0019	0.0106	N
alpha-Chlordane [3]	5103-71-9	ug/L	2	4	0.0021	0.0021	0.191	N
beta-BHC	319-85-7	ug/L	4	4	0.0032	0.0032	0.0372	N
delta-BHC [4]	319-86-8	ug/L	4	4	0.0023	0.0023	0.0106	N
Dieldrin	60-57-1	ug/L	4	4	0.002	0.002	0.00419	N
Endosulfan I	959-98-8	ug/L	4	4	0.0023	0.0023	21.9	N
Endosulfan II [5]	33213-65-9	ug/L	4	4	0.0018	0.0018	21.9	N
Endosulfan Sulfate [5]	1031-07-8	ug/L	4	4	0.0033	0.0033	21.9	N
Endrin	72-20-8	ug/L	4	4	0.002	0.002	1.095	N
Endrin Aldehyde [6]	7421-93-4	ug/L	4	4	0.0029	0.0029	1.095	N
Endrin Ketone [6]	53494-70-5	ug/L	4	4	0.0033	0.0033	1.095	N
gamma-BHC (Lindane)	58-89-9	ug/L	4	4	0.0018	0.0018	0.0515	N
gamma-Chlordane [3]	5103-74-2	ug/L	2	4	0.0021	0.0021	0.191	N
Heptachlor	76-44-8	ug/L	4	4	0.003	0.003	0.0149	N
Heptachlor Epoxide	1024-57-3	ug/L	4	4	0.0021	0.0021	0.00736	N
Methoxychlor	72-43-5	ug/L	4	4	0.0052	0.0052	18.25	N
Toxaphene	8001-35-2	ug/L	4	4	0.1	0.1	0.0609	**Y**
Aroclor 1016 [7]	12674-11-2	ug/L	4	4	0.05	0.05	0.255	N
Aroclor 1221	11104-28-2	ug/L	4	4	0.068	0.068	0.0335	**Y**
Aroclor 1232	11141-16-5	ug/L	4	4	0.031	0.031	0.0335	N
Aroclor 1242	53469-21-9	ug/L	4	4	0.035	0.035	0.0335	**Y**
Aroclor 1248	12672-29-6	ug/L	4	4	0.04	0.04	0.0335	**Y**
Aroclor 1254	11097-69-1	ug/L	4	4	0.034	0.034	0.0335	**Y**
Aroclor 1260	11096-82-5	ug/L	4	4	0.034	0.034	0.0335	**Y**
Aroclor 1262	37324-23-5	ug/L	4	4	0.022	0.022	--	NS
Aroclor 1268	11100-14-4	ug/L	4	4	0.049	0.049	--	NS
TCL VOCs								
1,1,1-Trichloroethane	71-55-6	ug/L	4	4	0.11	0.11	913.3	N
1,1,2,2-Tetrachloroethane	79-34-5	ug/L	4	4	0.1	0.1	0.0527	**Y**
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/L	4	4	0.14	0.14	5938	N
1,1,2-Trichloroethane	79-00-5	ug/L	4	4	0.21	0.21	0.188	**Y**
1,1-Dichloroethane	75-34-3	ug/L	4	4	0.076	0.076	89.65	N
1,1-Dichloroethene	75-35-4	ug/L	4	4	0.14	0.14	35.32	N
1,2,3-Trichlorobenzene	87-61-6	ug/L	4	4	0.13	0.13	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/L	4	4	0.16	0.16	6.083	N
1,2-Dibromo-3-chloropropane	96-12-8	ug/L	4	4	0.29	0.29	0.0002	**Y**
1,2-Dibromoethane	106-93-4	ug/L	4	4	0.22	0.22	0.00527	**Y**
1,2-Dichlorobenzene	95-50-1	ug/L	4	4	0.065	0.065	26.82	N
1,2-Dichloroethane	107-06-2	ug/L	4	4	0.15	0.15	0.116	**Y**
1,2-Dichloropropane	78-87-5	ug/L	4	4	0.1	0.1	0.257	N
1,3-Dichlorobenzene	541-73-1	ug/L	4	4	0.12	0.12	1.825	N
1,4-Dichlorobenzene	106-46-7	ug/L	4	4	0.13	0.13	0.281	N
2-Butanone (MEK)	78-93-3	ug/L	4	4	0.33	0.33	696.8	N
2-Hexanone	591-78-6	ug/L	4	4	0.42	0.42	--	NS
4-Methyl-2-pentanone (MIBK)	108-10-1	ug/L	4	4	0.38	0.38	627.8	N
Acetone	67-64-1	ug/L	4	4	1.2	1.2	547.5	N

Table E.1-2.5
SWMU 35 Groundwater Non-detects Screening
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adj. Tap Water RBC	Maximum MDL Exceeds SL
Benzene	71-43-2	ug/L	4	4	0.12	0.12	0.336	N
Bromochloromethane	74-97-5	ug/L	4	4	0.2	0.2	--	NS
Bromodichloromethane	75-27-4	ug/L	4	4	0.19	0.19	0.17	**Y**
Bromoform	75-25-2	ug/L	4	4	0.23	0.23	8.478	N
Bromomethane	74-83-9	ug/L	4	4	0.19	0.19	0.852	N
Carbon Disulfide	75-15-0	ug/L	4	4	0.28	0.28	104.3	N
Carbon Tetrachloride	56-23-5	ug/L	4	4	0.15	0.15	0.162	N
Chlorobenzene	108-90-7	ug/L	4	4	0.12	0.12	8.965	N
Chloroethane	75-00-3	ug/L	4	4	0.2	0.2	3.638	N
Chloroform	67-66-3	ug/L	2	4	0.061	0.061	0.155	N
Chloromethane	74-87-3	ug/L	4	4	0.06	0.06	18.98	N
cis-1,2-Dichloroethene	156-59-2	ug/L	4	4	0.17	0.17	6.083	N
cis-1,3-Dichloropropene	10061-01-5	ug/L	4	4	0.14	0.14	0.436	N
Cyclohexane	110-82-7	ug/L	4	4	0.14	0.14	1,241	N
Dibromochloromethane	124-48-1	ug/L	4	4	0.14	0.14	0.126	**Y**
Dichlorodifluoromethane	75-71-8	ug/L	4	4	0.17	0.17	34.76	N
Ethylbenzene	100-41-4	ug/L	4	4	0.13	0.13	134	N
Isopropylbenzene	98-82-8	ug/L	4	4	0.12	0.12	65.82	N
Methyl Acetate	79-20-9	ug/L	4	4	0.16	0.16	608.3	N
Methyl tert-Butyl Ether	1634-04-4	ug/L	4	4	0.096	0.096	2.637	N
Methylcyclohexane	108-87-2	ug/L	4	4	0.15	0.15	627.8	N
Methylene Chloride	75-09-2	ug/L	4	4	0.051	0.051	4.102	N
Styrene	100-42-5	ug/L	4	4	0.11	0.11	162.3	N
Tetrachloroethene	127-18-4	ug/L	4	4	0.15	0.15	0.104	**Y**
trans-1,2-Dichloroethene	156-60-5	ug/L	4	4	0.16	0.16	10.61	N
trans-1,3-Dichloropropene	10061-02-6	ug/L	4	4	0.16	0.16	0.436	N
Trichloroethene	79-01-6	ug/L	4	4	0.17	0.17	0.0264	**Y**
Trichlorofluoromethane	75-69-4	ug/L	4	4	0.18	0.18	128.8	N
Toluene	108-88-3	ug/L	1	4	0.072	0.072	227.1	N
Vinyl Chloride	75-01-4	ug/L	4	4	0.17	0.17	0.015	**Y**
Xylenes	1330-20-7	ug/L	4	4	0.36	0.36	21.26	N
TCL SVOCs								
1,1'-Biphenyl	92-52-4	ug/L	4	4	0.015	0.015	30.42	N
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/L	4	4	0.024	0.024	1.095	N
2,3,4,6-Tetrachlorophenol	58-90-2	ug/L	4	4	0.16	0.16	109.5	N
2,4,5-Trichlorophenol	95-95-4	ug/L	4	4	0.11	0.11	365	N
2,4,6-Trichlorophenol[8]	88-06-2	ug/L	4	4	0.027	0.027	3.6	N
2,4-Dichlorophenol	120-83-2	ug/L	4	4	0.015	0.015	10.95	N
2,4-Dimethylphenol	105-67-9	ug/L	4	4	0.33	0.33	73	N
2,4-Dinitrophenol	51-28-5	ug/L	4	4	1.5	1.5	7.3	N
2,4-Dinitrotoluene	121-14-2	ug/L	4	4	0.21	0.21	7.3	N
2,6-Dinitrotoluene	606-20-2	ug/L	4	4	0.05	0.05	3.65	N
2-Chloronaphthalene	91-58-7	ug/L	4	4	0.012	0.012	48.67	N
2-Chlorophenol	95-57-8	ug/L	4	4	0.016	0.016	3.042	N
2-Methylnaphthalene	91-57-6	ug/L	4	4	0.015	0.015	2.433	N
2-Methylphenol	95-48-7	ug/L	4	4	0.14	0.14	182.5	N
2-Nitroaniline	88-74-4	ug/L	4	4	0.12	0.12	--	NS
2-Nitrophenol	88-75-5	ug/L	4	4	0.026	0.026	--	NS
3,3'-Dichlorobenzidine	91-94-1	ug/L	4	4	0.21	0.21	0.149	**Y**
3-Nitroaniline	99-09-2	ug/L	4	4	0.13	0.13	--	NS
4,6-Dinitro-2-methylphenol	534-52-1	ug/L	4	4	0.12	0.12	--	NS
4-Bromophenyl Phenyl Ether	101-55-3	ug/L	4	4	0.026	0.026	--	NS
4-Chloro-3-methylphenol[9]	59-50-7	ug/L	4	4	0.021	0.021	182.5	N
4-Chloroaniline	106-47-8	ug/L	4	4	0.021	0.021	14.6	N
4-Chlorophenyl Phenyl Ether	7005-72-3	ug/L	4	4	0.016	0.016	--	NS
4-Methylphenol	106-44-5	ug/L	4	4	0.16	0.16	18.25	N
4-Nitroaniline	100-01-6	ug/L	4	4	0.14	0.14	--	NS
4-Nitrophenol	100-02-7	ug/L	4	4	1.3	1.3	--	NS
Acenaphthene	83-32-9	ug/L	4	4	0.013	0.013	36.5	N
Acenaphthylene[10]	208-96-8	ug/L	4	4	0.012	0.012	18.25	N
Acetophenone	98-86-2	ug/L	4	4	0.043	0.043	60.83	N
Anthracene	120-12-7	ug/L	3	4	0.014	0.014	182.5	N
Atrazine	1912-24-9	ug/L	4	4	0.026	0.026	0.304	N
Benzaldehyde	100-52-7	ug/L	4	4	0.051	0.051	365	N
Benzo(a)anthracene	56-55-3	ug/L	4	4	0.037	0.037	0.03	**Y**
Benzo(a)pyrene	50-32-8	ug/L	4	4	0.023	0.023	0.003	**Y**
Benzo(b)fluoranthene	205-99-2	ug/L	4	4	0.04	0.04	0.03	**Y**
Benzo(g,h,i)perylene[10]	191-24-2	ug/L	4	4	0.022	0.022	18.25	N
Benzo(k)fluoranthene	207-08-9	ug/L	4	4	0.036	0.036	0.3	N
Bis(2-chloroethoxy)methane	111-91-1	ug/L	4	4	0.016	0.016	--	NS
Bis(2-chloroethyl) Ether	111-44-4	ug/L	4	4	0.016	0.016	0.00959	**Y**
Bis(2-chloroisopropyl) Ether	108-60-1	ug/L	4	4	0.047	0.047	0.26	N
Caprolactam	105-60-2	ug/L	4	4	0.14	0.14	1,825	N
Carbazole	86-74-8	ug/L	4	4	0.018	0.018	3.349	N
Chrysene	218-01-9	ug/L	4	4	0.02	0.02	3	N
Dibenz(a,h)anthracene	53-70-3	ug/L	4	4	0.026	0.026	0.003	**Y**

Table E.1-2.5
SWMU 35 Groundwater Non-detects Screening
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adj. Tap Water RBC	Maximum MDL Exceeds SL
Dibenzofuran	132-64-9	ug/L	4	4	0.016	0.016	3.65	N
Diethylphthalate	84-66-2	ug/L	4	4	0.034	0.034	2,920	N
Dimethylphthalate	131-11-3	ug/L	4	4	0.016	0.016	--	NS
Di-n-butylphthalate	4-74-2	ug/L	3	4	0.38	0.38	--	NS
Di-n-octylphthalate	117-84-0	ug/L	4	4	0.34	0.34	--	NS
Fluoranthene	206-44-0	ug/L	3	4	0.016	0.016	146	N
Fluorene	86-73-7	ug/L	4	4	0.011	0.011	24.33	N
Hexachlorobenzene	118-74-1	ug/L	4	4	0.019	0.019	0.0419	N
Hexachlorobutadiene	87-68-3	ug/L	4	4	0.018	0.018	0.859	N
Hexachlorocyclopentadiene	77-47-4	ug/L	4	4	0.13	0.13	21.9	N
Hexachloroethane	67-72-1	ug/L	4	4	0.038	0.038	3.65	N
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	4	4	0.014	0.014	0.03	N
N-Nitrosodi-n-propylamine	621-64-7	ug/L	4	4	0.03	0.03	0.00957	**Y**
N-Nitroso-diphenylamine	86-30-6	ug/L	4	4	0.019	0.019	13.67	N
Naphthalene	91-20-3	ug/L	4	4	0.023	0.023	0.651	N
Nitrobenzene	98-95-3	ug/L	4	4	0.026	0.026	0.353	N
Pentachlorophenol	87-86-5	ug/L	4	4	0.19	0.19	0.558	N
Phenanthrene[10]	85-01-8	ug/L	2	4	0.015	0.015	18.25	N
Phenol	108-95-2	ug/L	4	4	0.028	0.028	1,095	N
Pyrene	129-00-0	ug/L	4	4	0.047	0.047	18.25	N
Explosives								
1,3,5-Trinitrobenzene	99-35-4	ug/L	4	4	0.045	0.045	109.5	N
1,3-Dinitrobenzene	99-65-0	ug/L	4	4	0.071	0.071	0.365	N
2,4,6-Trinitrotoluene[11]	118-96-7	ug/L	4	4	0.1	0.1	1.83	N
2,4-Dinitrotoluene	121-14-2	ug/L	4	4	0.092	0.092	7.3	N
2,6-Dinitrotoluene	606-20-2	ug/L	4	4	0.16	0.16	3.65	N
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	4	4	0.24	0.24	7.3	N
2-Nitrotoluene	88-72-2	ug/L	4	4	0.28	0.28	6.083	N
3-Nitrotoluene	99-08-1	ug/L	4	4	0.17	0.17	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	ug/L	4	4	0.22	0.22	7.3	N
4-Nitrotoluene	99-99-0	ug/L	4	4	0.49	0.49	4.186	N
Nitrobenzene	98-95-3	ug/L	4	4	0.15	0.15	0.353	N
RDX	121-82-4	ug/L	4	4	0.092	0.092	0.609	N
Tetryl	479-45-8	ug/L	4	4	0.15	0.15	14.6	N
Nitroglycerin/PETN								
Nitroglycerin	55-63-0	ug/L	4	4	0.58	0.58	0.365	**Y**
PETN	78-11-5	ug/L	4	4	0.61	0.61	--	NS

Notes:

CAS = Chemical Abstracts Service
ug/L = Microgram per liter
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PETN = Pentaerythritol Tetranitrate
MDL = Method Detection Limit
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

[1] = Lead Action Level used for screening
[2] = Tap Water RBC for methylmercury used for screening
[3] = Alpha-BHC RBC value was used
[4] = Chlordane RBC value was used
[5] = Endosulfan RBC value was used
[6] = Endrin RBC value was used
[7] = Noncarcinogenic Tap Water RBC value for Aroclor 1016 used for screening
[8] = Noncarcinogenic Tap Water RBC value for 2,4,6-Trichlorophenol used for screening
[9] = 3-Methylphenol RBC value used for screening
[10] = Pyrene RBC value used for screening
[11] = Noncarcinogenic Tap Water RBC values for 2,4,6-Trinitrotoluene used for screening

Table E.1-3.1
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Exposure to Contaminants in SWMU 35 Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Soil	Aluminum	mg/kg	21,500	23,028	25,000	23,028	mg/kg	95% Student's t UCL	ProUCL 4.0
	Arsenic	mg/kg	5.03	6.908	10	6.908	mg/kg	95% Student's t UCL	ProUCL 4.0
	Chromium	mg/kg	81.4	130	160	130	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Cobalt	mg/kg	8.96	10.11	11.5	10.11	mg/kg	95% Student's t UCL	ProUCL 4.0
	Iron	mg/kg	25,700	27,594	31,000	27,594	mg/kg	95% Student's t UCL	ProUCL 4.0
	Lead	mg/kg	233.6	445.5	750	445.5	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Manganese	mg/kg	513.5	594.2	675	594	mg/kg	95% Student's t UCL	ProUCL 4.0
	Vanadium	mg/kg	34.55	38.69	43.5	38.69	mg/kg	95% Student's t UCL	ProUCL 4.0
	Aroclor 1254	mg/kg	0.450	0.839	1.7	0.839	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Nitroglycerin*	mg/kg	--	--	11	11	mg/kg	Maximum Detected Concentration	--

Notes:
FOD = frequency of detection
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
* Due to the low frequency of detection, a mean and UCL were not calculated.

Table E.1-3.2
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Exposure to Contaminants in SWMU 35 Total Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Medium: Total Soil
Exposure Medium: Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Total Soil	Aluminum	mg/kg	18,455	19,840	25,000	19,840	mg/kg	95% Student's t UCL	ProUCL 4.0
	Arsenic	mg/kg	3.176	4.318	10	4.318	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Chromium	mg/kg	53.36	95.56	160	95.56	mg/kg	95% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Cobalt	mg/kg	9.091	9.691	12	9.691	mg/kg	95% Student's t UCL	ProUCL 4.0
	Iron	mg/kg	24,227	25,518	31,000	25,518	mg/kg	95% Student's t UCL	ProUCL 4.0
	Lead	mg/kg	137.1	224.5	750	224.5	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Manganese	mg/kg	432.5	483.1	675	483.1	mg/kg	95% Student's t UCL	ProUCL 4.0
	Vanadium	mg/kg	34.7	36.78	43.5	36.78	mg/kg	95% Student's t UCL	ProUCL 4.0
	Aroclor 1254	mg/kg	0.2885	0.5778	1.7	0.5778	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.0
	Nitroglycerin*	mg/kg	--	--	11	11	mg/kg	Maximum Detected Concentration	--

Notes:
FOD = frequency of detection
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
* Due to the low frequency of detection, a mean and UCL were not calculated.

Table E.1-4.1a
Values used for Daily Intake Equations for Current/Future Scenario - Surface Soil - Exposure Medium Soil - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Maintenance Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = $\frac{CS \times IRS \times EF \times ED \times FI \times CF1}{BW \times AT}$
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 2004	
				EF	Exposure Frequency	50	days/year	(1)	
				FI	Fraction Ingested	1	(unitless)	(2)	
				IRS	Ingestion Rate of Soil	100	mg/day	USEPA, 1991	
Dermal Absorption *	Maintenance Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.1	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 2004	
				EF	Exposure Frequency	50	days/year	(1)	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	

Notes:

(1) Best professional judgement. Based on site maintenance conducted 1 day/week with 2 weeks/year vacation.

(2) Fraction ingested assumed 100%.

*See Table E.1-4.3 for chemical specific dermal absorption fractions

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

cm^2 = square centimeter

USEPA = U.S. Environmental Protection Agency

EPC = Exposure Point Concentration

Table E.1-4.1b
Values used for Daily Intake Equations for Current/Future Scenario - Surface Soil - Exposure Medium Air - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Maintenance Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	50	days/year	(1)	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.5	m^3/hr	USEPA, 1989	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(2)	

Notes:

(1) Best professional judgement. Based on site maintenance conducted 1 day/week with 2 weeks/year vacation.

(2) PEFs provided on Table E.1-4.4

Note: VOCs not identified as COPC in soil; therefore, vapor inhalation pathway not assessed.

USEPA, 1989. Risk Assessment Guidance for Superfund Volume I - Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

m^3/hour = cubic meters per hour

USEPA = U.S. Environmental Protection Agency

Table E.1-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Maintenance Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 2004	
				EF	Exposure Frequency	50	days/year	(1)	
				FI	Fraction Ingested	1	(unitless)	(2)	
				IRS	Ingestion Rate of Soil	100	mg/day	USEPA, 1991	
	Construction Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				FI	Fraction Ingested	1	(unitless)	(2)	
				IRS	Ingestion Rate of Soil	330	mg/day	USEPA, 2002	
	Commercial Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(2)	
				IRS	Ingestion Rate of Soil	50	mg/day	USEPA, 2002	
	Resident	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(2)	
				IRS	Ingestion Rate of Soil	100	mg/day	USEPA, 1991	
		Child	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(2)	
				IRS	Ingestion Rate of Soil	200	mg/day	USEPA, 1991	

Table E.1-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption *	Maintenance Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.1	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 2004	
				EF	Exposure Frequency	50	days/year	(2)	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	
	Construction Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.3	mg/(cm^2-event)	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2002	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				EV	Event Frequency	1	events/day	USEPA, 2002	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	
	Commercial Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.1	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	
	Resident	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.07	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	5,700	cm^2	USEPA, 2004	

Table E.1-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption Cont.*	Resident Cont.	Child	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.2	$mg/(cm^2\text{-event})$	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2002	
				SA	Skin Surface Area Available for Contact	2,800	cm^2	USEPA, 2004	

Notes:

(1) Best professional judgement. Based on site maintenance conducted 1 day/week with 2 weeks/year vacation.

(2) Fraction ingested assumed 100%.

*See Table E.1-4.3 for chemical specific dermal absorption fractions

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

cm^2 = square centimeter

USEPA = U.S. Environmental Protection Agency

EPC = Exposure Point Concentration

Table E.1-4.1d
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Air - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Maintenance Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	50	days/year	(1)	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.5	m^3/hr	USEPA, 1989	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(2)	
	Construction Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	2.5	m^3/hr	USEPA, 1991	
				PEF	Particulate Emission Factor	1.17E+06	m^3/kg	(2)	
	Commercial Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	25	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.0	m^3/hr	USEPA, 1989	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(2)	
	Resident	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	2	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.83	m^3/hr	(3)	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(2)	
		Child	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	6	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.5	m^3/hr	(4)	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(2)	

Table E.1-4.1d
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Air - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

(1) Best professional ju (1) Best professional judgen (1) Best profess (1) Best professional ju (1) Best pro (1) Best professional judgement. Based on s (1) Best professiona (1) Best profession (1) Best professi (1) Best professional j (1) Best professional judgement. Based on site ma
(2) PEFs provided on Table E.1-4.4
(3) The inhalation rate is calculated using a daily long term rate of 20 m^3/day (USEPA, 1991) divided by 24 hours to derive hourly inhalation rate of 0.83 m^3/hour.
(4) The inhalation rate is calculated using a daily long term rate of 12 m^3/day (USEPA, 2003) divided by 24 hours to derive hourly inhalation rate of 0.5 m^3/hour.
Note: VOCs not identified as COPC in soil; therefore, vapor inhalation pathway not assessed.

USEPA, 1989. Risk Assessment Guidance for Superfund Volume I - Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002.
USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.
USEPA, 1997. Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa through Fc.

kg/mg = Kilogram Per Millogram
mg/kg = Milligram Per Kilogram
hr/day = hour per day
m^3/hour = cubic meters per hour
USEPA = U.S. Environmental Protection Agency

Table E.1-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Commercial Worker	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	1	L/day	USEPA, 1991	
	Resident	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	2	L/day	USEPA, 1991	
		Child	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	1	L/day	USEPA, 1991	
Dermal Absorption*	Commercial Worker	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	*Organics:*
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	if $t_{event} \le t^*$, $DA_{event} = 2 \times CF1 \times CF2 \times FA \times Kp \times CW \times [(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	if $t_{event} > t^*$, $DA_{event} = CF1 \times CF2 \times FA \times Kp \times CW \times [(t_{event}/(1+B)) + 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	800	cm^2	(1)	*Inorganics:*
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	$DA_{event} = CF1 \times CF2 \times Kp \times CW \times t_{event}$
				t_{event}	Event Duration	1	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	

Table E.1-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption Continued*	Resident	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	70	kg	USEPA, 1991	*Organics:*
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	if $t_{event} \le t^*$, DA_{event} = 2 x CF1 x CF2 x FA x Kp x CW x $[(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	24	years	USEPA, 1991	if $t_{event} > t^*$, DA_{event} = CF1 x CF2 x FA x Kp x CW x $[(t_{event}/(1+B))+ 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	*Inorganics:*
				SA	Skin Surface Area Available for Contact	18,000	cm^2	USEPA, 2004	DA_{event} = CF1 x CF2 x Kp x CW x t_{event}
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	
				t_{event}	Event Duration	0.58	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	
		Child	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	*Organics:*
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	if $t_{event} \le t^*$, DA_{event} = 2 x CF1 x CF2 x FA x Kp x CW x $[(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	if $t_{event} > t^*$, DA_{event} = CF1 x CF2 x FA x Kp x CW x $[(t_{event}/(1+B))+ 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	6,600	cm^2	USEPA, 2004	*Inorganics:*
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	DA_{event} = CF1 x CF2 x Kp x CW x t_{event}
				t_{event}	Event Duration	1	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	

Table E.1-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

(1) Best Professional Judgement. Based on the mean surface area for hands for men and women.

*See Table E.1-4.6 for chemical specific parameters used to calculate absorbed dose per event

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final.

kg = Kilogram

ug/L = Microgram Per Liter

mg/kg = milligram per kilogram

cm^2 = square centimeter

cm^3 = Cubic Centimeter

L/day = liter/day

USEPA = U.S. Environmental Protection Agency

VDEQ = Virginia Department of Environmental Quality

EPC = Exposure Point Concentration

Table E.1-4.2b
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Air - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Construction Worker	Adult	Trench Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USUSEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USUSEPA, 1991	
				BW	Body Weight	70	kg	USUSEPA, 1991	
				CA	Chemical Concentration in Outdoor Air	calculated	mg/m^3	(1)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	1	years	USUSEPA, 1991	
				EF	Exposure Frequency	125	days/year	VDEQ, 2006	
				ET	Exposure Time	8	hr/day	USUSEPA, 1991	
				IR	Inhalation Rate	2.5	m^3/hr	USUSEPA, 2002	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
	Commercial Worker	Adult	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.0	m^3/hr	USEPA, 1997	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
	Resident	Adult	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	16.4	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.83	m^3/hr	(4)	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
			Vapors while showering with groundwater	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	10,950	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Shower Air	calculated	mg/m^3	(5)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	0.261	hr/day	(6)	
				IR	Inhalation Rate	0.83	m^3/hr	USEPA, 1997	
				FI	Fraction of Exposure, Air	1	unitless	(2)	

Table E.1-4.2b
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Air - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation Cont.	Resident Cont.	Child	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	18	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.5	m^3/hr	(7)	
				FI	Fraction of Exposure, Air	1	unitless	(2)	

Notes:

(1) See Table E.1-4.8 for trench air calculations.

(2) Best Professional Judgement. Based on 100% inhalation fraction.

(3) Chemical Concentration in Air for Indoor Vapors calculated using Johnson and Ettinger Model (See Table E.1-4.6).

(4) The inhalation rate is calculated using a daily long term rate of 20 m^3/day (USEPA, 1991) divided by 24 hours to derive hourly inhalation rate of 0.83 m^3/hour.

(5) Chemical Concentration in Air for Vapors while showering with groundwater calculated using Foster and Chrostowski Inhalation Model (See Table E.1-4.7).

(6) ET calculated using ET=(Ds+((exp(-Ra*t))/Ra - ((exp(Ra(Ds-t))/Ra)))*1hr/60min

Ds (shower time) =	30	min
t (total time in shower room) =	60	min
Ra (air exchange rate) =	0.01667	per min
ET=	0.261	hour/day

(7) The inhalation rate is calculated using a daily long term rate of 12 m^3/day (USEPA, 2003) divided by 24 hours to derive hourly inhalation rate of 0.5 m^3/hour.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 1997. Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.

USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

VDEQ, 2006. Voluntary Remediation Program Risk Assessment Guidance. www.deq.virginia.gov/vrprisk/raguide.html.

kg = Kilogram
ug/L = Microgram Per Liter
mg/kg = milligram per kilogram
cm^3 = Cubic Centimeter
L/day = liter/day
USEPA = U.S. Environmental Protection Agency
VDEQ = Virginia Department of Environmental Quality

Table E.1-4.3.RME
Dermal Absorption Fractions and Volatilization Factors for Soil - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	ABSd * (m^3/kg)	$VF_{C/I\ Worker}$/ $VF_{Maint.\ Worker}$ (m^3/kg)	$VF_{Const.\ Worker}$ (m^3/kg)	$VF_{Adult\ Resident}$ (m^3/kg)	$VF_{Child\ Resident}$ (m^3/kg)
Aluminum	7429-90-5	1.00E-02	--	--	--	--
Arsenic	7440-38-2	3.00E-02	--	--	--	--
Chromium	7440-47-3	1.00E-02	--	--	--	--
Cobalt	7440-48-4	1.00E-02	--	--	--	--
Iron	7439-89-6	1.00E-02	--	--	--	--
Manganese	7439-96-5	1.00E-02	--	--	--	--
Vanadium	7440-62-2	1.00E-02	--	--	--	--
Aroclor 1254	11097-69-1	1.40E-01	--	--	--	--
Nitroglycerin	55-63-0	1.00E-02	--	--	--	--

Notes:
CAS = Chemical Abstract Service
ABS_d = Dermal Absorption Fraction
VF = Volatilization Factor
D_a = Apparent Diffusivity
m^3/kg = cubic meters per kilogram
cm2/s = centimeter squared per second

*ABS_d values are taken from Exhibit 3-4, Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation and Manual, Part E; Supplemental Guidance for Dermal Risk Assessment, July 2004, and Region III Technical Guidance, Assessing Dermal Exposure in Soil, December 1995.

Volatiles were not identified as COPCs in soil; therefore, VFs not calculated

Table E.1-4.4.RME
PEF Calculations - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Commercial/Industrial Worker

Equation 4-5 from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA, 2002.

$$PEF = Q / C_{wind} \cdot \frac{3{,}600 s/h}{0.036 \cdot (1-V) \cdot (U_m / U_t)\text{^}3 \cdot F(x)}$$

Parameter	Value	
PEF	9.27E+08	
Q/C_{wind}	63.94	calculated below
V	0.5	default
U_m	4.69	default
U_t	11.32	default
F(x)	0.194	default

PEF = particulate emission factor (m^3/kg)
s/h = seconds per hour
Q/Cwind = Inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source (g/m^3-s per kg/m^3)
V = fraction of vegatative cover (unitless)
U_m = mean annual windspeed (m/s)
U_t = equivalent threshold value of windspeed at 7m (m/s)
F(x) = function dependent on U_m/U_t derived using Cowherd et al. (1985)
Site Area = 0.3 acres

Q/C_{wind} calculated in accordance with Exhibit D-2 from USEPA, 2002 using A, B, and C values for Huntington, WV:
$Q/C_{wind} = A*e\text{^}((\ln A_{site} - B)^2/C))$

Q/C_{wind}=	63.94	
A =	9.9253	unitless
B =	18.6636	unitless
C =	211.8862	unitless
A_{site}=	0.3	acres

Table E.1-4.4.RME
PEF Calculations - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Construction Worker

Equation 5-5 from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA, 2002.

$$PEF_{sc} = Q / C_{sr} \cdot \frac{1}{F_D} \cdot \left[\frac{T \cdot A_R}{556 \cdot (W/3)^{0.4} \cdot \frac{(365\ d/yr - p)}{365\ d/yr} \cdot \sum VKT} \right]$$

Parameter	Value	
PEF_{sc}	1.61E+06	
Q/C_{sr}	25.32	calculated
F_D	0.185	default
T (sec)	7,488,000	assumed-see below
A_R (m^2)	212	calculated
W (tons)	8	assumed-see below
p (days/yr)	140	determined-see below
sumVKT (km)	267	assumed-see below

PEF_{sr} = subchronic road particulate emission factor (m^3/kg)
Q/C_{sr} = Inverse of the ratio of the 1-h geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/m2-s per kg/m3)
F_D = dispersion correction factor (unitless)
T = total time over which construction occurs-total time period assumed to be 6 months (52wks x 5days per week x 8 hours per day x 3,600 s per hour)
A_R = surface area of contaminated road segment (m^2)
L_R = length of road segment (assumed to equal to (0.3 acres*43,560 ft^2/acre)$^{1/2}$)
W_R = width of road segment (assumed to be 20 ft)
$A_R = L_R \times W_R \times 0.092903 m^2/ft^2$

A_R= 212 m^2

W = mean vehicle weight assumed to be 8 tons ([(20 cars * 2 tons/car)+(10 trucks*20 tons/truck)]/30 vehicles)
p = number of days with at least 0.01 inches of precipitation (from Exhibit 5-2 140 days/year)
sumVKT = sum of fleet vehicle kilometers traveled during the exposure duration (km)
(30 of vehicles x 0.034 km/day x 52wks x 5 days/wk)

Q/C_{sr} calculated in accordance with Equation 5-6:
using A, B, and C default values:
$Q/C_{sr} = A*e^{((\ln A_s - B)^2/C)}$

Q/C_{sr}=	25.32	g/m^2-s per kg/m^3
A =	12.9351	unitless
B =	5.7383	unitless
C =	71.7711	unitless
A_s =	0.3	acres

Table E.1-4.5
Parameter Values Used for Groundwater - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	FA	Kp (cm/hr)	tau $_{event}$ (hr)	B	t* (hr)
Cobalt	7440-48-4	--	4.0E-04	--	--	--
Manganese	7439-96-5	--	1.0E-03	--	--	--
Chloroform	67-66-3	1.0	6.8E-03	5.0E-01	2.9E-02	1.2E+00

Notes:

Organic parameter values are taken from Organic values from Organic Chemicals in Water Spreadsheet (http://www.epa.gov/oswer/riskassessment/ragse/index.htm)

Inorganic parameters were taken from Exhibit 3-1, Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual, Part E; Supplemental Guidance for Dermal Risk Assessment. July 2004.

TABLE E.1-4.6
Groundwater Inhalation Indoor Air Concentration Summary - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	C_a mg/m^3
Chloroform	67-66-3	3.60E-01	1.50E-06

Notes:

Indoor Air Concentrations Modeled Using Johnson and Ettinger Model.

Non-default Model Inputs: Depth below grade to bottom of enclosed floor space (15 cm)
Depth below grade to water table (609 cm)
Soil Type (SC)

TABLE E.1-4.7
Groundwater Inhalation Shower Stall Air Concentration Calculations - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	MW g/mole	H atm-m^3/mole	k_l cm/hour	k_g cm/hour	K_L cm/hour	K_{aL} cm/hour	C_{wd} ug/L	S ug/m^3-min	C_a mg/m^3
Chloroform	67-66-3	3.60E-01	119.4	3.7E-03	12.14	1164.91	1.14E+01	1.52E+01	1.43E-01	4.77E-01	2.86E-02

Equations:

k_l (liquid-film transfer coefficient) = $20*(44/MW)^{0.5}$

k_g (gas-film transfer coefficient) = $3000*(18/MW)^{0.5}$

K_L (overall mass transfer coefficient) = $(1/k_l+(R*t/H*k_g))^{-1}$

K_{aL} (overall mass transfer coefficient adjusted to shower water temperature) = $K_L*((T*u_s/T_s*u_l)^{-0.5}$

C_{wd} (VOC concentration leaving shower droplet) = $C_w*(1-\exp(-K_{aL}*t_s/60*d)$

S (VOC generation rate) = C_{wd}*FR/SV

C_a (VOC concentration in shower air) =$(S/R_a)*(1mg/1000ug)$

Constants:

R (gas constant)	8.20E-05	atm-m^3/mole-K
T (room temperature)	298	K
T_s (water temp)	318	K
u_s (water viscosity at T_s)	0.596	centapoise
u_l (water viscosity at T)	1.002	centapoise
t_s (shower droplet drop time)	2	sec
d (droplet diameter)	1	mm
FR (shower flow rate)	20	L/min
SV (shower room air volume)	6	m^3
R_a (air exchange rate)	0.01667	permin

TABLE E.1-4.8
Groundwater Inhalation Construction Worker Trench Gas Concentration Calculations - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	H_i atm-m^3/mole	D_{air} cm^2/sec	VF L/m^3	C_a mg/m^3
Chloroform	67-66-3	3.60E-01	3.67E-03	1.04E-01	2.06E-02	7.41E-06

Notes:

Exposure-point Concentrations calculated using VDEQ VRP Model for construction/utility workers in a trench: deep Goundwater greater than 15 feet

Equations:

$VF = (H_i * D_{air} * AC_{vad}^{3.33} * A * F * CF1 * CF2 * CF3)/(R * T * L_d * ACH * V * Por_{vad}^2)$

$C_a = C_W * VF * CF4$

Constants:

H_i (Henry's Law Constant)	chem spec	atm-m^3/mol
D_{air} (diffusion coefficient in air)	chem spec	cm^2/s
AC_{vad} (volumetric air content in vadose zone soil)	0.25	cm^3/cm^3
L (length of trench)	2.44	m
W (width of trench)	0.91	m
A (area of trench - L*W)	2.23	m^2
F (fraction of floor through which contaminant can enter)	1	untiless
R (gas constant)	8.2E-05	atm-m^3/mole-K
T (average system absolute temp)	298	K
L_d (dist. b/w trench bottom and groundwater)	153	cm
d (depth of trench)	4.57	m
V (volume of trench)	10.19	m^3
ACH (air changes per hour)	2	per hour
Por_{vad} (total soil porosity in vadose zone)	0.44	cm^3/cm^3
CF1	0.001	L/cm^3
CF2	10,000	cm^2/m^2
CF3	3600	sec/hour
CF4	0.001	mg/ug

Table E.1-5.1
Non-Cancer Toxicity Data - Oral/Dermal - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
			Value	Units		Value	Units			Source(s)	Date(s)
Aluminum	7429-90-5	Chronic	1.00E+00	mg/kg-day	1	1.00E+00	mg/kg-day	developmental CNS	100	PPRTV	07/26/2001
Arsenic	7440-38-2	Chronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	skin/ vascular	3	IRIS	06/17/2008
Arsenic	7440-38-2	Subchronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	skin	3	HEAST	07/31/1997
Chromium(2)	7440-47-3	Chronic	3.00E-03	mg/kg-day	0.025	7.50E-05	mg/kg-day	GI tract/fetus/bone marrow/liver	900	IRIS	06/17/2008
Chromium(2)	7440-47-3	Subchronic	2.00E-02	mg/kg-day	0.025	5.00E-04	mg/kg-day	GI tract/fetus/bone marrow/liver	100	HEAST	07/31/1997
Cobalt	7440-48-4	Chronic	2.00E-02	mg/kg-day	1	2.00E-02	mg/kg-day	blood	10	PPRTV	01/15/2002
Iron	7439-89-6	Chronic	7.00E-01	mg/kg-day	1	7.00E-01	mg/kg-day	blood/ liver/ GI tract	1	PPTRV	01/05/1999
Manganese	7439-96-5	Chronic	2.00E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	CNS	1	IRIS	06/17/2008
Vanadium	7440-62-2	Chronic	1.00E-03	mg/kg-day	0.026	2.60E-05	mg/kg-day	kidney	NA	NCEA, Region III	10/25/2005
Vanadium	7440-62-2	Subchronic	7.00E-03	mg/kg-day	0.026	1.80E-04	mg/kg-day	kidney/ blood	100	HEAST	07/31/1997
Aroclor 1254	11097-69-1	Chronic	2.00E-05	mg/kg-day	1	2.00E-05	mg/kg-day	eyes	300	IRIS	06/17/2008
Aroclor 1254	11097-69-1	Subchronic	5.00E-05	mg/kg-day	1	5.00E-05	mg/kg-day	immune system	100	HEAST	07/31/1997
Nitroglycerin	55-63-0	Chronic	1.00E-04	mg/kg-day	1	1.00E-04	mg/kg-day	vascular	NA	PPRTV, Region III	04/10/2007
Chloroform	67-66-3	Chronic	1.00E-02	mg/kg-day	1	1.00E-02	mg/kg-day	liver	100	IRIS	06/17/2008
Chloroform	67-66-3	Subchronic	1.00E-02	mg/kg-day	1	1.00E-02	mg/kg-day	liver	1000	HEAST	07/31/1997

Notes:

CAS = Chemical Abstract Service
RfD = Reference Dose
mg/(kg-d) = milligrams per kilogram day
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables

PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available
(1) Oral absorption efficiency for dermal from Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005. 2004.
(2) Chromium VI toxicity value used

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III, and HEAST.
For IRIS values, the date of the IRIS search is provided.
For HEAST values, the date of HEAST is provided.
For Region III values, the date of the Region III RBC Table is provided.
For PPRTV/NCEA, date of paper is provided.

Table E.1-5.2
Non-Cancer Toxicity Data - Inhalation - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
			Value	Units	Value	Units			Source(s)	Date(s)
Aluminum	7429-90-5	Chronic	1.00E-03	mg/m3	1.00E-03	mg/kg-day	CNS	300	PPRTV, Region III	10/11/2007
Arsenic	7440-38-2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium(1)	7440-47-3	Chronic	1.00E-04	mg/m3	2.90E-05	mg/kg-day	respiratory	300	IRIS	06/17/2008
Cobalt	7440-48-4	Chronic	2.00E-05	mg/m3	5.70E-06	mg/kg-day	respiratory	100	PPRTV	01/15/2002
Iron	7439-89-6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	7439-96-5	Chronic	5.00E-05	mg/m3	1.43E-05	mg/kg-day	CNS	1000	IRIS	06/17/2008
Vanadium	7440-62-2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitroglycerin	55-63-0	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	67-66-3	Chronic	4.90E-02	mg/m3	1.40E-02	mg/kg-day	respiratory	NA	NCEA, Region III	10/11/2007

Notes:

RfC = Reference Concentration
RfD = Reference Dose
mg/m^3 = milligrams per cubic meter
mg/(kg-d) = milligrams per kilogram day
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available

(1) Toxicity data for chromium VI particulates
Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III, VDEQ, and HEAST.
For IRIS values, the date of the IRIS search is provided.
For PPRTV values, the date of the paper is provided.
For Region III values, the date of the Region III RBC Table is provided.
RfDi (mg/kg-day) = RfC (mg/m3) x 20 m3/day x 1/70 kg

Table E.1-6.1
Cancer Toxicity Data - Oral/Dermal - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
		Value	Units		Value	Units		Source(s)	Date(s)
Aluminum	7429-90-5	NA	NA	1	NA	NA	NA	NA	NA
Antimony	7440-36-0	NA	NA	0.15	NA	NA	NA	NA	NA
Arsenic	7440-38-2	1.50E+00	1/(mg/kg-day)	1	1.50E+00	1/(mg/kg-day)	A	IRIS	06/17/2008
Cadmium	7440-43-9	NA	NA	0.025	NA	NA	NA	NA	NA
Chromium[(2)]	7440-47-3	NA	NA	0.025	NA	NA	Cannot Be Determined	NA	NA
Cobalt	7440-48-4	NA	NA	1	NA	NA	NA	NA	NA
Iron	7439-89-6	NA	NA	1	NA	NA	NA	NA	NA
Manganese	7439-96-5	NA	NA	0.04	NA	NA	D	NA	NA
Thallium	7440-28-0	NA	NA	1	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NA	NA	0.026	NA	NA	NA	NA	NA
Zinc	7440-66-6	NA	NA	1	NA	NA	D	NA	NA
Aroclor 1254	11097-69-1	2.00E+00	1/(mg/kg-day)	1	2.00E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
Nitroglycerin	55-63-0	1.70E-02	1/(mg/kg-day)	1	1.70E-02	1/(mg/kg-day)	C	PPRTV, Region III	04/10/2007
Chloroform	67-66-3	NA	NA	1	NA	NA	B2	NA	NA

Notes:

CSF = Cancer Slope Factor
mg/(kg-d) = Milligrams Per Kilogram Day
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NA = Not Available
1986 Cancer Guideline Description:
A = Human carcinogen
B1 = Probable human carcinogen - indicates that limited human data are available.
B2 = Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C = Possible human carcinogen
D = Not classifiable as a human carcinogen

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III and VDEQ.
For IRIS values, the date of the IRIS search is provided.

(1) Oral absorption efficiency for dermal from Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. . EPA/540/R/99/005. 2004
(2) Chromium VI toxicity data used.

Table E.1-6.2
Cancer Toxicity Data - Inhalation - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	CSF	
		Value	Units	Value	Units		Source(s)	Date(s)
Aluminum	7429-90-5	NA	NA	NA	NA	NA	NA	NA
Antimony	7440-36-0	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	4.30E+00	1/(mg/m3)	1.50E+01	1/(mg/kg-day)	A	IRIS	06/17/2008
Cadmium	7440-43-9	1.80E+00	1/(mg/m3)	6.30E+00	1/(mg/kg-day)	B1	IRIS	06/17/2008
Chromium(1)	7440-47-3	1.20E+01	1/(mg/m3)	4.10E+01	1/(mg/kg-day)	A	IRIS	06/17/2008
Cobalt	7440-48-4	2.80E+00	1/(mg/m3)	9.80E+00	1/(mg/kg-day)	B1	PPRTV	01/15/2002
Iron	7439-89-6	NA	NA	NA	NA	NA	NA	NA
Manganese	7439-96-5	NA	NA	NA	NA	D	NA	NA
Thallium	7440-28-0	NA	NA	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NA	NA	NA	NA	NA	NA	NA
Zinc	7440-66-6	NA	NA	NA	NA	D	NA	NA
Aroclor 1254	11097-69-1	5.71E-01	1/(mg/m3)	2.00E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
Nitroglycerin	55-63-0	NA	NA	NA	NA	NA	NA	NA
Chloroform	67-66-3	2.31E-02	1/(mg/m3)	8.10E-02	1/(mg/kg-day)	B2	IRIS	06/17/2008

Notes:

CSF = Cancer Slope Factor
mg/(kg-d) = Milligrams Per Kilogram Day
USEPA = U.S. Environmental Protection Agency
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available
(1) = Chromium VI toxicity data used
CSF = Unit Risk ($1/mg/m^3$) x 70 kg x 1 day/20 m^3

1986 Cancer Guideline Description:
A = Human carcinogen
B1 = Probable human carcinogen - indicates that limited human data are available.
B2 = Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C = Possible human carcinogen
D = Not classifiable as a human carcinogen

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III and VDEQ.
For IRIS values, the date of the IRIS search is provided.
For NCEA, Region III values, the date of the Region III RBC Table is provided.
For PPRTV values, the date of the paper is provided.

TABLE E.1-7.1.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Maintenance Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Soil	Soil	Ingestion	Aluminum	23,028	mg/kg	1.61E-03	mg/kg-day	--	--	--	4.51E-03	mg/kg-day	1.00E+00	mg/kg-day	5.E-03
				Arsenic	6.908	mg/kg	4.83E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	7.2.E-07	1.35E-06	mg/kg-day	3.00E-04	mg/kg-day	5.E-03
				Chromium	130	mg/kg	9.09E-06	mg/kg-day	--	--	--	2.54E-05	mg/kg-day	3.00E-03	mg/kg-day	8.E-03
				Cobalt	10.11	mg/kg	7.07E-07	mg/kg-day	--	--	--	1.98E-06	mg/kg-day	2.00E-02	mg/kg-day	1.E-04
				Iron	27,594	mg/kg	1.93E-03	mg/kg-day	--	--	--	5.40E-03	mg/kg-day	7.00E-01	mg/kg-day	8.E-03
				Manganese	564	mg/kg	3.94E-05	mg/kg-day	--	--	--	1.10E-04	mg/kg-day	2.00E-02	mg/kg-day	6.E-03
				Vanadium	38.69	mg/kg	2.70E-06	mg/kg-day	--	--	--	7.57E-06	mg/kg-day	1.00E-03	mg/kg-day	8.E-03
				Aroclor 1254	0.839	mg/kg	5.86E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.2.E-07	1.64E-07	mg/kg-day	2.00E-05	mg/kg-day	8.E-03
				Nitroglycerin	11	mg/kg	7.69E-07	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	1.3.E-08	2.15E-06	mg/kg-day	1.00E-04	mg/kg-day	2.E-02
			Exp. Route Total								9.E-07					7.E-02
			Dermal Absorption	Aluminum	23,028	mg/kg	5.31E-05	mg/kg-day	--	--	--	1.49E-04	mg/kg-day	1.00E+00	mg/kg-day	1.E-04
				Arsenic	6.908	mg/kg	4.78E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	7.E-08	1.34E-07	mg/kg-day	3.00E-04	mg/kg-day	4.E-04
				Chromium	130	mg/kg	3.00E-07	mg/kg-day	--	--	--	8.40E-07	mg/kg-day	7.50E-05	mg/kg-day	1.E-02
				Cobalt	10.11	mg/kg	2.33E-08	mg/kg-day	--	--	--	6.53E-08	mg/kg-day	2.00E-02	mg/kg-day	3.E-06
				Iron	27,594	mg/kg	6.36E-05	mg/kg-day	--	--	--	1.78E-04	mg/kg-day	7.00E-01	mg/kg-day	3.E-04
				Manganese	564	mg/kg	1.30E-06	mg/kg-day	--	--	--	3.64E-06	mg/kg-day	8.00E-04	mg/kg-day	5.E-03
				Vanadium	38.69	mg/kg	8.92E-08	mg/kg-day	--	--	--	2.50E-07	mg/kg-day	2.60E-05	mg/kg-day	1.E-02
				Aroclor 1254	0.839	mg/kg	2.71E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	5.E-08	7.59E-08	mg/kg-day	2.00E-05	mg/kg-day	4.E-03
				Nitroglycerin	11	mg/kg	2.54E-08	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	4.E-10	7.10E-08	mg/kg-day	1.00E-04	mg/kg-day	7.E-04
			Exp. Route Total								1.E-07					3.E-02
		Exposure Point Total									1.E-06					1.E-01
	Exposure Medium Total										9.8.E-07					1.E-01
	Air	Fugitive Dust	Inhalation	Aluminum	23,028	mg/kg	2.08E-07	mg/kg-day	--	--	--	5.83E-07	mg/kg-day	1.00E-03	mg/kg-day	6.E-04
				Arsenic	6.908	mg/kg	6.25E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	9.E-10	1.75E-10	mg/kg-day	--	--	--
				Chromium	130	mg/kg	1.18E-09	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	5.E-08	3.29E-09	mg/kg-day	2.90E-05	mg/kg-day	1.E-04
				Cobalt	10.11	mg/kg	9.15E-11	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	9.E-10	2.56E-10	mg/kg-day	5.70E-06	mg/kg-day	4.E-05
				Iron	27,594	mg/kg	2.50E-07	mg/kg-day	--	--	--	6.99E-07	mg/kg-day	--	--	--
				Manganese	564	mg/kg	5.10E-09	mg/kg-day	--	--	--	1.43E-08	mg/kg-day	1.43E-05	mg/kg-day	1.E-03
				Vanadium	38.69	mg/kg	3.50E-10	mg/kg-day	--	--	--	9.80E-10	mg/kg-day	--	--	--
				Aroclor 1254	0.839	mg/kg	7.59E-12	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-11	2.13E-11	mg/kg-day	--	--	--
				Nitroglycerin	11	mg/kg	9.95E-11	mg/kg-day	--	--	--	2.79E-10	mg/kg-day	--	--	--
			Exp. Route Total								5.E-08					2.E-03
		Exposure Point Total									5.E-08					2.E-03
	Exposure Medium Total										5.E-08					2.E-03
Soil Total											1.E-06					1.E-01
											Total of Receptor Risks Across All Media	1.E-06		Total of Receptor Hazards Across All Media		1.E-01

TABLE E.1-7.2.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Maintenance Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	19,840	mg/kg	1.39E-03	mg/kg-day	--	--	--	3.88E-03	mg/kg-day	1.00E+00	mg/kg-day	4.E-03
				Arsenic	4.318	mg/kg	3.02E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	4.5.E-07	8.45E-07	mg/kg-day	3.00E-04	mg/kg-day	3.E-03
				Chromium	95.56	mg/kg	6.68E-06	mg/kg-day	--	--	--	1.87E-05	mg/kg-day	3.00E-03	mg/kg-day	6.E-03
				Cobalt	9.691	mg/kg	6.77E-07	mg/kg-day	--	--	--	1.90E-06	mg/kg-day	2.00E-02	mg/kg-day	9.E-05
				Iron	25,518	mg/kg	1.78E-03	mg/kg-day	--	--	--	4.99E-03	mg/kg-day	7.00E-01	mg/kg-day	7.E-03
				Manganese	483.1	mg/kg	3.38E-05	mg/kg-day	--	--	--	9.45E-05	mg/kg-day	2.00E-02	mg/kg-day	5.E-03
				Vanadium	36.78	mg/kg	2.57E-06	mg/kg-day	--	--	--	7.20E-06	mg/kg-day	1.00E-03	mg/kg-day	7.E-03
				Aroclor 1254	0.578	mg/kg	4.04E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	8.1.E-08	1.13E-07	mg/kg-day	2.00E-05	mg/kg-day	6.E-03
				Nitroglycerin	11	mg/kg	7.69E-07	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	1.3.E-08	2.15E-06	mg/kg-day	1.00E-04	mg/kg-day	2.E-02
			Exp. Route Total								5.E-07					6.E-02
			Dermal Absorption	Aluminum	19,840	mg/kg	4.58E-05	mg/kg-day	--	--	--	1.28E-04	mg/kg-day	1.00E+00	mg/kg-day	1.E-04
				Arsenic	4.318	mg/kg	2.99E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	4.E-08	8.37E-08	mg/kg-day	3.00E-04	mg/kg-day	3.E-04
				Chromium	95.56	mg/kg	2.20E-07	mg/kg-day	--	--	--	6.17E-07	mg/kg-day	7.50E-05	mg/kg-day	8.E-03
				Cobalt	9.691	mg/kg	2.24E-08	mg/kg-day	--	--	--	6.26E-08	mg/kg-day	2.00E-02	mg/kg-day	3.E-06
				Iron	25,518	mg/kg	5.89E-05	mg/kg-day	--	--	--	1.65E-04	mg/kg-day	7.00E-01	mg/kg-day	2.E-04
				Manganese	483.1	mg/kg	1.11E-06	mg/kg-day	--	--	--	3.12E-06	mg/kg-day	8.00E-04	mg/kg-day	4.E-03
				Vanadium	36.78	mg/kg	8.48E-08	mg/kg-day	--	--	--	2.38E-07	mg/kg-day	2.60E-05	mg/kg-day	9.E-03
				Aroclor 1254	0.578	mg/kg	1.87E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	4.E-08	5.23E-08	mg/kg-day	2.00E-05	mg/kg-day	3.E-03
				Nitroglycerin	11	mg/kg	2.54E-08	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	4.E-10	7.10E-08	mg/kg-day	1.00E-04	mg/kg-day	7.E-04
			Exp. Route Total								8.E-08					3.E-02
		Exposure Point Total									6.E-07					8.E-02
	Exposure Medium Total										6.3.E-07					8.E-02
	Air	Fugitive Dust	Inhalation	Aluminum	19,840	mg/kg	1.80E-07	mg/kg-day	--	--	--	5.03E-07	mg/kg-day	1.00E-03	mg/kg-day	5.E-04
				Arsenic	4.318	mg/kg	3.91E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	6.E-10	1.09E-10	mg/kg-day	--	--	--
				Chromium	95.56	mg/kg	8.65E-10	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	4.E-08	2.42E-09	mg/kg-day	2.90E-05	mg/kg-day	8.E-05
				Cobalt	9.691	mg/kg	8.77E-11	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	9.E-10	2.46E-10	mg/kg-day	5.70E-06	mg/kg-day	4.E-05
				Iron	25,518	mg/kg	2.31E-07	mg/kg-day	--	--	--	6.47E-07	mg/kg-day	--	--	--
				Manganese	483.1	mg/kg	4.37E-09	mg/kg-day	--	--	--	1.22E-08	mg/kg-day	1.43E-05	mg/kg-day	9.E-04
				Vanadium	36.78	mg/kg	3.33E-10	mg/kg-day	--	--	--	9.32E-10	mg/kg-day	--	--	--
				Aroclor 1254	0.578	mg/kg	5.23E-12	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-11	1.46E-11	mg/kg-day	--	--	--
				Nitroglycerin	11	mg/kg	9.95E-11	mg/kg-day	--	--	--	2.79E-10	mg/kg-day	--	--	--
			Exp. Route Total								4.E-08					1.E-03
		Exposure Point Total									4.E-08					1.E-03
	Exposure Medium Total										4.E-08					1.E-03
Soil Total											7.E-07					9.E-02
											Total of Receptor Risks Across All Media	7.E-07		Total of Receptor Hazards Across All Media		9.E-02

TABLE E.1-7.3.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Commercial Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	19,840	mg/kg	3.47E-03	mg/kg-day	--	--	--	9.71E-03	mg/kg-day	1.00E+00	mg/kg-day	1.E-02
				Arsenic	4.318	mg/kg	7.54E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	1.E-06	2.11E-06	mg/kg-day	3.00E-04	mg/kg-day	7.E-03
				Chromium	95.56	mg/kg	1.67E-05	mg/kg-day	--	--	--	4.68E-05	mg/kg-day	3.00E-03	mg/kg-day	2.E-02
				Cobalt	9.691	mg/kg	1.69E-06	mg/kg-day	--	--	--	4.74E-06	mg/kg-day	2.00E-02	mg/kg-day	2.E-04
				Iron	25,518	mg/kg	4.46E-03	mg/kg-day	--	--	--	1.25E-02	mg/kg-day	7.00E-01	mg/kg-day	2.E-02
				Manganese	483.1	mg/kg	8.44E-05	mg/kg-day	--	--	--	2.36E-04	mg/kg-day	2.00E-02	mg/kg-day	1.E-02
				Vanadium	36.78	mg/kg	6.43E-06	mg/kg-day	--	--	--	1.80E-05	mg/kg-day	1.00E-03	mg/kg-day	2.E-02
				Aroclor 1254	0.578	mg/kg	1.01E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-07	2.83E-07	mg/kg-day	2.00E-05	mg/kg-day	1.E-02
				Nitroglycerin	11	mg/kg	1.92E-06	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	3.E-08	5.38E-06	mg/kg-day	1.00E-04	mg/kg-day	5.E-02
			Exp. Route Total								1.4.E-06					1.E-01
			Dermal Absorption	Aluminum	19,840	mg/kg	2.29E-04	mg/kg-day	--	--	--	6.41E-04	mg/kg-day	1.00E+00	mg/kg-day	6.E-04
				Arsenic	4.318	mg/kg	1.49E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.E-07	4.18E-07	mg/kg-day	3.00E-04	mg/kg-day	1.E-03
				Chromium	95.56	mg/kg	1.10E-06	mg/kg-day	--	--	--	3.09E-06	mg/kg-day	7.50E-05	mg/kg-day	4.E-02
				Cobalt	9.691	mg/kg	1.12E-07	mg/kg-day	--	--	--	3.13E-07	mg/kg-day	2.00E-02	mg/kg-day	2.E-05
				Iron	25,518	mg/kg	2.94E-04	mg/kg-day	--	--	--	8.24E-04	mg/kg-day	7.00E-01	mg/kg-day	1.E-03
				Manganese	483.1	mg/kg	5.57E-06	mg/kg-day	--	--	--	1.56E-05	mg/kg-day	8.00E-04	mg/kg-day	2.E-02
				Vanadium	36.78	mg/kg	4.24E-07	mg/kg-day	--	--	--	1.19E-06	mg/kg-day	2.60E-05	mg/kg-day	5.E-02
				Aroclor 1254	0.578	mg/kg	9.33E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-07	2.61E-07	mg/kg-day	2.00E-05	mg/kg-day	1.E-02
				Nitroglycerin	11	mg/kg	1.27E-07	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	2.E-09	3.55E-07	mg/kg-day	1.00E-04	mg/kg-day	4.E-03
			Exp. Route Total								4.E-07					1.E-01
		Exposure Point Total									2.E-06					3.E-01
	Exposure Medium Total										2.E-06					3.E-01

TABLE E.1-7.3.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Commercial Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Fugitive Dust	Inhalation	Aluminum	19,840	mg/kg	5.98E-07	mg/kg-day	--	--	--	1.68E-06	mg/kg-day	1.00E-03	mg/kg-day	2.E-03
				Arsenic	4.318	mg/kg	1.30E-10	mg/kg-day	1.50E+01	mg/kg-day^{-1}	2.E-09	3.65E-10	mg/kg-day	--	--	--
				Chromium	95.56	mg/kg	2.88E-09	mg/kg-day	4.10E+01	mg/kg-day^{-1}	1.E-07	8.07E-09	mg/kg-day	2.90E-05	mg/kg-day	3.E-04
				Cobalt	9.691	mg/kg	2.92E-10	mg/kg-day	9.80E+00	mg/kg-day^{-1}	3.E-09	8.18E-10	mg/kg-day	5.70E-06	mg/kg-day	1.E-04
				Iron	25,518	mg/kg	7.70E-07	mg/kg-day	--	--	--	2.16E-06	mg/kg-day	--	--	--
				Manganese	483.1	mg/kg	1.46E-08	mg/kg-day	--	--	--	4.08E-08	mg/kg-day	1.43E-05	mg/kg-day	3.E-03
				Vanadium	36.78	mg/kg	1.11E-09	mg/kg-day	--	--	--	3.11E-09	mg/kg-day	--	--	--
				Aroclor 1254	0.578	mg/kg	1.74E-11	mg/kg-day	2.00E+00	mg/kg-day^{-1}	3.E-11	4.88E-11	mg/kg-day	--	--	--
				Nitroglycerin	11	mg/kg	3.32E-10	mg/kg-day	--	--	--	9.29E-10	mg/kg-day	--	--	--
			Exp. Route Total								1.E-07					5.E-03
		Exposure Point Total									1.E-07					5.E-03
	Exposure Medium Total										1.E-07					5.E-03
Soil Total											2.E-06					3.E-01
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	1.4	ug/L	4.89E-06	mg/kg-day	--	--	--	1.37E-05	mg/kg-day	2.00E-02	mg/kg-day	7.E-04
				Manganese	91	ug/L	3.18E-04	mg/kg-day	--	--	--	8.90E-04	mg/kg-day	2.00E-02	mg/kg-day	4.E-02
				Chloroform	0.36	ug/L	1.26E-06	mg/kg-day	--	--	--	3.52E-06	mg/kg-day	1.00E-02	mg/kg-day	4.E-04
			Exp. Route Total								--					5.E-02
			Dermal Absorption	Cobalt	1.4	ug/L	1.57E-09	mg/kg-day	--	--	--	4.38E-09	mg/kg-day	2.00E-02	mg/kg-day	2.E-07
				Manganese	91	ug/L	2.54E-07	mg/kg-day	--	--	--	7.12E-07	mg/kg-day	8.00E-04	mg/kg-day	9.E-04
				Chloroform	0.36	ug/L	1.92E-09	mg/kg-day	--	--	--	5.37E-09	mg/kg-day	1.00E-02	mg/kg-day	5.E-07
			Exp. Route Total								--					9.E-04
		Exposure Point Total									--					5.E-02
	Exposure Medium Total										--					5.E-02
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.50E-06	mg/m^3	4.19E-08	mg/kg-day	8.10E-02	mg/kg-day^{-1}	3.E-09	1.17E-07	mg/kg-day	1.40E-02	mg/kg-day	8.E-06
			Exp. Route Total								3.E-09					8.E-06
		Exposure Point Total									3.E-09					8.E-06
	Exposure Medium Total										3.E-09					8.E-06
Groundwater Total											3.E-09					5.E-02
											Total of Receptor Risks Across All Media					
											2.E-06	Total of Receptor Hazards Across All Media				3.E-01

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.1-4.6)

TABLE E.1-7.4.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Construction Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	19,840	mg/kg	9.15E-04	mg/kg-day	--	--	--	6.41E-02	mg/kg-day	1.00E+00	mg/kg-day	6.E-02
				Arsenic	4.318	mg/kg	1.99E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	3.E-07	1.39E-05	mg/kg-day	3.00E-04	mg/kg-day	5.E-02
				Chromium	95.56	mg/kg	4.41E-06	mg/kg-day	--	--	--	3.09E-04	mg/kg-day	2.00E-02	mg/kg-day	2.E-02
				Cobalt	9.691	mg/kg	4.47E-07	mg/kg-day	--	--	--	3.13E-05	mg/kg-day	2.00E-02	mg/kg-day	2.E-03
				Iron	25,518	mg/kg	1.18E-03	mg/kg-day	--	--	--	8.24E-02	mg/kg-day	3.00E-01	mg/kg-day	3.E-01
				Manganese	483.1	mg/kg	2.23E-05	mg/kg-day	--	--	--	1.56E-03	mg/kg-day	2.00E-02	mg/kg-day	8.E-02
				Vanadium	36.78	mg/kg	1.70E-06	mg/kg-day	--	--	--	1.19E-04	mg/kg-day	7.00E-03	mg/kg-day	2.E-02
				Aroclor 1254	0.578	mg/kg	2.67E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	5.E-08	1.87E-06	mg/kg-day	5.00E-05	mg/kg-day	4.E-02
				Nitroglycerin	11	mg/kg	5.07E-07	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	9.E-09	3.55E-05	mg/kg-day	1.00E-04	mg/kg-day	4.E-01
			Exp. Route Total								4.E-07					9.E-01
			Dermal Absorption	Aluminum	19,840	mg/kg	2.75E-05	mg/kg-day	--	--	--	1.92E-03	mg/kg-day	1.00E+00	mg/kg-day	2.E-03
				Arsenic	4.318	mg/kg	1.79E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	3.E-08	1.25E-06	mg/kg-day	3.00E-04	mg/kg-day	4.E-03
				Chromium	95.56	mg/kg	1.32E-07	mg/kg-day	--	--	--	9.26E-06	mg/kg-day	5.00E-04	mg/kg-day	2.E-02
				Cobalt	9.691	mg/kg	1.34E-08	mg/kg-day	--	--	--	9.39E-07	mg/kg-day	2.00E-02	mg/kg-day	5.E-05
				Iron	25,518	mg/kg	3.53E-05	mg/kg-day	--	--	--	2.47E-03	mg/kg-day	3.00E-01	mg/kg-day	8.E-03
				Manganese	483.1	mg/kg	6.69E-07	mg/kg-day	--	--	--	4.68E-05	mg/kg-day	8.00E-04	mg/kg-day	6.E-02
				Vanadium	36.78	mg/kg	5.09E-08	mg/kg-day	--	--	--	3.56E-06	mg/kg-day	1.80E-04	mg/kg-day	2.E-02
				Aroclor 1254	0.578	mg/kg	1.12E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-08	7.84E-07	mg/kg-day	5.00E-05	mg/kg-day	2.E-02
				Nitroglycerin	11	mg/kg	1.52E-08	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	3.E-10	1.07E-06	mg/kg-day	1.00E-04	mg/kg-day	1.E-02
			Exp. Route Total								5.E-08					1.E-01
		Exposure Point Total									4.E-07					1.E+00
	Exposure Medium Total										4.E-07					1.E+00

TABLE E.1-7.4.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Construction Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Fugitive Dust	Inhalation	Aluminum	19,840	mg/kg	3.45E-05	mg/kg-day	--	--	--	2.42E-03	mg/kg-day	1.00E-03	mg/kg-day	2.E+00
				Arsenic	4.318	mg/kg	7.51E-09	mg/kg-day	1.50E+01	$mg/kg\text{-}day^{-1}$	1.E-07	5.26E-07	mg/kg-day	--	--	--
				Chromium	95.56	mg/kg	1.66E-07	mg/kg-day	4.10E+01	$mg/kg\text{-}day^{-1}$	7.E-06	1.16E-05	mg/kg-day	2.90E-05	mg/kg-day	4.E-01
				Cobalt	9.691	mg/kg	1.69E-08	mg/kg-day	9.80E+00	$mg/kg\text{-}day^{-1}$	2.E-07	1.18E-06	mg/kg-day	5.70E-06	mg/kg-day	2.E-01
				Iron	25,518	mg/kg	4.44E-05	mg/kg-day	--	--	--	3.11E-03	mg/kg-day	--	--	--
				Manganese	483.1	mg/kg	8.41E-07	mg/kg-day	--	--	--	5.88E-05	mg/kg-day	1.43E-05	mg/kg-day	4.E+00
				Vanadium	36.78	mg/kg	6.40E-08	mg/kg-day	--	--	--	4.48E-06	mg/kg-day	--	--	--
				Aroclor 1254	0.578	mg/kg	1.01E-09	mg/kg-day	2.00E+00	$mg/kg\text{-}day^{-1}$	2.E-09	7.04E-08	mg/kg-day	--	--	--
				Nitroglycerin	11	mg/kg	1.91E-08	mg/kg-day	--	--	--	1.34E-06	mg/kg-day	--	--	--
			Exp. Route Total								7.E-06					7.1.E+00
		Exposure Point Total									7.E-06					7.1.E+00
	Exposure Medium Total										7.E-06					7.1.E+00
Soil Total											8.E-06					8.2.E+00
Groundwater	Air	Upward Migration of Vapors from Groundwater Trench Vapors (1)	Inhalation	Chloroform	7.41E-06	mg/m^3	1.04E-08	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	8.E-10	7.25E-07	mg/kg-day	5.70E-06	mg/kg-day	1.E-01
			Exp. Route Total								8.E-10					1.E-01
		Exposure Point Total									8.E-10					1.E-01
	Exposure Medium Total										8.E-10					1.E-01
Groundwater Total											8.E-10					1.E-01
										Total of Receptor Risks Across All Media	8.E-06			Total of Receptor Hazards Across All Media		8.3.E+00

(1) See Table E.1-4.8 for trench vapor calculations

TABLE E.1-7.5.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Soil	Soil	Ingestion	Aluminum	23,028	mg/kg	1.08E-02	mg/kg-day	--	--	--	3.15E-02	mg/kg-day	1.00E+00	mg/kg-day	3.E-02
				Arsenic	6.908	mg/kg	3.24E-06	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	5.E-06	9.46E-06	mg/kg-day	3.00E-04	mg/kg-day	3.E-02
				Chromium	130	mg/kg	6.11E-05	mg/kg-day	--	--	--	1.78E-04	mg/kg-day	3.00E-03	mg/kg-day	6.E-02
				Cobalt	10.11	mg/kg	4.75E-06	mg/kg-day	--	--	--	1.38E-05	mg/kg-day	2.00E-02	mg/kg-day	7.E-04
				Iron	27,594	mg/kg	1.30E-02	mg/kg-day	--	--	--	3.78E-02	mg/kg-day	7.00E-01	mg/kg-day	5.E-02
				Manganese	564	mg/kg	2.65E-04	mg/kg-day	--	--	--	7.73E-04	mg/kg-day	2.00E-02	mg/kg-day	4.E-02
				Vanadium	38.69	mg/kg	1.82E-05	mg/kg-day	--	--	--	5.30E-05	mg/kg-day	1.00E-03	mg/kg-day	5.E-02
				Aroclor 1254	0.839	mg/kg	3.94E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	8.E-07	1.15E-06	mg/kg-day	2.00E-05	mg/kg-day	6.E-02
				Nitroglycerin	11	mg/kg	5.17E-06	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	9.E-08	1.51E-05	mg/kg-day	1.00E-04	mg/kg-day	2.E-01
			Exp. Route Total								6.E-06					5.E-01
			Dermal Absorption	Aluminum	23,028	mg/kg	4.32E-04	mg/kg-day	--	--	--	1.26E-03	mg/kg-day	1.00E+00	mg/kg-day	1.E-03
				Arsenic	6.908	mg/kg	3.88E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	6.E-07	1.13E-06	mg/kg-day	3.00E-04	mg/kg-day	4.E-03
				Chromium	130	mg/kg	2.44E-06	mg/kg-day	--	--	--	7.11E-06	mg/kg-day	7.50E-05	mg/kg-day	9.E-02
				Cobalt	10.11	mg/kg	1.89E-07	mg/kg-day	--	--	--	5.53E-07	mg/kg-day	2.00E-02	mg/kg-day	3.E-05
				Iron	27,594	mg/kg	5.17E-04	mg/kg-day	--	--	--	1.51E-03	mg/kg-day	7.00E-01	mg/kg-day	2.E-03
				Manganese	564	mg/kg	1.06E-05	mg/kg-day	--	--	--	3.08E-05	mg/kg-day	8.00E-04	mg/kg-day	4.E-02
				Vanadium	38.69	mg/kg	7.25E-07	mg/kg-day	--	--	--	2.11E-06	mg/kg-day	2.60E-05	mg/kg-day	8.E-02
				Aroclor 1254	0.839	mg/kg	2.20E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	4.E-07	6.42E-07	mg/kg-day	2.00E-05	mg/kg-day	3.E-02
				Nitroglycerin	11	mg/kg	2.06E-07	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	4.E-09	6.01E-07	mg/kg-day	1.00E-04	mg/kg-day	6.E-03
			Exp. Route Total								1.E-06					3.E-01
		Exposure Point Total									7.E-06					7.E-01
	Exposure Medium Total										7.E-06					7.E-01
	Air	Fugitive Dust	Inhalation	Aluminum	23,028	mg/kg	1.94E-07	mg/kg-day	--	--	--	5.65E-07	mg/kg-day	1.00E-03	mg/kg-day	6.E-04
				Arsenic	6.908	mg/kg	5.81E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	9.E-10	1.69E-10	mg/kg-day	--	--	--
				Chromium	130	mg/kg	1.09E-09	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	4.E-08	3.19E-09	mg/kg-day	2.90E-05	mg/kg-day	1.E-04
				Cobalt	10.11	mg/kg	8.50E-11	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	8.E-10	2.48E-10	mg/kg-day	5.70E-06	mg/kg-day	4.E-05
				Iron	27,594	mg/kg	2.32E-07	mg/kg-day	--	--	--	6.77E-07	mg/kg-day	--	--	--
				Manganese	564	mg/kg	4.74E-09	mg/kg-day	--	--	--	1.38E-08	mg/kg-day	1.43E-05	mg/kg-day	1.E-03
				Vanadium	38.69	mg/kg	3.25E-10	mg/kg-day	--	--	--	9.49E-10	mg/kg-day	--	--	--
				Aroclor 1254	0.839	mg/kg	7.06E-12	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-11	2.06E-11	mg/kg-day	--	--	--
				Nitroglycerin	11	mg/kg	9.25E-11	mg/kg-day	--	--	--	2.70E-10	mg/kg-day	--	--	--
			Exp. Route Total								5.E-08					2.E-03
		Exposure Point Total									5.E-08					2.E-03
	Exposure Medium Total										5.E-08					2.E-03
Soil Total											7.E-06					7.4.E-01
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	1.4	ug/L	1.32E-05	mg/kg-day	--	--	--	3.84E-05	mg/kg-day	2.00E-02	mg/kg-day	2.E-03
				Manganese	91	ug/L	8.55E-04	mg/kg-day	--	--	--	2.49E-03	mg/kg-day	2.00E-02	mg/kg-day	1.E-01
				Chloroform	0.36	ug/L	3.38E-06	mg/kg-day	--	--	--	9.86E-06	mg/kg-day	1.00E-02	mg/kg-day	1.E-03
			Exp. Route Total								--					1.3.E-01
			Dermal Absorption	Cobalt	1.4	ug/L	2.75E-08	mg/kg-day	--	--	--	8.01E-08	mg/kg-day	2.00E-02	mg/kg-day	4.E-06
				Manganese	91	ug/L	4.46E-06	mg/kg-day	--	--	--	1.30E-05	mg/kg-day	8.00E-04	mg/kg-day	2.E-02
				Chloroform	0.36	ug/L	3.82E-08	mg/kg-day	--	--	--	1.12E-07	mg/kg-day	1.00E-02	mg/kg-day	1.E-05
			Exp. Route Total								--					2.E-02
		Exposure Point Total									--					1.4.E-01
	Exposure Medium Total										--					1.4.E-01

TABLE E.1-7.5.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.50E-06	mg/m^3	9.59E-08	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	8.E-09	2.80E-07	mg/kg-day	1.40E-02	mg/kg-day	2.E-05
			Exp. Route Total								8.E-09					2.E-05
		Exposure Point Total									8.E-09					2.E-05
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	2.86E-02	mg/m^3	2.91E-05	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	2.E-06	6.80E-05	mg/kg-day	1.40E-02	mg/kg-day	5.E-03
			Exp. Route Total								2.E-06					5.E-03
		Exposure Point Total									2.E-06					5.E-03
	Exposure Medium Total										2.E-06					5.E-03
Groundwater Total											2.E-06					1.5.E-01
											Total of Receptor Risks Across All Media					9.E-01
											9.E-06	Total of Receptor Hazards Across All Media				

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.1-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.1-4.7)

TABLE E.1-7.6.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	19,840	mg/kg	9.32E-03	mg/kg-day	--	--	--	2.72E-02	mg/kg-day	1.00E+00	mg/kg-day	3.E-02
				Arsenic	4.318	mg/kg	2.03E-06	mg/kg-day	1.50E+00	mg/kg-day^{-1}	3.E-06	5.92E-06	mg/kg-day	3.00E-04	mg/kg-day	2.E-02
				Chromium	95.56	mg/kg	4.49E-05	mg/kg-day	--	--	--	1.31E-04	mg/kg-day	3.00E-03	mg/kg-day	4.E-02
				Cobalt	9.691	mg/kg	4.55E-06	mg/kg-day	--	--	--	1.33E-05	mg/kg-day	2.00E-02	mg/kg-day	7.E-04
				Iron	25,518	mg/kg	1.20E-02	mg/kg-day	--	--	--	3.50E-02	mg/kg-day	7.00E-01	mg/kg-day	5.E-02
				Manganese	483.1	mg/kg	2.27E-04	mg/kg-day	--	--	--	6.62E-04	mg/kg-day	2.00E-02	mg/kg-day	3.E-02
				Vanadium	36.78	mg/kg	1.73E-05	mg/kg-day	--	--	--	5.04E-05	mg/kg-day	1.00E-03	mg/kg-day	5.E-02
				Aroclor 1254	0.578	mg/kg	2.71E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	5.E-07	7.92E-07	mg/kg-day	2.00E-05	mg/kg-day	4.E-02
				Nitroglycerin	11	mg/kg	5.17E-06	mg/kg-day	1.70E-02	mg/kg-day^{-1}	9.E-08	1.51E-05	mg/kg-day	1.00E-04	mg/kg-day	2.E-01
			Exp. Route Total								4.E-06					4.E-01
			Dermal Absorption	Aluminum	19,840	mg/kg	3.72E-04	mg/kg-day	--	--	--	1.08E-03	mg/kg-day	1.00E+00	mg/kg-day	1.E-03
				Arsenic	4.318	mg/kg	2.43E-07	mg/kg-day	1.50E+00	mg/kg-day^{-1}	4.E-07	7.08E-07	mg/kg-day	3.00E-04	mg/kg-day	2.E-03
				Chromium	95.56	mg/kg	1.79E-06	mg/kg-day	--	--	--	5.22E-06	mg/kg-day	7.50E-05	mg/kg-day	7.E-02
				Cobalt	9.691	mg/kg	1.82E-07	mg/kg-day	--	--	--	5.30E-07	mg/kg-day	2.00E-02	mg/kg-day	3.E-05
				Iron	25,518	mg/kg	4.78E-04	mg/kg-day	--	--	--	1.39E-03	mg/kg-day	7.00E-01	mg/kg-day	2.E-03
				Manganese	483.1	mg/kg	9.05E-06	mg/kg-day	--	--	--	2.64E-05	mg/kg-day	8.00E-04	mg/kg-day	3.E-02
				Vanadium	36.78	mg/kg	6.89E-07	mg/kg-day	--	--	--	2.01E-06	mg/kg-day	2.60E-05	mg/kg-day	8.E-02
				Aroclor 1254	0.578	mg/kg	1.52E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	3.E-07	4.42E-07	mg/kg-day	2.00E-05	mg/kg-day	2.E-02
				Nitroglycerin	11	mg/kg	2.06E-07	mg/kg-day	1.70E-02	mg/kg-day^{-1}	4.E-09	6.01E-07	mg/kg-day	1.00E-04	mg/kg-day	6.E-03
			Exp. Route Total								7.E-07					2.E-01
		Exposure Point Total									4.E-06					6.E-01
	Exposure Medium Total										4.E-06					6.E-01
	Air	Fugitive Dust	Inhalation	Aluminum	19,840	mg/kg	1.67E-07	mg/kg-day	--	--	--	4.87E-07	mg/kg-day	1.00E-03	mg/kg-day	5.E-04
				Arsenic	4.318	mg/kg	3.63E-11	mg/kg-day	1.50E+01	mg/kg-day^{-1}	5.E-10	1.06E-10	mg/kg-day	--	--	--
				Chromium	95.56	mg/kg	8.04E-10	mg/kg-day	4.10E+01	mg/kg-day^{-1}	3.E-08	2.34E-09	mg/kg-day	2.90E-05	mg/kg-day	8.E-05
				Cobalt	9.691	mg/kg	8.15E-11	mg/kg-day	9.80E+00	mg/kg-day^{-1}	8.E-10	2.38E-10	mg/kg-day	5.70E-06	mg/kg-day	4.E-05
				Iron	25,518	mg/kg	2.15E-07	mg/kg-day	--	--	--	6.26E-07	mg/kg-day	--	--	--
				Manganese	483.1	mg/kg	4.06E-09	mg/kg-day	--	--	--	1.19E-08	mg/kg-day	1.43E-05	mg/kg-day	8.E-04
				Vanadium	36.78	mg/kg	3.09E-10	mg/kg-day	--	--	--	9.02E-10	mg/kg-day	--	--	--
				Aroclor 1254	0.578	mg/kg	4.86E-12	mg/kg-day	2.00E+00	mg/kg-day^{-1}	1.E-11	1.42E-11	mg/kg-day	--	--	--
				Nitroglycerin	11	mg/kg	9.25E-11	mg/kg-day	--	--	--	2.70E-10	mg/kg-day	--	--	--
			Exp. Route Total								3.E-08					1.E-03
		Exposure Point Total									3.E-08					1.E-03
	Exposure Medium Total										3.E-08					1.E-03
Soil Total											4.E-06					6.E-01
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	1.4	ug/L	1.32E-05	mg/kg-day	--	--	--	3.84E-05	mg/kg-day	2.00E-02	mg/kg-day	2.E-03
				Manganese	91	ug/L	8.55E-04	mg/kg-day	--	--	--	2.49E-03	mg/kg-day	2.00E-02	mg/kg-day	1.E-01
				Chloroform	0.36	ug/L	3.38E-06	mg/kg-day	--	--	--	9.86E-06	mg/kg-day	1.00E-02	mg/kg-day	1.E-03
			Exp. Route Total								--					1.3.E-01
			Dermal Absorption	Cobalt	1.4	ug/L	2.75E-08	mg/kg-day	--	--	--	8.01E-08	mg/kg-day	2.00E-02	mg/kg-day	4.E-06
				Manganese	91	ug/L	4.46E-06	mg/kg-day	--	--	--	1.30E-05	mg/kg-day	8.00E-04	mg/kg-day	2.E-02
				Chloroform	0.36	ug/L	3.82E-08	mg/kg-day	--	--	--	1.12E-07	mg/kg-day	1.00E-02	mg/kg-day	1.E-05
			Exp. Route Total								--					2.E-02
		Exposure Point Total									--					1.4.E-01
	Exposure Medium Total										--					1.4.E-01

TABLE E.1-7.6.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.50E-06	mg/m^3	9.59E-08	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	8.E-09	2.80E-07	mg/kg-day	1.40E-02	mg/kg-day	2.E-05
			Exp. Route Total								8.E-09					2.E-05
		Exposure Point Total									8.E-09					2.E-05
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	2.86E-02	mg/m^3	2.91E-05	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	2.E-06	6.80E-05	mg/kg-day	1.40E-02	mg/kg-day	5.E-03
			Exp. Route Total								2.E-06					5.E-03
		Exposure Point Total									2.E-06					5.E-03
	Exposure Medium Total										2.E-06					5.E-03
Groundwater Total											2.E-06					1.5.E-01
											Total of Receptor Risks Across All Media	7.E-06		Total of Receptor Hazards Across All Media		8.E-01

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.1-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.1-4.7)

TABLE E.1-7.7.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Soil	Soil	Ingestion	Aluminum	23,028	mg/kg	2.52E-02	mg/kg-day	--	--	--	2.94E-01	mg/kg-day	1.00E+00	mg/kg-day	3.E-01
				Arsenic	6.908	mg/kg	7.57E-06	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	1.E-05	8.83E-05	mg/kg-day	3.00E-04	mg/kg-day	3.E-01
				Chromium	130	mg/kg	1.42E-04	mg/kg-day	--	--	--	1.66E-03	mg/kg-day	3.00E-03	mg/kg-day	6.E-01
				Cobalt	10.11	mg/kg	1.11E-05	mg/kg-day	--	--	--	1.29E-04	mg/kg-day	2.00E-02	mg/kg-day	6.E-03
				Iron	27,594	mg/kg	3.02E-02	mg/kg-day	--	--	--	3.53E-01	mg/kg-day	7.00E-01	mg/kg-day	5.E-01
				Manganese	564	mg/kg	6.18E-04	mg/kg-day	--	--	--	7.21E-03	mg/kg-day	2.00E-02	mg/kg-day	4.E-01
				Vanadium	38.69	mg/kg	4.24E-05	mg/kg-day	--	--	--	4.95E-04	mg/kg-day	1.00E-03	mg/kg-day	5.E-01
				Aroclor 1254	0.839	mg/kg	9.19E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-06	1.07E-05	mg/kg-day	2.00E-05	mg/kg-day	5.E-01
				Nitroglycerin	11	mg/kg	1.21E-05	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	2.E-07	1.41E-04	mg/kg-day	1.00E-04	mg/kg-day	1.E+00
			Exp. Route Total								1.E-05					4.5.E+00
			Dermal Absorption	Aluminum	23,028	mg/kg	7.07E-04	mg/kg-day	--	--	--	8.24E-03	mg/kg-day	1.00E+00	mg/kg-day	8.E-03
				Arsenic	6.908	mg/kg	6.36E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	1.E-06	7.42E-06	mg/kg-day	3.00E-04	mg/kg-day	2.E-02
				Chromium	130	mg/kg	3.99E-06	mg/kg-day	--	--	--	4.65E-05	mg/kg-day	7.50E-05	mg/kg-day	6.E-01
				Cobalt	10.11	mg/kg	3.10E-07	mg/kg-day	--	--	--	3.62E-06	mg/kg-day	2.00E-02	mg/kg-day	2.E-04
				Iron	27,594	mg/kg	8.47E-04	mg/kg-day	--	--	--	9.88E-03	mg/kg-day	7.00E-01	mg/kg-day	1.E-02
				Manganese	564	mg/kg	1.73E-05	mg/kg-day	--	--	--	2.02E-04	mg/kg-day	8.00E-04	mg/kg-day	3.E-01
				Vanadium	38.69	mg/kg	1.19E-06	mg/kg-day	--	--	--	1.39E-05	mg/kg-day	2.60E-05	mg/kg-day	5.E-01
				Aroclor 1254	0.839	mg/kg	3.60E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	7.E-07	4.20E-06	mg/kg-day	2.00E-05	mg/kg-day	2.E-01
				Nitroglycerin	11	mg/kg	3.38E-07	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	6.E-09	3.94E-06	mg/kg-day	1.00E-04	mg/kg-day	4.E-02
			Exp. Route Total								2.E-06					2.E+00
		Exposure Point Total									2.E-05					6.E+00
	Exposure Medium Total										2.E-05					6.E+00
	Air	Fugitive Dust	Inhalation	Aluminum	23,028	mg/kg	4.08E-07	mg/kg-day	--	--	--	4.76E-06	mg/kg-day	1.00E-03	mg/kg-day	5.E-03
				Arsenic	6.908	mg/kg	1.23E-10	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	2.E-09	1.43E-09	mg/kg-day	--	--	--
				Chromium	130	mg/kg	2.31E-09	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	9.E-08	2.69E-08	mg/kg-day	2.90E-05	mg/kg-day	9.E-04
				Cobalt	10.11	mg/kg	1.79E-10	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	2.E-09	2.09E-09	mg/kg-day	5.70E-06	mg/kg-day	4.E-04
				Iron	27,594	mg/kg	4.89E-07	mg/kg-day	--	--	--	5.71E-06	mg/kg-day	--	--	--
				Manganese	564	mg/kg	1.00E-08	mg/kg-day	--	--	--	1.17E-07	mg/kg-day	1.43E-05	mg/kg-day	8.E-03
				Vanadium	38.69	mg/kg	6.86E-10	mg/kg-day	--	--	--	8.01E-09	mg/kg-day	--	--	--
				Aroclor 1254	0.839	mg/kg	1.49E-11	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	3.E-11	1.74E-10	mg/kg-day	--	--	--
				Nitroglycerin	11	mg/kg	1.95E-10	mg/kg-day	--	--	--	2.28E-09	mg/kg-day	--	--	--
			Exp. Route Total								1.E-07					1.E-02
		Exposure Point Total									1.E-07					1.E-02
	Exposure Medium Total										1.E-07					1.E-02
Soil Total											2.E-05					6.E+00
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	1.4	ug/L	7.67E-06	mg/kg-day	--	--	--	8.95E-05	mg/kg-day	2.00E-02	mg/kg-day	4.E-03
				Manganese	91	ug/L	4.99E-04	mg/kg-day	--	--	--	5.82E-03	mg/kg-day	2.00E-02	mg/kg-day	3.E-01
				Chloroform	0.36	ug/L	1.97E-06	mg/kg-day	--	--	--	2.30E-05	mg/kg-day	1.00E-02	mg/kg-day	2.E-03
			Exp. Route Total								--					3.E-01
			Dermal Absorption	Cobalt	1.4	ug/L	2.03E-08	mg/kg-day	--	--	--	2.36E-07	mg/kg-day	2.00E-02	mg/kg-day	1.E-05
				Manganese	91	ug/L	3.29E-06	mg/kg-day	--	--	--	3.84E-05	mg/kg-day	8.00E-04	mg/kg-day	5.E-02
				Chloroform	0.36	ug/L	2.48E-08	mg/kg-day	--	--	--	2.90E-07	mg/kg-day	1.00E-02	mg/kg-day	3.E-05
			Exp. Route Total								--					5.E-02
		Exposure Point Total									--					3.E-01
	Exposure Medium Total										--					3.E-01

TABLE E.1-7.7.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.50E-06	mg/m^3	7.40E-08	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	6.E-09	8.63E-07	mg/kg-day	1.40E-02	mg/kg-day	6.E-05
			Exp. Route Total								6.E-09					6.E-05
		Exposure Point Total									6.E-09					6.E-05
	Exposure Medium Total										6.E-09					6.E-05
Groundwater Total											6.E-09					3.E-01
											Total of Receptor Risks Across All Media	1.5.E-05		Total of Receptor Hazards Across All Media		7.E+00

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.1-4.6)

TABLE E.1-7.8.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	19,840	mg/kg	2.17E-02	mg/kg-day	--	--	--	2.54E-01	mg/kg-day	1.00E+00	mg/kg-day	3.E-01
				Arsenic	4.318	mg/kg	4.73E-06	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	7.E-06	5.52E-05	mg/kg-day	3.00E-04	mg/kg-day	2.E-01
				Chromium	95.56	mg/kg	1.05E-04	mg/kg-day	--	--	--	1.22E-03	mg/kg-day	3.00E-03	mg/kg-day	4.E-01
				Cobalt	9.691	mg/kg	1.06E-05	mg/kg-day	--	--	--	1.24E-04	mg/kg-day	2.00E-02	mg/kg-day	6.E-03
				Iron	25,518	mg/kg	2.80E-02	mg/kg-day	--	--	--	3.26E-01	mg/kg-day	7.00E-01	mg/kg-day	5.E-01
				Manganese	483.1	mg/kg	5.29E-04	mg/kg-day	--	--	--	6.18E-03	mg/kg-day	2.00E-02	mg/kg-day	3.E-01
				Vanadium	36.78	mg/kg	4.03E-05	mg/kg-day	--	--	--	4.70E-04	mg/kg-day	1.00E-03	mg/kg-day	5.E-01
				Aroclor 1254	0.578	mg/kg	6.33E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-06	7.39E-06	mg/kg-day	2.00E-05	mg/kg-day	4.E-01
				Nitroglycerin	11	mg/kg	1.21E-05	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	2.E-07	1.41E-04	mg/kg-day	1.00E-04	mg/kg-day	1.E+00
			Exp. Route Total								9.E-06					3.9.E+00
			Dermal Absorption	Aluminum	19,840	mg/kg	6.09E-04	mg/kg-day	--	--	--	7.10E-03	mg/kg-day	1.00E+00	mg/kg-day	7.E-03
				Arsenic	4.318	mg/kg	3.97E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	6.E-07	4.64E-06	mg/kg-day	3.00E-04	mg/kg-day	2.E-02
				Chromium	95.56	mg/kg	2.93E-06	mg/kg-day	--	--	--	3.42E-05	mg/kg-day	7.50E-05	mg/kg-day	5.E-01
				Cobalt	9.691	mg/kg	2.97E-07	mg/kg-day	--	--	--	3.47E-06	mg/kg-day	2.00E-02	mg/kg-day	2.E-04
				Iron	25,518	mg/kg	7.83E-04	mg/kg-day	--	--	--	9.14E-03	mg/kg-day	7.00E-01	mg/kg-day	1.E-02
				Manganese	483.1	mg/kg	1.48E-05	mg/kg-day	--	--	--	1.73E-04	mg/kg-day	8.00E-04	mg/kg-day	2.E-01
				Vanadium	36.78	mg/kg	1.13E-06	mg/kg-day	--	--	--	1.32E-05	mg/kg-day	2.60E-05	mg/kg-day	5.E-01
				Aroclor 1254	0.578	mg/kg	2.48E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	5.E-07	2.90E-06	mg/kg-day	2.00E-05	mg/kg-day	1.E-01
				Nitroglycerin	11	mg/kg	3.38E-07	mg/kg-day	1.70E-02	mg/kg-day $^{-1}$	6.E-09	3.94E-06	mg/kg-day	1.00E-04	mg/kg-day	4.E-02
			Exp. Route Total								1.E-06					1.4.E+00
		Exposure Point Total									1.E-05					5.3.E+00
	Exposure Medium Total										1.E-05					5.3.E+00
	Air	Fugitive Dust	Inhalation	Aluminum	19,840	mg/kg	3.52E-07	mg/kg-day	--	--	--	4.10E-06	mg/kg-day	1.00E-03	mg/kg-day	4.E-03
				Arsenic	4.318	mg/kg	7.66E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	1.E-09	8.93E-10	mg/kg-day	--	--	--
				Chromium	95.56	mg/kg	1.69E-09	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	7.E-08	1.98E-08	mg/kg-day	2.90E-05	mg/kg-day	7.E-04
				Cobalt	9.691	mg/kg	1.72E-10	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	2.E-09	2.01E-09	mg/kg-day	5.70E-06	mg/kg-day	4.E-04
				Iron	25,518	mg/kg	4.53E-07	mg/kg-day	--	--	--	5.28E-06	mg/kg-day	--	--	--
				Manganese	483.1	mg/kg	8.57E-09	mg/kg-day	--	--	--	1.00E-07	mg/kg-day	1.43E-05	mg/kg-day	7.E-03
				Vanadium	36.78	mg/kg	6.52E-10	mg/kg-day	--	--	--	7.61E-09	mg/kg-day	--	--	--
				Aroclor 1254	0.578	mg/kg	1.03E-11	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-11	1.20E-10	mg/kg-day	--	--	--
				Nitroglycerin	11	mg/kg	1.95E-10	mg/kg-day	--	--	--	2.28E-09	mg/kg-day	--	--	--
			Exp. Route Total								7.E-08					1.E-02
		Exposure Point Total									7.E-08					1.E-02
	Exposure Medium Total										7.E-08					1.E-02
Soil Total											1.E-05					5.3.E+00
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	1.4	ug/L	7.67E-06	mg/kg-day	--	--	--	8.95E-05	mg/kg-day	2.00E-02	mg/kg-day	4.E-03
				Manganese	91	ug/L	4.99E-04	mg/kg-day	--	--	--	5.82E-03	mg/kg-day	2.00E-02	mg/kg-day	3.E-01
				Chloroform	0.36	ug/L	1.97E-06	mg/kg-day	--	--	--	2.30E-05	mg/kg-day	1.00E-02	mg/kg-day	2.E-03
			Exp. Route Total								--					3.E-01
			Dermal Absorption	Cobalt	1.4	ug/L	2.03E-08	mg/kg-day	--	--	--	2.36E-07	mg/kg-day	2.00E-02	mg/kg-day	1.E-05
				Manganese	91	ug/L	3.29E-06	mg/kg-day	--	--	--	3.84E-05	mg/kg-day	8.00E-04	mg/kg-day	5.E-02
				Chloroform	0.36	ug/L	2.48E-08	mg/kg-day	--	--	--	2.90E-07	mg/kg-day	1.00E-02	mg/kg-day	3.E-05
			Exp. Route Total								--					5.E-02
		Exposure Point Total									--					3.E-01
	Exposure Medium Total										--					3.E-01

TABLE E.1-7.8.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.50E-06	mg/m^3	7.40E-08	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	6.E-09	8.63E-07	mg/kg-day	1.40E-02	mg/kg-day	6.E-05
			Exp. Route Total								6.E-09					6.E-05
		Exposure Point Total									6.E-09					6.E-05
	Exposure Medium Total										6.E-09					6.E-05
Groundwater Total											6.E-09					3.E-01
											Total of Receptor Risks Across All Media					1.E-05
												Total of Receptor Hazards Across All Media				6.E+00

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.1-4.6)

TABLE E.1-7.9.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Surface Soil	Soil	Soil	Ingestion	Aluminum	23,028	mg/kg	--
				Arsenic	6.908	mg/kg	2.E-05
				Chromium	130	mg/kg	--
				Cobalt	10.11	mg/kg	--
				Iron	27,594	mg/kg	--
				Manganese	564	mg/kg	--
				Vanadium	38.69	mg/kg	--
				Aroclor 1254	0.839	mg/kg	3.E-06
				Nitroglycerin	11	mg/kg	3.E-07
			Exp. Route Total				2.E-05
			Dermal Absorption	Aluminum	23,028	mg/kg	--
				Arsenic	6.908	mg/kg	2.E-06
				Chromium	130	mg/kg	--
				Cobalt	10.11	mg/kg	--
				Iron	27,594	mg/kg	--
				Manganese	564	mg/kg	--
				Vanadium	38.69	mg/kg	--
				Aroclor 1254	0.839	mg/kg	1.E-06
				Nitroglycerin	11	mg/kg	9.E-09
			Exp. Route Total				3.E-06
		Exposure Point Total					2.E-05
	Exposure Medium Total						2.E-05
	Air	Fugitive Dust	Inhalation	Aluminum	23,028	mg/kg	--
				Arsenic	6.908	mg/kg	3.E-09
				Chromium	130	mg/kg	1.E-07
				Cobalt	10.11	mg/kg	3.E-09
				Iron	27,594	mg/kg	--
				Manganese	564	mg/kg	--
				Vanadium	38.69	mg/kg	--
				Aroclor 1254	0.839	mg/kg	4.E-11
				Nitroglycerin	11	mg/kg	--
			Exp. Route Total				1.E-07
		Exposure Point Total					1.E-07
	Exposure Medium Total						1.E-07
Soil Total							2.E-05

TABLE E.1-7.9.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	1.4	ug/L	--
				Manganese	91	ug/L	--
				Chloroform	0.36	ug/L	--
			Exp. Route Total				--
			Dermal Absorption	Cobalt	1.4	ug/L	--
				Manganese	91	ug/L	--
				Chloroform	0.36	ug/L	--
			Exp. Route Total				--
		Exposure Point Total					--
	Exposure Medium Total						--
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.50E-06	mg/m^3	1.E-08
			Exp. Route Total				1.E-08
		Exposure Point Total					1.E-08
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	0.029	mg/m^3	2.E-06
			Exp. Route Total				2.E-06
		Exposure Point Total					2.E-06
	Exposure Medium Total						2.E-06
Groundwater Total							2.E-06
							2.E-05

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.1-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.1-4.7)

TABLE E.1-7.10.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Total Soil	Soil	Soil	Ingestion	Aluminum	19,840	mg/kg	--
				Arsenic	4.318	mg/kg	1.E-05
				Chromium	95.56	mg/kg	--
				Cobalt	9.691	mg/kg	--
				Iron	25,518	mg/kg	--
				Manganese	483.1	mg/kg	--
				Vanadium	36.78	mg/kg	--
				Aroclor 1254	0.578	mg/kg	2.E-06
				Nitroglycerin	11	mg/kg	3.E-07
			Exp. Route Total				1.E-05
			Dermal Absorption	Aluminum	19,840	mg/kg	--
				Arsenic	4.318	mg/kg	1.E-06
				Chromium	95.56	mg/kg	--
				Cobalt	9.691	mg/kg	--
				Iron	25,518	mg/kg	--
				Manganese	483.1	mg/kg	--
				Vanadium	36.78	mg/kg	--
				Aroclor 1254	0.578	mg/kg	8.E-07
				Nitroglycerin	11	mg/kg	9.E-09
			Exp. Route Total				2.E-06
		Exposure Point Total					1.E-05
	Exposure Medium Total						1.E-05
	Air	Fugitive Dust	Inhalation	Aluminum	19,840	mg/kg	--
				Arsenic	4.318	mg/kg	2.E-09
				Chromium	95.56	mg/kg	1.E-07
				Cobalt	9.691	mg/kg	2.E-09
				Iron	25,518	mg/kg	--
				Manganese	483.1	mg/kg	--
				Vanadium	36.78	mg/kg	--
				Aroclor 1254	0.578	mg/kg	3.E-11
				Nitroglycerin	11	mg/kg	--
			Exp. Route Total				1.E-07
		Exposure Point Total					1.E-07
	Exposure Medium Total						1.E-07
Soil Total							1.E-05

TABLE E.1-7.10.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 35
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	1.4	ug/L	--
				Manganese	91	ug/L	--
				Chloroform	0.36	ug/L	--
			Exp. Route Total				--
			Dermal Absorption	Cobalt	1.4	ug/L	--
				Manganese	91	ug/L	--
				Chloroform	0.36	ug/L	--
			Exp. Route Total				--
		Exposure Point Total					--
	Exposure Medium Total						--
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.50E-06	mg/m^3	1.E-08
			Exp. Route Total				1.E-08
		Exposure Point Total					1.E-08
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	0.029	mg/m^3	2.E-06
			Exp. Route Total				2.E-06
		Exposure Point Total					2.E-06
	Exposure Medium Total						2.E-06
Groundwater Total							2.E-06
							2.E-05

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.1-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.1-4.7)

TABLE E.1-9.1.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Maintenance Worker - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Receptor Population:	Maintenance Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	5.E-03	--	1.E-04	5.E-03
			Arsenic	7.2.E-07	--	7.E-08	8.E-07	Arsenic	skin/ vascular	5.E-03	--	4.E-04	5.E-03
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	8.E-03	--	1.E-02	2.E-02
			Cobalt	--	--	--	--	Cobalt	blood	1.E-04	--	3.E-06	1.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	8.E-03	--	3.E-04	8.E-03
			Manganese	--	--	--	--	Manganese	CNS	6.E-03	--	5.E-03	1.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	8.E-03	--	1.E-02	2.E-02
			Aroclor 1254	1.2.E-07	--	5.E-08	2.E-07	Aroclor 1254	eyes	8.E-03	--	4.E-03	1.E-02
			Nitroglycerin	1.3.E-08	--	4.E-10	1.E-08	Nitroglycerin	vascular	2.E-02	--	7.E-04	2.E-02
				9.E-07	--	1.E-07	9.8.E-07			7.E-02	--	3.E-02	1.E-01
		Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	6.E-04	--	6.E-04
			Arsenic	--	9.E-10	--	9.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	5.E-08	--	5.E-08	Chromium	respiratory	--	1.E-04	--	1.E-04
			Cobalt	--	9.E-10	--	9.E-10	Cobalt	respiratory	--	4.E-05	--	4.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	1.E-03	--	1.E-03
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	2.E-11	--	2.E-11	Aroclor 1254	NA	--	--	--	--
			Nitroglycerin	--	--	--	--	Nitroglycerin	NA	--	--	--	--
				--	5.E-08	--	5.E-08			--	2.E-03	--	2.E-03
						Total Risk Across Soil	1.E-06					Total Hazard Index Across Soil	1.E-01

Total Risk Across All Media and All Exposure Routes	1.E-06

Total Hazard Index Across All Media and All Exposure Routes	1.E-01

Total blood HI across all media =	8.E-03
Total CNS HI across all media =	2.E-02
Total skin HI across all media =	5.E-03
Total respiratory HI across all media =	2.E-04
Total GI tract HI across all media =	3.E-02
Total kidney HI across all media =	2.E-02
Total liver HI across all media =	3.E-02
Total vascular HI across all media =	3.E-02
Total eyes HI across all media =	1.E-02
Total bone marrow HI across all media =	2.E-02
Total fetus HI across all media =	2.E-02

TABLE E.1-9.2.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Maintenance Worker - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Maintenance Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	4.E-03	--	1.E-04	4.E-03
			Arsenic	4.5.E-07	--	4.E-08	5.E-07	Arsenic	skin/ vascular	3.E-03	--	3.E-04	3.E-03
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	6.E-03	--	8.E-03	1.E-02
			Cobalt	--	--	--	--	Cobalt	blood	9.E-05	--	3.E-06	1.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	7.E-03	--	2.E-04	7.E-03
			Manganese	--	--	--	--	Manganese	CNS	5.E-03	--	4.E-03	9.E-03
			Vanadium	--	--	--	--	Vanadium	kidney	7.E-03	--	9.E-03	2.E-02
			Aroclor 1254	8.1.E-08	--	4.E-08	1.E-07	Aroclor 1254	eyes	6.E-03	--	3.E-03	8.E-03
			Nitroglycerin	1.3.E-08	--	4.E-10	1.E-08	Nitroglycerin	vascular	2.E-02	--	7.E-04	2.E-02
				5.E-07	--	8.E-08	6.3.E-07			6.E-02	--	3.E-02	8.E-02
		Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-04	--	5.E-04
			Arsenic	--	6.E-10	--	6.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	4.E-08	--	4.E-08	Chromium	respiratory	--	8.E-05	--	8.E-05
			Cobalt	--	9.E-10	--	9.E-10	Cobalt	respiratory	--	4.E-05	--	4.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	9.E-04	--	9.E-04
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	1.E-11	--	1.E-11	Aroclor 1254	NA	--	--	--	--
			Nitroglycerin	--	--	--	--	Nitroglycerin	NA	--	--	--	--
				--	4.E-08	--	4.E-08			--	1.E-03	--	1.E-03
						Total Risk Across Soil	7.E-07					Total Hazard Index Across Soil	9.E-02

Total Risk Across All Media and All Exposure Routes	7.E-07

Total Hazard Index Across All Media and All Exposure Routes	9.E-02

Total blood HI across all media =	7.E-03
Total CNS HI across all media =	1.E-02
Total skin HI across all media =	3.E-03
Total respiratory HI across all media =	1.E-04
Total GI tract HI across all media =	2.E-02
Total kidney HI across all media =	2.E-02
Total liver HI across all media =	2.E-02
Total vascular HI across all media =	3.E-02
Total eyes HI across all media =	8.E-03
Total bone marrow HI across all media =	1.E-02
Total fetus HI across all media =	1.E-02

TABLE E.1-9.3.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Commercial Worker - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Commercial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	1.E-02	--	6.E-04	1.E-02
			Arsenic	1.E-06	--	2.E-07	1.E-06	Arsenic	skin/ vascular	7.E-03	--	1.E-03	8.E-03
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	2.E-02	--	4.E-02	6.E-02
			Cobalt	--	--	--	--	Cobalt	blood	2.E-04	--	2.E-05	3.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	2.E-02	--	1.E-03	2.E-02
			Manganese	--	--	--	--	Manganese	CNS	1.E-02	--	2.E-02	3.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	2.E-02	--	5.E-02	6.E-02
			Aroclor 1254	2.E-07	--	2.E-07	4.E-07	Aroclor 1254	eyes	1.E-02	--	1.E-02	3.E-02
			Nitroglycerin	3.E-08	--	2.E-09	3.E-08	Nitroglycerin	vascular	5.E-02	--	4.E-03	6.E-02
			Total	1.4.E-06	--	4.E-07	2.E-06	Total		1.E-01	--	1.E-01	3.E-01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	2.E-03	--	2.E-03
			Arsenic	--	2.E-09	--	2.E-09	Arsenic	NA	--	--	--	--
			Chromium	--	1.E-07	--	1.E-07	Chromium	respiratory	--	3.E-04	--	3.E-04
			Cobalt	--	3.E-09	--	3.E-09	Cobalt	respiratory	--	1.E-04	--	1.E-04
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	3.E-03	--	3.E-03
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	3.E-11	--	3.E-11	Aroclor 1254	NA	--	--	--	--
			Nitroglycerin	--	--	--	--	Nitroglycerin	NA	--	--	--	--
			Total	--	1.E-07	--	1.E-07	Total		--	5.E-03	--	5.E-03
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	7.E-04	--	2.E-07	7.E-04
			Manganese	--	--	--	--	Manganese	CNS	4.E-02	--	9.E-04	5.E-02
			Chloroform	--	--	--	--	Chloroform	liver	4.E-04	--	5.E-07	4.E-04
			Total	--	--	--	--	Total		5.E-02	--	9.E-04	5.E-02
	Air	Air (Indoor Air)	Chloroform	--	3.E-09	--	3.E-09	Chloroform	respiratory	--	8.E-06	--	8.E-06
				--	3.E-09	--	3.E-09			--	8.E-06	--	8.E-06
							Total Risk Across Soil						Total Hazard Index Across Soil
							2.E-06						3.E-01
							Total Risk Across Groundwater						Total Hazard Index Across Groundwater
							3.E-09						5.E-02

Total Risk Across All Media and All Exposure Routes	2.E-06
Total Hazard Index Across All Media and All Exposure Routes	3.E-01

Total blood HI across all media =	2.E-02
Total CNS HI across all media =	9.E-02
Total skin HI across all media =	8.E-03
Total respiratory HI across all media =	4.E-04
Total GI tract HI across all media =	8.E-02
Total kidney HI across all media =	6.E-02
Total liver HI across all media =	8.E-02
Total vascular HI across all media =	7.E-02
Total eyes HI across all media =	3.E-02
Total bone marrow HI across all media =	6.E-02
Total fetus HI across all media =	6.E-02

TABLE E.1-9.4.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Construction Worker - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	6.E-02	--	2.E-03	7.E-02
			Arsenic	3.E-07	--	3.E-08	3.E-07	Arsenic	skin/ vascular	5.E-02	--	4.E-03	5.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	2.E-02	--	2.E-02	3.E-02
			Cobalt	--	--	--	--	Cobalt	blood	2.E-03	--	5.E-05	2.E-03
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	3.E-01	--	8.E-03	3.E-01
			Manganese	--	--	--	--	Manganese	CNS	8.E-02	--	6.E-02	1.E-01
			Vanadium	--	--	--	--	Vanadium	kidney	2.E-02	--	2.E-02	4.E-02
			Aroclor 1254	5.E-08	--	2.E-08	8.E-08	Aroclor 1254	eyes	4.E-02	--	2.E-02	5.E-02
			Nitroglycerin	9.E-09	--	3.E-10	9.E-09	Nitroglycerin	vascular	4.E-01	--	1.E-02	4.E-01
			Total	4.E-07	--	5.E-08	4.E-07	Total		9.E-01	--	1.E-01	1.E+00
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	2.4.E+00	--	2.4.E+00
			Arsenic	--	1.E-07	--	1.E-07	Arsenic	NA	--	--	--	--
			Chromium	--	7.E-06	--	7.E-06	Chromium	respiratory	--	4.E-01	--	4.E-01
			Cobalt	--	2.E-07	--	2.E-07	Cobalt	respiratory	--	2.E-01	--	2.E-01
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	4.E+00	--	4.1.E+00
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	2.E-09	--	2.E-09	Aroclor 1254	NA	--	--	--	--
			Nitroglycerin	--	--	--	--	Nitroglycerin	NA	--	--	--	--
			Total	--	7.E-06	--	7.E-06	Total		--	7.1.E+00	--	7.1.E+00
		Air (Trench Air)	Chloroform	--	8.E-10	--	8.E-10	Chloroform	respiratory	--	1.E-01	--	1.E-01
				--	8.E-10	--	8.E-10			--	1.E-01	--	1.3.E-01
							Total Risk Across Soil: 8.E-06						Total Hazard Index Across Soil: 8.2.E+00
							Total Risk Across Groundwater: 8.E-10						Total Hazard Index Across Groundwater: 1.E-01

Total Risk Across All Media and All Exposure Routes: 8.E-06

Total Hazard Index Across All Media and All Exposure Routes: 8.3.E+00

Total blood HI across all media =	3.E-01
Total CNS HI across all media =	7.E+00
Total skin HI across all media =	5.E-02
Total respiratory HI across all media =	7.E-01
Total GI tract HI across all media =	3.E-01
Total kidney HI across all media =	4.E-02
Total liver HI across all media =	3.E-01
Total vascular HI across all media =	4.E-01
Total eyes HI across all media =	5.E-02
Total bone marrow HI across all media =	3.E-02
Total fetus HI across all media =	3.E-02

TABLE E.1-9.5.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Adult Resident - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	3.E-02	--	1.E-03	3.E-02
			Arsenic	5.E-06	--	6.E-07	5.E-06	Arsenic	skin/ vascular	3.E-02	--	4.E-03	4.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	6.E-02	--	9.E-02	2.E-01
			Cobalt	--	--	--	--	Cobalt	blood	7.E-04	--	3.E-05	7.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-02	--	2.E-03	6.E-02
			Manganese	--	--	--	--	Manganese	CNS	4.E-02	--	4.E-02	8.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	5.E-02	--	8.E-02	1.E-01
			Aroclor 1254	8.E-07	--	4.E-07	1.E-06	Aroclor 1254	eyes	6.E-02	--	3.E-02	9.E-02
			Nitroglycerin	9.E-08	--	4.E-09	9.E-08	Nitroglycerin	vascular	2.E-01	--	6.E-03	2.E-01
			Total	6.E-06	--	1.E-06	7.E-06	Total		5.E-01	--	3.E-01	7.E-01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	6.E-04	--	6.E-04
			Arsenic	--	9.E-10	--	9.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	4.E-08	--	4.E-08	Chromium	respiratory	--	1.E-04	--	1.E-04
			Cobalt	--	8.E-10	--	8.E-10	Cobalt	respiratory	--	4.E-05	--	4.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	1.E-03	--	1.E-03
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	1.E-11	--	1.E-11	Aroclor 1254	NA	--	--	--	--
			Nitroglycerin	--	--	--	--	Nitroglycerin	NA	--	--	--	--
			Total	--	5.E-08	--	5.E-08	Total		--	2.E-03	--	2.E-03
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	2.E-03	--	4.E-06	2.E-03
			Manganese	--	--	--	--	Manganese	CNS	1.E-01	--	2.E-02	1.E-01
			Chloroform	--	--	--	--	Chloroform	liver	1.E-03	--	1.E-05	1.E-03
			Total	--	--	--	--	Total		1.3.E-01	--	2.E-02	1.E-01
	Air	Air (Indoor Air)	Chloroform	--	8.E-09	--	8.E-09	Chloroform	respiratory	--	2.E-05	--	2.E-05
				--	8.E-09	--	8.E-09			--	2.E-05	--	2.E-05
		Air (Shower Air)	Chloroform	--	2.E-06	--	2.E-06	Chloroform	respiratory	--	5.E-03	--	5.E-03
				--	2.E-06	--	2.E-06			--	5.E-03	--	5.E-03
						Total Risk Across Soil	7.E-06					Total Hazard Index Across Soil	7.4.E-01
						Total Risk Across Groundwater	2.E-06					Total Hazard Index Across Groundwater	1.5.E-01

Total Risk Across All Media and All Exposure Routes	9.E-06

Total Hazard Index Across All Media and All Exposure Routes	9.E-01

Total blood HI across all media =	6.E-02
Total CNS HI across all media =	3.E-01
Total skin HI across all media =	4.E-02
Total respiratory HI across all media =	5.E-03
Total GI tract HI across all media =	2.E-01
Total kidney HI across all media =	1.E-01
Total liver HI across all media =	2.E-01
Total vascular HI across all media =	2.E-01
Total eyes HI across all media =	9.E-02
Total bone marrow HI across all media =	2.E-01
Total fetus HI across all media =	2.E-01

TABLE E.1-9.6.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Adult Resident - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	3.E-02	--	1.E-03	3.E-02
			Arsenic	3.E-06	--	4.E-07	3.E-06	Arsenic	skin/ vascular	2.E-02	--	2.E-03	2.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	4.E-02	--	7.E-02	1.E-01
			Cobalt	--	--	--	--	Cobalt	blood	7.E-04	--	3.E-05	7.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-02	--	2.E-03	5.E-02
			Manganese	--	--	--	--	Manganese	CNS	3.E-02	--	3.E-02	7.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	5.E-02	--	8.E-02	1.E-01
			Aroclor 1254	5.E-07	--	3.E-07	8.E-07	Aroclor 1254	eyes	4.E-02	--	2.E-02	6.E-02
			Nitroglycerin	9.E-08	--	4.E-09	9.E-08	Nitroglycerin	vascular	2.E-01	--	6.E-03	2.E-01
			Total	4.E-06	--	7.E-07	4.E-06	Total		4.E-01	--	2.E-01	6.E-01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-04	--	5.E-04
			Arsenic	--	5.E-10	--	5.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	3.E-08	--	3.E-08	Chromium	respiratory	--	8.E-05	--	8.E-05
			Cobalt	--	8.E-10	--	8.E-10	Cobalt	respiratory	--	4.E-05	--	4.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	8.E-04	--	8.E-04
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	1.E-11	--	1.E-11	Aroclor 1254	NA	--	--	--	--
			Nitroglycerin	--	--	--	--	Nitroglycerin	NA	--	--	--	--
			Total	--	3.E-08	--	3.E-08	Total		--	1.E-03	--	1.E-03
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	2.E-03	--	4.E-06	2.E-03
			Manganese	--	--	--	--	Manganese	CNS	1.E-01	--	2.E-02	1.E-01
			Chloroform	--	--	--	--	Chloroform	liver	1.E-03	--	1.E-05	1.E-03
			Total	--	--	--	--	Total		1.3.E-01	--	2.E-02	1.E-01
	Air	Air (Indoor Air)	Chloroform	--	8.E-09	--	8.E-09	Chloroform	respiratory	--	2.E-05	--	2.E-05
				--	8.E-09	--	8.E-09			--	2.E-05	--	2.E-05
		Air (Shower Air)	Chloroform	--	2.E-06	--	2.E-06	Chloroform	respiratory	--	5.E-03	--	5.E-03
				--	2.E-06	--	2.E-06			--	5.E-03	--	5.E-03
						Total Risk Across Soil	4.E-06					Total Hazard Index Across Soil	6.E-01
						Total Risk Across Groundwater	2.E-06					Total Hazard Index Across Groundwater	1.E-01

Total Risk Across All Media and All Exposure Routes	7.E-06

Total Hazard Index Across All Media and All Exposure Routes	8.E-01

Total blood HI across all media =	5.E-02
Total CNS HI across all media =	2.E-01
Total skin HI across all media =	2.E-02
Total respiratory HI across all media =	5.E-03
Total GI tract HI across all media =	2.E-01
Total kidney HI across all media =	1.E-01
Total liver HI across all media =	2.E-01
Total vascular HI across all media =	2.E-01
Total eyes HI across all media =	6.E-02
Total bone marrow HI across all media =	1.E-01
Total fetus HI across all media =	1.E-01

TABLE E.1-9.7.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Child Resident - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	3.E-01	--	8.E-03	3.E-01
			Arsenic	1.E-05	--	1.E-06	1.E-05	Arsenic	skin/ vascular	3.E-01	--	2.E-02	3.E-01
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	6.E-01	--	6.E-01	1.E+00
			Cobalt	--	--	--	--	Cobalt	blood	6.E-03	--	2.E-04	7.E-03
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-01	--	1.E-02	5.E-01
			Manganese	--	--	--	--	Manganese	CNS	4.E-01	--	3.E-01	6.E-01
			Vanadium	--	--	--	--	Vanadium	kidney	5.E-01	--	5.E-01	1.E+00
			Aroclor 1254	2.E-06	--	7.E-07	3.E-06	Aroclor 1254	eyes	5.E-01	--	2.E-01	7.E-01
			Nitroglycerin	2.E-07	--	6.E-09	2.E-07	Nitroglycerin	vascular	1.E+00	--	4.E-02	1.4.E+00
			Total	1.E-05	--	2.E-06	2.E-05	Total		4.E+00	--	2.E+00	6.2.E+00
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-03	--	5.E-03
			Arsenic	--	2.E-09	--	2.E-09	Arsenic	NA	--	--	--	--
			Chromium	--	9.E-08	--	9.E-08	Chromium	respiratory	--	9.E-04	--	9.E-04
			Cobalt	--	2.E-09	--	2.E-09	Cobalt	respiratory	--	4.E-04	--	4.E-04
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	8.E-03	--	8.E-03
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	3.E-11	--	3.E-11	Aroclor 1254	NA	--	--	--	--
			Nitroglycerin	--	--	--	--	Nitroglycerin	NA	--	--	--	--
			Total	--	1.E-07	--	1.E-07	Total		--	1.E-02	--	1.E-02
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	4.E-03	--	1.E-05	4.E-03
			Manganese	--	--	--	--	Manganese	CNS	3.E-01	--	5.E-02	3.E-01
			Chloroform	--	--	--	--	Chloroform	liver	2.E-03	--	3.E-05	2.E-03
			Total	--	--	--	--	Total		3.E-01	--	5.E-02	3.E-01
	Air	Air (Indoor Air)	Chloroform	--	6.E-09	--	6.E-09	Chloroform	respiratory	--	6.E-05	--	6.E-05
				--	6.E-09	--	6.E-09			--	6.E-05	--	6.E-05
						Total Risk Across Soil	2.E-05					Total Hazard Index Across Soil	6.2.E+00
						Total Risk Across Groundwater	6.E-09					Total Hazard Index Across Groundwater	3.E-01

Total Risk Across All Media and All Exposure Routes	2.E-05
Total Hazard Index Across All Media and All Exposure Routes	7.E+00

Total blood HI across all media =	5.E-01
Total CNS HI across all media =	1.E+00
Total skin HI across all media =	3.E-01
Total respiratory HI across all media =	1.E-03
Total GI tract HI across all media =	2.E+00
Total kidney HI across all media =	1.E+00
Total liver HI across all media =	2.E+00
Total vascular HI across all media =	2.E+00
Total eyes HI across all media =	7.E-01
Total bone marrow HI across all media =	1.E+00
Total fetus HI across all media =	1.E+00

TABLE E.1-9.8.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Child Resident - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	3.E-01	--	7.E-03	3.E-01
			Arsenic	7.E-06	--	6.E-07	8.E-06	Arsenic	skin/ vascular	2.E-01	--	2.E-02	2.E-01
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	4.E-01	--	5.E-01	9.E-01
			Cobalt	--	--	--	--	Cobalt	blood	6.E-03	--	2.E-04	6.E-03
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-01	--	1.E-02	5.E-01
			Manganese	--	--	--	--	Manganese	CNS	3.E-01	--	2.E-01	5.E-01
			Vanadium	--	--	--	--	Vanadium	kidney	5.E-01	--	5.E-01	1.E+00
			Aroclor 1254	1.E-06	--	5.E-07	2.E-06	Aroclor 1254	eyes	4.E-01	--	1.E-01	5.E-01
			Nitroglycerin	2.E-07	--	6.E-09	2.E-07	Nitroglycerin	vascular	1.E+00	--	4.E-02	1.4.E+00
			Total	9.E-06	--	1.E-06	1.E-05	Total		4.E+00	--	1.E+00	5.3.E+00
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	4.E-03	--	4.E-03
			Arsenic	--	1.E-09	--	1.E-09	Arsenic	NA	--	--	--	--
			Chromium	--	7.E-08	--	7.E-08	Chromium	respiratory	--	7.E-04	--	7.E-04
			Cobalt	--	2.E-09	--	2.E-09	Cobalt	respiratory	--	4.E-04	--	4.E-04
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	7.E-03	--	7.E-03
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	2.E-11	--	2.E-11	Aroclor 1254	NA	--	--	--	--
			Nitroglycerin	--	--	--	--	Nitroglycerin	NA	--	--	--	--
			Total	--	7.E-08	--	7.E-08	Total		--	1.E-02	--	1.E-02
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	4.E-03	--	1.E-05	4.E-03
			Manganese	--	--	--	--	Manganese	CNS	3.E-01	--	5.E-02	3.E-01
			Chloroform	--	--	--	--	Chloroform	liver	2.E-03	--	3.E-05	2.E-03
			Total	--	--	--	--	Total		3.E-01	--	5.E-02	3.E-01
	Air	Air (Indoor Air)	Chloroform	--	6.E-09	--	6.E-09	Chloroform	respiratory	--	6.E-05	--	6.E-05
				--	6.E-09	--	6.E-09			--	6.E-05	--	6.E-05
						Total Risk Across Soil	1.E-05					Total Hazard Index Across Soil	5.3.E+00
						Total Risk Across Groundwater	6.E-09					Total Hazard Index Across Groundwater	3.E-01

Total Risk Across All Media and All Exposure Routes	1.E-05
Total Hazard Index Across All Media and All Exposure Routes	6.E+00

Total blood HI across all media =	5.E-01
Total CNS HI across all media =	1.E+00
Total skin HI across all media =	2.E-01
Total respiratory HI across all media =	1.E-03
Total GI tract HI across all media =	1.E+00
Total kidney HI across all media =	1.E+00
Total liver HI across all media =	1.E+00
Total vascular HI across all media =	2.E+00
Total eyes HI across all media =	5.E-01
Total bone marrow HI across all media =	9.E-01
Total fetus HI across all media =	9.E-01

TABLE E.1-9.9.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Lifetime Resident - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--
			Arsenic	2.E-05	--	2.E-06	2.E-05
			Chromium	--	--	--	--
			Cobalt	--	--	--	--
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	3.E-06	--	1.E-06	4.E-06
			Nitroglycerin	3.E-07	--	9.E-09	3.E-07
			Total	2.E-05	--	3.E-06	2.E-05
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--
			Arsenic	--	3.E-09	--	3.E-09
			Chromium	--	1.E-07	--	1.E-07
			Cobalt	--	3.E-09	--	3.E-09
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	--	4.E-11	--	4.E-11
			Nitroglycerin	--	--	--	--
			Total	--	1.E-07	--	1.E-07
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--
			Manganese	--	--	--	--
			Chloroform	--	--	--	--
			Total	--	--	--	--
	Air	Air (Indoor Air)	Chloroform	--	1.E-08	--	1.E-08
				--	1.E-08	--	1.E-08
		Air (Shower Air)	Chloroform	--	2.E-06	--	2.E-06
				--	2.E-06	--	2.E-06
						Total Risk Across Soil	2.E-05
						Total Risk Across Groundwater	2.E-06

Total Risk Across All Media and All Exposure Routes 2.E-05

TABLE E.1-9.10.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Lifetime Resident - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--
			Arsenic	1.E-05	--	1.E-06	1.1.E-05
			Chromium	--	--	--	--
			Cobalt	--	--	--	--
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	2.E-06	--	8.E-07	3.E-06
			Nitroglycerin	3.E-07	--	9.E-09	3.E-07
			Total	1.E-05	--	2.E-06	1.4.E-05
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--
			Arsenic	--	2.E-09	--	2.E-09
			Chromium	--	1.E-07	--	1.E-07
			Cobalt	--	2.E-09	--	2.E-09
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	--	3.E-11	--	3.E-11
			Nitroglycerin	--	--	--	--
			Total	--	1.E-07	--	1.E-07
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--
			Manganese	--	--	--	--
			Chloroform	--	--	--	--
			Total	--	--	--	--
	Air	Air (Indoor Air)	Chloroform	--	1.E-08	--	1.E-08
				--	1.E-08	--	1.E-08
		Air (Shower Air)	Chloroform	--	2.E-06	--	2.E-06
				--	2.E-06	--	2.E-06
						Total Risk Across Soil	1.4.E-05
						Total Risk Across Groundwater	2.E-06

Total Risk Across All Media and All Exposure Routes 2.E-05

TABLE E.1-10.1.RME
RME Risk Assessment Summary: Construction Worker - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	None Identified					None Identified		--	--	--	--
			Total	--	--	--	--	Total		--	--	--	--
	Air	Air	None Identified					Aluminum	CNS	--	2.4.E+00	--	2.4.E+00
								Manganese	CNS	--	4.1.E+00	--	4.1.E+00
			Total	--	--	--	--	Total		--	7.E+00	--	7.E+00
Groundwater	Groundwater	Groundwater	None Identified					None Identified					
			Total	--	--	--	--	Total		--	--	--	--
						Total Risk Across Soil	--					Total Hazard Index Across Soil	7.E+00
						Total Risk Across Groundwater	--					Total Hazard Index Across Groundwater	--
						Total Risk Across All Media and All Exposure Routes	--					Total Hazard Index Across All Media and All Exposure Routes	7.E+00
												Total CNS HI across all media =	7.E+00

TABLE E.1-10.2.RME
RME Risk Assessment Summary: Child Resident - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Arsenic	skin/ vascular	3.E-01	--	2.E-02	3.E-01
			Chromium	GI tract/fetus/bone marrow/liver	6.E-01	--	6.E-01	1.E+00
			Iron	blood/ liver/ GI tract	5.E-01	--	1.E-02	5.E-01
			Nitroglycerin	vascular	1.4.E+00	--	4.E-02	1.4.E+00
			Total		2.8.E+00	--	7.E-01	3.5.E+00
	Air	Air	None Identified		--	--	--	--
			Total		--	--	--	--
Groundwater	Groundwater	Groundwater Used as	None Identified		--	--	--	--
			Total		--	--	--	--
							Total Hazard Index Across Soil	3.5.E+00
							Total Hazard Index Across Groundwater	--

Total Hazard Index Across All Media and All Exposure Routes	3.5.E+00

Total vascular HI across all media =	2.E+00
Total GI tract HI across all media =	2.E+00
Total liver HI across all media =	2.E+00

TABLE E.1-10.3.RME
RME Risk Assessment Summary: Child Resident - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Arsenic	skin/ vascular	2.E-01	--	2.E-02	2.E-01
			Nitroglycerin	vascular	1.4.E+00	--	4.E-02	1.4.E+00
			Total		1.6.E+00	--	5.E-02	2.E+00
	Air	Air	None Identified		--	--	--	--
			Total		--	--	--	--
Groundwater	Groundwater	Groundwater Used as	None Identified		--	--	--	--
			Total		--	--	--	--
							Total Hazard Index Across Soil	2.E+00
							Total Hazard Index Across Groundwater	--

Total Hazard Index Across All Media and All Exposure Routes: 2.E+00

Total vascular HI across all media = 2.E+00

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IRON MARGIN OF EXPOSURE EVALUATION

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Table 1
Iron "Margin of Exposure" Evaluation - SWMU 35
SMWUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Total Soil - Child Resident				
Iron EPC (mg/kg)	Child Daily Intake Estimate* (mg/day)	RDA for Child 6 mths to 4 years Old	Child Daily Intake** (mg/kg-day)	Provisional RfD (mg/kg-day)
25,518	4.9	10 mg/day	0.33	0.7

* See Table 2 for equations used to calculated daily intake estimates.
** Default weight of 15 kg used for child

Table 2
Iron "Margin of Exposure" Evaluation - SWMU 35
SMWUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion-Total Soil	Resident	Child	SWMU 35	AT-NC	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	Chronic Daily Intake (mg/day) = CS*IRS*EF*ED*FI*CF1 / BW*AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	MDC or EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	default	
				IRS	Ingestion Rate of Soil	200	mg/day	USEPA, 1991	

Notes:

MDC = Maximum Detected Concentration

EPC = Exposure Point Concentration

kg = kilogram

mg/kg = milligram per kilogram

mg/day = milligram per day

kg/mg = kilogram per milligram

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

APPENDIX E.2

SWMU 37 HHRA
RAGS D TABLES AND IRON "MARGIN OF EXPOSURE" EVALUATION

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Table E.2-10.3 RME Risk Assessment Summary: Child Resident - SWMU 37 (Total Soil)

Table E.2-1
Selection of Exposure Pathways - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil	Surface Soil	Surface Soil	Maintenance Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
						Dermal Absorption	Quant	Receptor could come into contact with surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
		Air	Ambient Air Above Surface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil. [1]
	Subsurface Soil	Subsurface Soil	Subsurface Soil	Maintenance Worker	Adult	Ingestion	None	Receptor is not likely to ingest subsurface soil from the site since maintenance does not include excavation.
						Dermal Absorption	None	Receptor is not likely to come in contact with subsurface soil from the site since maintenance does not include excavation.
		Air	Ambient Air Above Subsurface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	None	Receptor is not likely to inhale particulates from ambient air above the subsurface soil since maintenance activities do not include excavation. [1]
	Groundwater [2]	Groundwater	Groundwater	Maintenance Worker	Adult	Ingestion	None	Receptor is not likely to ingest groundwater from the site during maintenance activities.
						Dermal Absorption	None	Receptor is not likely to contact groundwater from the site during maintenance activities.
		Air	Upward Migration of Vapors from Groundwater (Outdoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
			Upward Migration of Vapors from Groundwater (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors.
			Vapors while Showering	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
Future	Surface Soil	Surface Soil	Surface Soil	Maintenance Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
						Dermal Absorption	Quant	Receptor could come into contact with surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
				Commerical/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil while working on site.
						Dermal Absorption	Quant	Receptor could contact surface soil while working on site.
				Construction Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil from the site during construction activities.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil from the site during construction activities.
				Resident	Child	Ingestion	Quant	Receptor could ingest surface soil while living on site.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil while living on site.
					Adult	Ingestion	Quant	Receptor could ingest surface soil while living on site.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil while living on site.
					Child/Adult	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to surface soil. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
		Air	Ambient Air Above Surface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while working on site. [1]
				Commerical/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while working on site. [1]
				Construction Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while working on site. [1]
				Resident	Child	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while living on site. [1]
					Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while living on site. [1]
					Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to surface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]

Table E.2-1
Selection of Exposure Pathways - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Cont.	Surface Soil Cont.	Air Cont.	Upward Migration of Vapors from Soil (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into building. [1]
				Construction Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Resident	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [1]
					Child	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [1]
					Child/Adult	Inhalation	None	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to surface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]
	Subsurface Soil	Subsurface Soil	Subsurface Soil	Maintenance Worker	Adult	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction activities while conducting routine maintenance activities.
						Dermal Absorption	Quant	Receptor could come in contact with subsurface soil when mixed with surface soil from construction activities while conducting routine maintenance activities.
				Commerical/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a commercial/industrial facility.
						Dermal Absorption	Quant	Receptor could contact subsurface soil when mixed with surface soil from construction of a commercial/industrial facility.
				Construction Worker	Adult	Ingestion	Quant	Receptor could ingest subsurface soil from the site while during construction activities.
						Dermal Absorption	Quant	Receptor could come into contact with subsurface soil from the site during construction activities.
				Resident	Child	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a residence.
						Dermal Absorption	Quant	Receptor could come in contact with subsurface soil when mixed with surface soil from construction of a residence.
					Adult	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a residence.
						Dermal Absorption	Quant	Receptor could come in contact with subsurface soil when mixed with surface soil from construction of a residence.
					Child/Adult	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to subsurface soil. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
		Air	Ambient Air Above Subsurface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction activities while conducting routine maintenance activities. [1]
				Commerical/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a commercial/industrial facility. [1]
				Construction Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil during construction activities. [1]
				Resident	Child	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a residence. [1]
					Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a residence. [1]
					Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to subsurface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]

Table E.2-1
Selection of Exposure Pathways - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Cont.	Subsurface Soil Cont.	Air Cont.	Upward Migration of Vapors from Soil (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into building.[1]
				Construction Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Resident	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [1]
					Child	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence.[1]
					Child/Adult	Inhalation	None	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to subsurface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]
	Groundwater [2]	Groundwater	Groundwater	Maintenance Worker	Adult	Ingestion	None	Receptor is not likely to ingest groundwater from the site during maintenance activities.
						Dermal Absorption	None	Receptor is not likely to contact groundwater from the site during maintenance activities.
				Commercial/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply for industrial process.
				Construction Worker	Adult	Ingestion	None	Due to the depth to groundwater (approximately 20-25 ft bgs), the receptor is not likely to ingest groundwater during excavation activities.
						Dermal Absorption	None	Due to the depth to groundwater (approximately 20-25 ft bgs), the receptor is not likely to contact groundwater during excavation activities.
				Resident	Adult	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply.
					Child	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply.
					Child/Adult	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
		Air	Upward Migration of Vapors from Groundwater (Outdoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
				Construction Worker	Adult	Inhalation	Quant	Receptor could inhale vapors that migrated upward from groundwater to during excavation activities.
				Resident	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
					Child	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
					Child/Adult	Inhalation	None	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.[2]
			Upward Migration of Vapors from Groundwater (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors.
				Commercial/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into building.
				Construction Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors.
				Resident	Adult	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into residence.
					Child	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into residence.

Table E.2-1
Selection of Exposure Pathways - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Cont.	Groundwater Cont.	Air Cont.	Upward Migration of Vapors from Groundwater (Indoors) Cont.	Resident Cont.	Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.[2]
			Vapors while Showering	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
				Construction Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
				Resident	Adult	Inhalation	Quant	Receptor could inhale vapors from groundwater while showering.
					Child	Inhalation	None	Receptor is assumed not to shower.
					Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. Since the shower scenario applies only to the adult resident, the lifetime resident exposure will be equivalent to that of the adult resident.[2]

Notes:
[1] VOCs not identified as COPCs in soil; therefore, vapors via inhalation pathway not assessed

[2] Groundwater from the surface aquifer is not currently used at the sites for potable or non-potable water supply.

Table E.2-2.1
SWMU 37 COPC Determination - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Surface Soil

Exposure point	CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Screening Toxicity Value (N/C)		Potential ARAR/TBC Value		Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Surface Soil		**TAL Metals**														
	7429-90-5	Aluminum	9,400	29,000	mg/kg	37SB7A	10/10	2.1 - 210	29,000	7,821	N	102,200	N	IND	Y	**ARES**
	7440-36-0	Antimony	0.076	1.2	mg/kg	37SB2A	10/10	0.042 - 0.0518	1.2	3.13	N	40.88	N	IND	N	BSL
	7440-38-2	Arsenic	1	11	mg/kg	37SB7A	10/10	0.0232 - 0.071	11	0.426	C	1.91	C	IND	Y	***ARES/IND***
	7440-39-3	Barium	47	103	mg/kg	37SB3A	10/10	0.106 - 0.53	103	1,564	N	20,440	N	IND	N	BSL
	7440-41-7	Beryllium	0.46	1.4	mg/kg	37SB7A	10/10	0.021 - 0.0391	1.4	15.64	N	204.4	N	IND	N	BSL
	7440-43-9	Cadmium	0.93	2.6	mg/kg	37SB10A	10/10	0.11 - 0.182	2.6	3.911	N	51.1	N	IND	N	BSL
	7440-70-2	Calcium	250	106,000	mg/kg	37SB2A	10/10	4.2 - 4150	106,000	--	--	1,095,000	--	RDA	N	BSL
	7440-47-3	Chromium [1]	15	200	mg/kg	37SB10A	10/10	0.72 - 4.56	200	23.46	N	306.6	N	IND	Y	**ARES**
	7440-48-4	Cobalt	2.8	9.6	mg/kg	37SB5A	10/10	0.208 - 0.37	9.6	--	--	--	--	--	Y	NSV
	7440-50-8	Copper	6.9	210	mg/kg	37SB7A	10/10	0.044 - 1.84	210	312.9	N	4,088	N	IND	N	BSL
	7439-89-6	Iron	14,300	29,000	mg/kg	37SB5A	10/10	0.48 - 240	29,000	5,475	N	71,540	N	IND	Y	**ARES**
	7439-92-1	Lead [2]	10	315	mg/kg	37SB8A DUP AVG	10/10	0.0218 - 1.09	315	400	--	750	--	AL	N	BSL
	7439-95-4	Magnesium	880	6,900	mg/kg	37SB10A	10/10	5 - 16.1	6,900	--	--	156,400	--	RDA	N	BSL
	7439-96-5	Manganese	130	470	mg/kg	37SB5A	10/10	0.16 - 2.64	470	156.4	N	2,044	N	IND	Y	**ARES**
	7439-97-6	Mercury [3]	0.013	3.3	mg/kg	37SB7A	10/10	0.0075 - 0.075	3.3	2.35	--	30.66	--	IND	Y	**ARES**
	7440-02-0	Nickel	7.2	53	mg/kg	37SB8A DUP AVG	10/10	0.0356 - 0.356	53	156.4	N	2,044	N	IND	N	BSL
	7440-09-7	Potassium	677	1,700	mg/kg	37SB5A	10/10	5 - 25	1,700	--	--	2,607,000	--	RDA	N	BSL
	7782-49-2	Selenium	0.07075	0.47	mg/kg	37SB1A	8/10	0.0502 - 0.089	0.47	39.11	N	511	N	IND	N	BSL
	7440-22-4	Silver	0.028	0.3	mg/kg	37SB7A	10/10	0.0044 - 0.013	0.3	39.11	N	511	N	IND	N	BSL
	7440-23-5	Sodium	28	110	mg/kg	37SB10A	10/10	8.92 - 13	110	--	--	625,700	--	RDA	N	BSL
	7440-28-0	Thallium	0.048	0.2	mg/kg	37SB5A	10/10	0.0049 - 0.027	0.2	0.548	N	7.154	N	IND	N	BSL
	7440-62-2	Vanadium	16	49	mg/kg	37SB5A	10/10	0.034 - 0.207	49	7.82	N	102.2	N	IND	Y	**ARES**
	7440-66-6	Zinc	31	150	mg/kg	37SB7A	10/10	0.517 - 2.585	150	2,346	N	30,660	N	IND	N	BSL
		Pesticides/PCBs														
	60-57-1	Dieldrin	1.1E-02	1.1E-02	mg/kg	37SB1A	1/8	0.000494 - 0.00095	1.1E-02	4.0E-02	C	1.8E-01	C	IND	N	BSL
	72-20-8	Endrin	3.5E-03	8.3E-03	mg/kg	37SB10A	4/8	0.000477 - 0.0011	8.3E-03	2.3E+00	N	3.1E+01	N	IND	N	BSL
	11097-69-1	Aroclor 1254 [4]	1.7E-02	1.0E+00	mg/kg	37SB7A	6/8	0.0048 - 0.0091	1.0E+00	1.6E-01	N	1.4E+00	C	IND	Y	**ARES**
		TCL VOCs														
	78-93-3	2-Butanone	2.4E-02	2.4E-02	mg/kg	37SB3A	1/3	0.0057 - 0.0082	2.4E-02	4.7E+03	N	6.1E+04	N	IND	N	BSL
	67-64-1	Acetone	3.7E-02	1.1E-01	mg/kg	37SB1A	3/3	0.0057 - 0.0082	1.1E-01	7.0E+03	N	9.2E+04	N	IND	N	BSL
	75-09-2	Methylene chloride	4.5E-03	1.0E-02	mg/kg	37SB2A	2/3	0.0032 - 0.00461	1.0E-02	8.5E+01	C	3.8E+02	C	IND	N	BSL
		TCL SVOCs														
	59-50-7	4-Chloro-3-Methylphenol [5]	1.2E-02	1.2E-02	mg/kg	37SB3A	1/3	0.00573 - 0.125	1.2E-02	3.9E+05	N	5.1E+06	N	IND	N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	4.6E-02	1.0E+00	mg/kg	37SB2A	3/3	0.00228 - 0.0497	1.0E+00	4.6E+01	C	2.0E+02	C	IND	N	BSL
	84-74-2	Di-n-butylphthalate	5.9E-02	2.6E+01	mg/kg	37SB2A	3/3	0.0042 - 0.0917	2.6E+01	7.8E+02	N	1.0E+04	N	IND	N	BSL
	84-66-2	Diethylphthalate	1.8E-02	1.2E-01	mg/kg	37SB2A	2/3	0.00209 - 0.0456	1.2E-01	6.3E+03	N	8.2E+04	N	IND	N	BSL
	206-44-0	Fluoranthene	1.2E-01	1.9E-01	mg/kg	37SB2A	2/3	0.00259 - 0.0564	1.9E-01	3.1E+02	N	4.1E+03	N	IND	N	BSL
	86-30-6	N-Nitrosodiphenylamine	3.0E-01	4.5E-01	mg/kg	37SB1A	2/3	0.00523 - 0.114	4.5E-01	1.3E+02	C	5.8E+02	C	IND	N	BSL
	85-01-8	Phenanthrene [6]	4.0E-02	4.0E-02	mg/kg	37SB1A	1/3	0.00253 - 0.0552	4.0E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
	129-00-0	Pyrene	1.1E-01	1.1E-01	mg/kg	37SB1A	2/3	0.00163 - 0.0355	1.1E-01	2.3E+02	N	3.1E+03	N	IND	N	BSL
		PAHs														
	120-12-7	Anthracene	2.4E-03	2.4E-03	mg/kg	37SB2A	1/3	0.00077 - 0.00115	2.4E-03	2.3E+03	N	3.1E+04	N	IND	N	BSL
	205-99-2	Benzo(b)fluoranthene	7.6E-03	7.6E-03	mg/kg	37SB2A	1/3	0.00143 - 0.00213	7.6E-03	2.2E-01	C	3.9E+00	C	IND	N	BSL
	207-08-9	Benzo(k)fluoranthene	5.5E-03	5.5E-03	mg/kg	37SB2A	1/3	0.0011 - 0.00164	5.5E-03	2.2E+00	C	3.9E+01	C	IND	N	BSL
	218-01-9	Chrysene	1.2E-02	1.2E-02	mg/kg	37SB2A	1/3	0.00132 - 0.00197	1.2E-02	2.2E+01	C	3.9E+02	C	IND	N	BSL
	206-44-0	Fluoranthene	2.2E-03	7.3E-02	mg/kg	37SB1A	3/3	0.00187 - 0.00279	7.3E-02	3.1E+02	N	4.1E+03	N	IND	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	8.1E-03	8.1E-03	mg/kg	37SB2A	1/3	0.00077 - 0.00115	8.1E-03	2.2E-01	C	3.9E+00	C	IND	N	BSL
	85-01-8	Phenanthrene [6]	1.5E-02	1.8E-02	mg/kg	37SB2A	2/3	0.00066 - 0.000984	1.8E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
	129-00-0	Pyrene	1.8E-03	5.9E-02	mg/kg	37SB2A	3/3	0.00099 - 0.00148	5.9E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
		Explosives														
	121-14-2	2,4-Dinitrotoluene	2.7E-01	6.3E-01	mg/kg	37SB2A	3/10	0.1 - 0.142	6.3E-01	1.6E+01	N	2.0E+02	N	IND	N	BSL
	--	Dinitrotoluene Mix	2.7E-01	6.3E-01	mg/kg	37SB2A	3/10	0 - 0	6.3E-01	9.4E-01	C	4.2E+00	C	IND	N	BSL
		Cyanide														
	57-12-5	Cyanide	5.0E-01	8.0E-01	mg/kg	37SB1A	2/3	0.0356 - 0.0356	8.0E-01	1.6E+02	N	2.0E+03	N	IND	N	BSL

Table E.2-2.1
SWMU 37 COPC Determination - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

COPC = Chemical of Potential Concern
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
mg/kg = Milligram Per Kilogram
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
N/C = Noncarcinogenic/Carcinogenic per EPA RBC Table (October 2007)
ARAR = Applicable, Relevant, and Appropriate Requirement
TBC = To-Be-Considered
IND = Adjusted Industrial RBC
AL = USEPA Action Level
-- = No Value Available
RDA = Recommended Daily Allowance

[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[5] = 3-Methylphenol RBC value was used
[6] = Pyrene RBC value was used

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table E.2-2.2
SWMU 37 COPC Determination - Total Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure point	CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Screening Toxicity Value (N/C)		Potential ARAR/TBC Value		Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Total Soil		**TAL Metals**														
	7429-90-5	Aluminum	9,400	29,000	mg/kg	37SB7A	21/21	2.1 - 210	29,000	7,821	N	102,200	N	IND	Y	**ARES**
	7440-36-0	Antimony	0.076	1.5	mg/kg	37SB9C	21/21	0.042 - 0.0518	1.5	3.13	N	40.88	N	IND	N	BSL
	7440-38-2	Arsenic	1	11	mg/kg	37SB7A	21/21	0.0232 - 0.071	11	0.426	C	1.91	C	IND	Y	***ARES/IND***
	7440-39-3	Barium	47	132	mg/kg	37SB1B	21/21	0.106 - 5.3	132	1,564	N	20,440	N	IND	N	BSL
	7440-41-7	Beryllium	0.46	1.4	mg/kg	37SB7A	21/21	0.021 - 0.0391	1.4	15.6	N	204.4	N	IND	N	BSL
	7440-43-9	Cadmium	0.79	2.6	mg/kg	37SB10A	21/21	0.11 - 0.182	2.6	3.91	N	51.1	N	IND	N	BSL
	7440-70-2	Calcium	250	106,000	mg/kg	37SB2A	21/21	4.2 - 4150	106,000	--	--	1,095,000	--	RDA	N	BSL
	7440-47-3	Chromium [1]	15	200	mg/kg	37SB10A	21/21	0.72 - 4.56	200	23.46	N	306.6	N	IND	Y	**ARES**
	7440-48-4	Cobalt	2.8	13	mg/kg	37SB10B	21/21	0.208 - 0.37	13	--	--	--	--	--	Y	NSV
	7440-50-8	Copper	6.9	210	mg/kg	37SB7A	21/21	0.044 - 1.84	210	312.9	N	4,088	N	IND	N	BSL
	7439-89-6	Iron	14,300	32,000	mg/kg	37SB7C	21/21	0.48 - 240	32,000	5,475	N	71,540	N	IND	Y	**ARES**
	7439-92-1	Lead [2]	7.4	315	mg/kg	37SB8A DUP AVG	21/21	0.0218 - 1.09	315	400	--	750	--	AL	N	BSL
	7439-95-4	Magnesium	880	6,900	mg/kg	37SB10A	21/21	5 - 32.1	6,900	--	--	156,400	--	RDA	N	BSL
	7439-96-5	Manganese	130	640	mg/kg	37SB9C	21/21	0.16 - 2.64	640	156.4	N	2,044	N	IND	Y	**ARES**
	7439-97-6	Mercury [3]	0.013	3.3	mg/kg	37SB7A	18/21	0.0075 - 0.075	3.3	2.4	--	31	--	IND	Y	**ARES**
	7440-02-0	Nickel	7.2	53	mg/kg	37SB8A DUP AVG	21/21	0.0356 - 0.356	53	156.4	N	2,044	N	IND	N	BSL
	7440-09-7	Potassium	677	2,700	mg/kg	37SB7C	21/21	5 - 25	2,700	--	--	2,607,000	--	RDA	N	BSL
	7782-49-2	Selenium	0.07075	0.6	mg/kg	37SB1B	17/21	0.0502 - 0.089	0.6	39.11	N	511	N	IND	N	BSL
	7440-22-4	Silver	0.028	0.3	mg/kg	37SB7A	21/21	0.0044 - 0.013	0.3	39.11	N	511	N	IND	N	BSL
	7440-23-5	Sodium	28	110	mg/kg	37SB7C	21/21	8.92 - 13	110	--	--	625,700	--	RDA	N	BSL
	7440-28-0	Thallium	0.048	0.27	mg/kg	37SB7B	21/21	0.0049 - 0.027	0.27	0.55	N	7.2	N	IND	N	BSL
	7440-62-2	Vanadium	16	49	mg/kg	37SB5A	21/21	0.034 - 0.207	49	8	N	102	N	IND	Y	**ARES**
	7440-66-6	Zinc	31	150	mg/kg	37SB7A	21/21	0.517 - 2.585	150	2,346	N	30,660	N	IND	N	BSL
		Pesticides/PCBs														
	60-57-1	Dieldrin	1.1E-02	1.1E-02	mg/kg	37SB1A	1/16	0.000494 - 0.00095	1.1E-02	4.0E-02	C	1.8E-01	C	IND	N	BSL
	72-20-8	Endrin	3.5E-03	8.3E-03	mg/kg	37SB10A	4/16	0.000477 - 0.0011	8.3E-03	2.3E+00	N	3.1E+01	N	IND	N	BSL
	11097-69-1	Aroclor 1254 [4]	1.7E-02	1.0E+00	mg/kg	37SB7A	8/16	0.0048 - 0.0091	1.0E+00	1.6E-01	N	1.4E+00	C	IND	Y	**ARES**
		TCL VOCs														
	78-93-3	2-Butanone	1.8E-02	2.4E-02	mg/kg	37SB1B	3/6	0.0057 - 0.0082	2.4E-02	4.7E+03	N	6.1E+04	N	IND	N	BSL
	67-64-1	Acetone	2.5E-02	1.1E-01	mg/kg	37SB1A	6/6	0.0057 - 0.0082	1.1E-01	7.0E+03	N	9.2E+04	N	IND	N	BSL
	156-59-2	cis-1,2-Dichloroethene	1.3E-03	1.3E-03	mg/kg	37SB2B	1/6	0.000809 - 0.00116	1.3E-03	7.8E+01	N	1.0E+03	N	IND	N	BSL
	108-87-2	Methylcyclohexane	3.0E-03	3.0E-03	mg/kg	37SB3B	1/6	0.000963 - 0.00139	3.0E-03	--	--	--	--	IND	Y	NSV
	75-09-2	Methylene chloride	4.5E-03	1.0E-02	mg/kg	37SB2A	5/6	0.0032 - 0.00461	1.0E-02	8.5E+01	C	3.8E+02	C	IND	N	BSL
	108-88-3	Toluene	1.0E-03	1.0E-03	mg/kg	37SB2B	1/6	0.000529 - 0.000761	1.0E-03	6.3E+02	N	8.2E+03	N	IND	N	BSL
	79-01-6	Trichloroethene	6.8E-03	6.8E-03	mg/kg	37SB2B	1/6	0.000772 - 0.00111	6.8E-03	1.6E+00	C	7.2E+00	C	IND	N	BSL
	1330-20-7	Xylenes	2.0E-03	2.0E-03	mg/kg	37SB3B	1/6	0.00048 - 0.00069	2.0E-03	1.6E+03	N	2.0E+04	N	IND	N	BSL
		TCL SVOCs														
	59-50-7	4-Chloro-3-Methylphenol [5]	1.2E-02	2.4E-02	mg/kg	37SB1B	3/6	0.00521 - 0.125	2.4E-02	3.9E+05	N	5.1E+06	N	IND	N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	4.4E-02	1.0E+00	mg/kg	37SB2A	6/6	0.00207 - 0.0497	1.0E+00	4.6E+01	C	2.0E+02	C	IND	N	BSL
	84-74-2	Di-n-butylphthalate	1.8E-02	2.6E+01	mg/kg	37SB2A	6/6	0.00382 - 0.0917	2.6E+01	7.8E+02	N	1.0E+04	N	IND	N	BSL
	117-84-0	Di-n-octylphthalate	3.8E-02	3.8E-02	mg/kg	37SB3B	1/6	0.0031 - 0.0744	3.8E-02	--	--	--	--	IND	Y	NSV
	84-66-2	Diethylphthalate	1.1E-02	1.2E-01	mg/kg	37SB2A	4/6	0.0019 - 0.0456	1.2E-01	6.3E+03	N	8.2E+04	N	IND	N	BSL
	131-11-3	Dimethylphthalate	3.0E-02	3.0E-02	mg/kg	37SB1B	1/6	0.00331 - 0.0794	3.0E-02	--	--	--	--	--	Y	NSV
	206-44-0	Fluoranthene	1.2E-01	1.9E-01	mg/kg	37SB2A	2/6	0.00235 - 0.0564	1.9E-01	3.1E+02	N	4.1E+03	N	IND	N	BSL
	86-30-6	N-Nitrosodiphenylamine	3.0E-01	4.5E-01	mg/kg	37SB1A	2/6	0.00475 - 0.114	4.5E-01	1.3E+02	C	5.8E+02	C	IND	N	BSL
	85-01-8	Phenanthrene [6]	4.0E-02	4.0E-02	mg/kg	37SB1A	1/6	0.0023 - 0.0552	4.0E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
	129-00-0	Pyrene	1.1E-01	1.1E-01	mg/kg	37SB1A	2/6	0.00148 - 0.0355	1.1E-01	2.3E+02	N	3.1E+03	N	IND	N	BSL
		PAHs														
	120-12-7	Anthracene	2.4E-03	2.4E-03	mg/kg	37SB2A	1/6	0.00077 - 0.00115	2.4E-03	2.3E+03	N	3.1E+04	N	IND	N	BSL
	205-99-2	Benzo(b)fluoranthene	7.6E-03	7.6E-03	mg/kg	37SB2A	1/6	0.00143 - 0.00213	7.6E-03	2.2E-01	C	3.9E+00	C	IND	N	BSL
	207-08-9	Benzo(k)fluoranthene	5.5E-03	5.5E-03	mg/kg	37SB2A	1/6	0.0011 - 0.00164	5.5E-03	2.2E+00	C	3.9E+01	C	IND	N	BSL
	218-01-9	Chrysene	1.2E-02	1.2E-02	mg/kg	37SB2A	1/6	0.00132 - 0.00197	1.2E-02	2.2E+01	C	3.9E+02	C	IND	N	BSL
	206-44-0	Fluoranthene	2.2E-03	7.3E-02	mg/kg	37SB1A	3/6	0.00187 - 0.00279	7.3E-02	3.1E+02	N	4.1E+03	N	IND	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	8.1E-03	8.1E-03	mg/kg	37SB2A	1/6	0.00077 - 0.00115	8.1E-03	2.2E-01	C	3.9E+00	C	IND	N	BSL
	85-01-8	Phenanthrene [6]	1.5E-02	1.8E-02	mg/kg	37SB2A	2/6	0.00066 - 0.000984	1.8E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
	129-00-0	Pyrene	1.8E-03	5.9E-02	mg/kg	37SB2A	3/6	0.00099 - 0.00148	5.9E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
		Explosives														
	121-14-2	2,4-Dinitrotoluene	2.7E-01	6.3E-01	mg/kg	37SB2A	3/21	0.1 - 0.142	6.3E-01	1.6E+01	N	2.0E+02	N	IND	N	BSL
	--	Dinitrotoluene Mix	2.7E-01	6.3E-01	mg/kg	37SB2A	3/21	0 - 0	6.3E-01	9.4E-01	C	4.2E+00	C	IND	N	BSL
	2691-41-0	HMX	3.2E-01	3.2E-01	mg/kg	37SB7C	1/21	0.066 - 0.229	3.2E-01	3.9E+02	N	5.1E+03	N	IND	N	BSL
		Cyanide														
	57-12-5	Cyanide	4.0E-02	8.0E-01	mg/kg	37SB1A	4/6	0.0356 - 0.0356	8.0E-01	1.6E+02	N	2.0E+03	N	IND	N	BSL

Table E.2-2.2
SWMU 37 COPC Determination - Total Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

COPC = Chemical of Potential Concern
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound
mg/kg = Milligram Per Kilogram
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
N/C = Noncarcinogenic/Carcinogenic per EPA RBC Table (October 2007)
ARAR = Applicable, Relevant, and Appropriate Requirement
TBC = To-Be-Considered
IND = Adjusted Industrial RBC
AL = USEPA Action Level
-- = No Value Available
RDA = Recommended Daily Allowance

[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol RBC value was used
[6] = Pyrene RBC value was used

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table E.2-2.3
Non-detected Chemicals MDL Screening for SWMU 37 - Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
TAL Metals								
Mercury [1]	7439-97-6	mg/kg	3	24	0.0077	0.0077	2.35	N
Selenium	7782-49-2	mg/kg	4	24	0.089	0.089	39.11	N
Pesticides/PCBs								
4,4'-DDD	72-54-8	ug/kg	16	16	0.381	2.3	2.7E+03	N
4,4'-DDE	72-55-9	ug/kg	16	16	0.28	1.9	1.9E+03	N
4,4'-DDT	50-29-3	ug/kg	16	16	0.288	2.1	1.9E+03	N
Aldrin	309-00-2	ug/kg	16	16	0.486	1.1	3.8E+01	N
alpha-BHC	319-84-6	ug/kg	16	16	0.4	0.73	1.0E+02	N
alpha-Chlordane [2]	5103-71-9	ug/kg	16	16	0.694	1.4	1.8E+03	N
beta-BHC	319-85-7	ug/kg	16	16	0.76	1.81	3.5E+02	N
delta-BHC [3]	319-86-8	ug/kg	16	16	1.1	1.9	1.0E+02	N
Dieldrin	60-57-1	ug/kg	15	16	0.52	0.95	4.0E+01	N
Endosulfan I	959-98-8	ug/kg	16	16	1	1.9	4.7E+04	N
Endosulfan II	33213-65-9	ug/kg	16	16	0.342	1.8	4.7E+04	N
Endosulfan Sulfate [4]	1031-07-8	ug/kg	16	16	0.805	2.1	4.7E+04	N
Endrin	72-20-8	ug/kg	12	16	0.477	0.64	2.3E+03	N
Endrin Aldehyde [5]	7421-93-4	ug/kg	16	16	1.2	2.2	2.3E+03	N
Endrin Ketone [5]	53494-70-5	ug/kg	16	16	0.44	2.1	2.3E+03	N
gamma-BHC (Lindane)	58-89-9	ug/kg	16	16	0.31	1.3	4.9E+02	N
gamma-Chlordane [2]	5103-74-2	ug/kg	16	16	0.53	1.12	1.8E+03	N
Heptachlor	76-44-8	ug/kg	16	16	1.13	2.5	1.4E+02	N
Heptachlor Epoxide	1024-57-3	ug/kg	16	16	0.47	0.86	7.0E+01	N
Methoxychlor	72-43-5	ug/kg	16	16	0.448	2.7	3.9E+04	N
Toxaphene	8001-35-2	ug/kg	16	16	25	46	5.8E+02	N
Aroclor 1016	12674-11-2	ug/kg	16	16	4.8	25.6	5.5E+02	N
Aroclor 1221	11104-28-2	ug/kg	16	16	3.2	15	3.2E+02	N
Aroclor 1232	11141-16-5	ug/kg	16	16	8	17	3.2E+02	N
Aroclor 1242	53469-21-9	ug/kg	16	16	4.8	34	3.2E+02	N
Aroclor 1248	12672-29-6	ug/kg	16	16	6	11	3.2E+02	N
Aroclor 1254 [6]	11097-69-1	ug/kg	8	16	5	5.3	1.6E+02	N
Aroclor 1260	11096-82-5	ug/kg	16	16	11.2	33	3.2E+02	N
Aroclor 1262	37324-23-5	ug/kg	15	15	5.9	11	--	NS
Aroclor 1268	11100-14-4	ug/kg	15	15	5	9.1	--	NS
Herbicides								
2,4,5-T	93-76-5	ug/kg	1	1	32	32	7.8E+04	N
2,4,5-TP (Silvex)	93-72-1	ug/kg	1	1	64	64	6.3E+04	N
2,4-D	94-75-7	ug/kg	1	1	256	256	7.8E+04	N
2,4-DB	94-82-6	ug/kg	1	1	992	992	6.3E+04	N
Dalapon	75-99-0	ug/kg	1	1	912	912	2.3E+05	N
Dicamba	1918-00-9	ug/kg	1	1	32	32	2.3E+05	N
Dichlorprop	120-36-5	ug/kg	1	1	272	272	--	NS
Dinoseb	88-85-7	ug/kg	1	1	21	21	7.8E+03	N
MCPA	94-74-6	ug/kg	1	1	22,300	22,300	3.9E+03	**Y**
MCPP	93-65-2	ug/kg	1	1	80,900	80,900	7.8E+03	**Y**
TCL VOCs								
1,1,1-Trichloroethane	71-55-6	ug/kg	6	9	0.486	0.699	1.6E+07	N
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	6	9	0.744	1.07	3.2E+03	N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/kg	6	9	0.865	1.24	2.3E+08	N
1,1,2-Trichloroethane	79-00-5	ug/kg	6	9	0.676	0.973	1.1E+04	N
1,1-Dichloroethane	75-34-3	ug/kg	6	9	0.825	1.19	1.6E+06	N
1,1-Dichloroethene	75-35-4	ug/kg	6	9	0.836	1.2	3.9E+05	N
1,2,3-Trichlorobenzene	87-61-6	ug/kg	6	9	0.62	0.892	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/kg	6	9	0.467	0.672	7.8E+04	N
1,2-Dibromo-3-chloropropane	96-12-8	ug/kg	6	9	2.37	3.41	2.0E+02	N
1,2-Dibromoethane	106-93-4	ug/kg	6	9	0.781	1.12	3.2E+02	N
1,2-Dichlorobenzene	95-50-1	ug/kg	6	9	0.552	0.794	7.0E+05	N
1,2-Dichloroethane	107-06-2	ug/kg	6	9	0.491	0.707	7.0E+03	N
1,2-Dichloropropane	78-87-5	ug/kg	6	9	0.668	0.961	9.4E+03	N
1,3-Dichlorobenzene	541-73-1	ug/kg	6	9	0.306	0.44	2.3E+04	N
1,4-Dichlorobenzene	106-46-7	ug/kg	6	9	0.809	1.16	2.7E+04	N
2-Butanone	78-93-3	ug/kg	3	9	5.95	8.2	4.7E+06	N
2-Hexanone	591-78-6	ug/kg	6	9	2.58	3.71	--	NS
4-Methyl-2-pentanone	108-10-1	ug/kg	6	9	1.66	2.39	--	NS
Benzene	71-43-2	ug/kg	6	9	0.601	0.864	1.2E+04	N
Bromochloromethane	74-97-5	ug/kg	6	9	0.868	1.25	--	NS
Bromodichloromethane	75-27-4	ug/kg	6	9	0.571	0.822	1.0E+04	N
Bromoform	75-25-2	ug/kg	6	9	0.659	0.948	8.1E+04	N
Bromomethane	74-83-9	ug/kg	6	9	1.71	2.46	1.1E+04	N
Carbon Disulfide	75-15-0	ug/kg	6	9	1.65	2.38	7.8E+05	N
Carbon Tetrachloride	56-23-5	ug/kg	6	9	0.531	0.764	4.9E+03	N
Chlorobenzene	108-90-7	ug/kg	6	9	0.754	1.08	1.6E+05	N
Chloroethane	75-00-3	ug/kg	6	9	1.54	2.21	2.2E+05	N
Chloroform	67-66-3	ug/kg	6	9	0.508	0.731	7.8E+04	N

Table E.2-2.3
Non-detected Chemicals MDL Screening for SWMU 37 - Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
Chloromethane	74-87-3	ug/kg	6	9	0.951	1.37	--	NS
cis-1,2-Dichloroethene	156-59-2	ug/kg	5	9	0.809	1.16	7.8E+04	N
cis-1,3-Dichloropropene [7]	10061-01-5	ug/kg	6	9	0.56	0.805	6.4E+03	N
Cyclohexane	110-82-7	ug/kg	6	9	0.36	0.518	--	NS
Dibromochloromethane	124-48-1	ug/kg	6	9	0.589	0.848	7.6E+03	N
Dichlorodifluoromethane	75-71-8	ug/kg	6	9	0.762	1.1	1.6E+06	N
Ethylbenzene	100-41-4	ug/kg	6	9	0.482	0.694	7.8E+05	N
Isopropylbenzene	98-82-8	ug/kg	6	9	0.622	0.895	7.8E+05	N
Methyl Acetate	79-20-9	ug/kg	6	9	3.96	5.69	7.8E+06	N
Methyl tert-Butyl Ether	1634-04-4	ug/kg	6	9	0.731	1.05	1.6E+05	N
Methylcyclohexane	108-87-2	ug/kg	5	9	0.963	1.39	--	NS
Methylene Chloride	75-09-2	ug/kg	1	9	4.61	4.61	8.5E+04	N
Styrene	100-42-5	ug/kg	6	9	0.504	0.725	1.6E+06	N
Tetrachloroethene	127-18-4	ug/kg	6	9	0.699	1.01	1.2E+03	N
Toluene	108-88-3	ug/kg	5	9	0.529	0.761	6.3E+05	N
trans-1,2-Dichloroethene	156-60-5	ug/kg	6	9	0.801	1.15	1.6E+05	N
trans-1,3-Dichloropropene [7]	10061-02-6	ug/kg	6	9	0.594	0.854	7.8E+04	N
Trichloroethene	79-01-6	ug/kg	5	9	0.772	1.11	1.6E+03	N
Trichlorofluoromethane	75-69-4	ug/kg	6	9	0.847	1.22	2.3E+06	N
Vinyl Chloride	75-01-4	ug/kg	6	9	0.422	0.607	9.0E+01	N
Xylenes	1330-20-7	ug/kg	5	9	0.48	0.69	1.6E+06	N
TCL SVOCs								
1,1'-Biphenyl	92-52-4	ug/kg	6	9	2.46	59	3.9E+05	N
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/kg	6	9	28.7	689	2.3E+03	N
2,2'-oxybis(1-Chloropropane)	108-60-1	ug/kg	6	9	1.32	31.7	9.1E+03	N
2,4,5-Trichlorophenol	95-95-4	ug/kg	6	9	3.34	80.2	7.8E+05	N
2,4,6-Trichlorophenol [8]	88-06-2	ug/kg	6	9	2.62	62.9	7.8E+03	N
2,4-Dichlorophenol	120-83-2	ug/kg	6	9	3.52	84.5	2.3E+04	N
2,4-Dimethylphenol	105-67-9	ug/kg	6	9	7.94	191	1.6E+05	N
2,4-Dinitrophenol	51-28-5	ug/kg	6	9	3.2	76.8	1.6E+04	N
2,4-Dinitrotoluene	121-14-2	ug/kg	4	9	3.15	3.78	1.6E+04	N
2,6-Dinitrotoluene	606-20-2	ug/kg	6	9	27.7	665	7.8E+03	N
2-Chloronaphthalene	91-58-7	ug/kg	6	9	2.3	55.2	6.3E+05	N
2-Chlorophenol	95-57-8	ug/kg	6	9	2.01	48.2	3.9E+04	N
2-Methylnaphthalene	91-57-6	ug/kg	6	9	2.74	65.8	3.1E+04	N
2-Methylphenol	95-48-7	ug/kg	6	9	4.84	116	3.9E+05	N
2-Nitroaniline	88-74-4	ug/kg	6	9	4.6	110	--	NS
2-Nitrophenol	88-75-5	ug/kg	6	9	1.7	40.8	--	NS
3,3'-Dichlorobenzidine	91-94-1	ug/kg	6	9	66.7	1,600	1.4E+03	**Y**
3-Nitroaniline	99-09-2	ug/kg	6	9	33.3	799	--	NS
4,6-Dinitro-2-methylphenol	534-52-1	ug/kg	6	9	4.51	108	--	NS
4-Bromophenyl-PhenylEther	101-55-3	ug/kg	6	9	3.38	81.1	--	NS
4-Chloro-3-methylphenol [9]	59-50-7	ug/kg	3	9	6.25	125	3.9E+05	N
4-Chloroaniline	106-47-8	ug/kg	6	9	1.26	30.2	3.1E+04	N
4-Chlorophenyl-PhenylEther	7005-72-3	ug/kg	6	9	3.27	78.5	--	NS
4-Methylphenol	106-44-5	ug/kg	6	9	6.37	153	3.9E+04	N
4-Nitroaniline	100-01-6	ug/kg	6	9	7.25	174	--	NS
4-Nitrophenol	100-02-7	ug/kg	6	9	2.83	67.9	--	NS
Acenaphthene	83-32-9	ug/kg	6	9	1.72	41.3	--	NS
Acenaphthylene [10]	208-96-8	ug/kg	6	9	1.5	36	--	NS
Acetophenone	98-86-2	ug/kg	6	9	1.9	45.6	--	NS
Anthracene	120-12-7	ug/kg	6	9	4.62	111	--	NS
Atrazine	1912-24-9	ug/kg	6	9	6.88	165	2.9E+03	N
Benzaldehyde	100-52-7	ug/kg	6	9	4.05	97.2	7.8E+05	N
Benzo(a)anthracene	56-55-3	ug/kg	6	9	13.3	319	2.2E+02	**Y**
Benzo(a)pyrene	50-32-8	ug/kg	6	9	5.71	1,370	2.2E+01	**Y**
Benzo(b)fluoranthene	205-99-2	ug/kg	6	9	9.76	2,340	2.2E+02	**Y**
Benzo(g,h,i)perylene [10]	191-24-2	ug/kg	6	9	8.72	2,090	2.3E+05	N
Benzo(k)fluoranthene	207-08-9	ug/kg	6	9	13.4	3,220	2.2E+03	**Y**
Bis(2-chloroethoxy)methane	111-91-1	ug/kg	6	9	3.14	75.4	--	NS
Bis(2-chloroethyl)Ether	111-44-4	ug/kg	6	9	1.73	41.5	5.8E+02	N
Butylbenzylphthalate	85-68-7	ug/kg	6	9	4.48	108	1.6E+06	N
Caprolactam	105-60-2	ug/kg	6	9	6.38	153	3.9E+06	N
Carbazole	86-74-8	ug/kg	6	9	6.1	146	3.2E+04	N
Chrysene	218-01-9	ug/kg	6	9	10.2	245	2.2E+04	N
Di-n-octylphthalate	117-84-0	ug/kg	5	9	3.1	74.4	--	NS
Dibenz(a,h)anthracene	53-70-3	ug/kg	6	9	5.9	1,420	2.2E+01	**Y**
Dibenzofuran	132-64-9	ug/kg	6	9	3.16	75.8	7.8E+03	N
Diethylphthalate	84-66-2	ug/kg	2	9	1.9	30.4	6.3E+06	N
Dimethylphthalate	131-11-3	ug/kg	5	9	3.64	79.4	--	NS
Fluoranthene	206-44-0	ug/kg	4	9	2.35	2.82	3.1E+05	N
Fluorene	86-73-7	ug/kg	6	9	1.68	40.3	3.1E+05	N
Hexachlorobenzene	118-74-1	ug/kg	6	9	2.51	60.2	4.0E+02	N
Hexachlorobutadiene [11]	87-68-3	ug/kg	6	9	3.87	92.9	7.8E+03	N

Table E.2-2.3
Non-detected Chemicals MDL Screening for SWMU 37 - Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
Hexachlorocyclopentadiene	77-47-4	ug/kg	6	9	1.98	47.5	4.7E+04	N
Hexachloroethane [12]	67-72-1	ug/kg	6	9	2.33	56	7.8E+03	N
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	6	9	3.92	941	2.2E+02	**Y**
Isophorone	78-59-1	ug/kg	6	9	1.73	41.5	6.7E+05	N
N-Nitrosodi-n-propylamine	621-64-7	ug/kg	6	9	3.29	79	9.1E+01	N
N-Nitrosodiphenylamine	86-30-6	ug/kg	4	9	4.75	5.7	1.3E+05	N
Naphthalene	91-20-3	ug/kg	6	9	2.75	66	1.6E+05	N
Nitrobenzene	98-95-3	ug/kg	6	9	3.2	76.8	3.9E+03	N
Pentachlorophenol	87-86-5	ug/kg	6	9	4.39	105	5.3E+03	N
Phenanthrene [10]	85-01-8	ug/kg	5	9	2.3	55.2	2.3E+05	N
Phenol	108-95-2	ug/kg	6	9	3.96	95	2.3E+06	N
Pyrene	129-00-0	ug/kg	4	9	1.48	1.78	2.3E+05	N
PAHs								
Acenaphthene	83-32-9	ug/kg	6	9	10.3	15.4	4.7E+05	N
Acenaphthylene [10]	208-96-8	ug/kg	6	9	12.8	19	2.3E+05	N
Anthracene	120-12-7	ug/kg	5	9	0.77	1.15	2.3E+06	N
Benzo(a)anthracene	56-55-3	ug/kg	6	9	0.88	1.31	2.2E+02	N
Benzo(a)pyrene	50-32-8	ug/kg	6	9	1.1	1.64	2.2E+01	N
Benzo(b)fluoranthene	205-99-2	ug/kg	5	9	1.43	2.13	2.2E+02	N
Benzo(g,h,i)perylene [10]	191-24-2	ug/kg	6	9	13.8	20.5	2.3E+05	N
Benzo(k)fluoranthene	207-08-9	ug/kg	5	9	1.1	1.64	2.2E+03	N
Chrysene	218-01-9	ug/kg	5	9	1.32	1.97	2.2E+04	N
Dibenz(a,h)anthracene	53-70-3	ug/kg	6	9	1.54	2.3	2.2E+01	N
Fluoranthene	206-44-0	ug/kg	3	9	2.04	2.04	3.1E+05	N
Fluorene	86-73-7	ug/kg	6	9	1.43	2.13	3.1E+05	N
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	5	9	0.77	1.15	2.2E+02	N
Naphthalene	91-20-3	ug/kg	6	9	8.69	13	1.6E+05	N
Phenanthrene [10]	85-01-8	ug/kg	4	9	0.66	0.72	2.3E+05	N
Pyrene	129-00-0	ug/kg	3	9	1.08	1.08	2.3E+05	N
Explosives								
1,3,5-Trinitrobenzene	99-35-4	mg/kg	21	24	0.074	0.14	2.3E+02	N
1,3-Dinitrobenzene	99-65-0	mg/kg	21	24	0.076	0.159	7.8E-01	N
2,4,6-Trinitrotoluene [13]	118-96-7	mg/kg	21	24	0.15	0.167	3.9E+00	N
2,4-Dinitrotoluene	121-14-2	mg/kg	18	24	0.1	0.142	1.6E+01	N
2,6-Dinitrotoluene	606-20-2	mg/kg	21	24	0.2	0.25	7.8E+00	N
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	21	24	0.151	0.22	1.6E+01	N
2-Nitrotoluene	88-72-2	mg/kg	21	24	0.17	0.266	7.8E+01	N
3-Nitrotoluene	99-08-1	mg/kg	21	24	0.184	0.21	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	mg/kg	21	24	0.162	0.3	1.6E+01	N
4-Nitrotoluene [14]	99-99-0	mg/kg	21	24	0.2	0.251	3.1E+01	N
HMX	2691-41-0	mg/kg	20	24	0.066	0.229	3.9E+02	N
Nitrobenzene	98-95-3	mg/kg	21	24	0.03	0.102	3.9E+00	N
RDX	121-82-4	mg/kg	21	24	0.048	0.131	5.8E+00	N
Tetryl	479-45-8	mg/kg	21	24	0.065	0.169	3.1E+01	N
Nitroglycerin/PETN								
Nitroglycerin	55-63-0	mg/kg	21	24	0.183	0.39	7.8E-01	N
PETN	78-11-5	mg/kg	21	24	0.23	0.511	--	NS
Cyanide								
Cyanide	57-12-5	mg/kg	2	9	0.0356	0.0356	1.6E+02	N

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
ug/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
PETN = Pentaerythritol Tetranitrate
MDL = Method Detection Limit
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
R-RBC = Residential RBC
SL = Screening Level

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

[1] = Mercuric chloride soil RBC value used
[2] = Chlordane RBC value was used
[3] = Alpha-BHC RBC value was used
[4] = Endosulfan RBC value was used
[5] = Endrin RBC value was used
[6] = Noncarcinogenic RBC value for Aroclor 1254 was used
[7] = 1,3-Dichloropropene RBC value was used
[8] = Noncarcinogenic RBC value for 2,4,6-Trichlorophenol was used
[9] = 3-Methylphenol RBC value was used
[10] = Pyrene RBC value was used
[11] = Noncarcinogenic RBC value for Hexachlorobutadiene was used
[12] = Noncarcinogenic RBC value for Hexachloroethane was used
[13] = Noncarcinogenic RBC value for 2,4,6-Trinitrotoluene was used
[14] = Noncarcinogenic RBC value for 4-Nitrotoluene was used

Table E.2-2.4
Groundwater COPC Selection - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted Tap Water RBC	MCL	COPC Flag (Y/N)	Rationale for Selection or Deletion
Perchlorate													
Perchlorate	14797-73-0	2	2.2	ug/L	37MW2	2/2	0.08 - 0.08	2.2	N	2.555	--	N	BSL
TAL Metals													
Aluminum, Total	7429-90-5	180	17,000	ug/L	37MW2	2/2	44 - 44	17,000	N	3650	--	Y	**ARBC**
Antimony, Dissolved	7440-36-0	0.54	0.54	ug/L	37MW2	1/2	0.44 - 0.44	0.54	N	1.46	6	N	BSL
Arsenic, Total	7440-38-2	3.9	3.9	ug/L	37MW2	1/2	0.74 - 0.74	3.9	C	0.0446	10	Y	**ARBC**
Barium, Dissolved	7440-39-3	12	28	ug/L	37MW2	2/2	0.52 - 0.52	28	N	730	2,000	N	BSL
Barium, Total	7440-39-3	16	1300	ug/L	37MW2	2/2	0.52 - 2.6	1,300	N	730	2,000	Y	**ARBC**
Beryllium, Total	7440-41-7	0.73	0.73	ug/L	37MW2	1/2	0.31 - 0.31	0.73	N	7.3	4	N	BSL
Cadmium, Total	7440-43-9	0.097	0.097	ug/L	37MW2	1/2	0.062 - 0.062	0.097	N	1.825	5	N	BSL
Calcium, Dissolved	7440-70-2	160,000	260,000	ug/L	37MW3	2/2	40 - 40	260,000	--	--	--	Y	NSV
Calcium, Total	7440-70-2	240,000	260,000	ug/L	37MW3	2/2	40 - 40	260,000	--	--	--	Y	NSV
Chromium, Dissolved [1]	7440-47-3	1.5	2.4	ug/L	37MW2	2/2	0.31 - 0.31	2.4	C	10.95	100	N	BSL
Chromium, Total [1]	7440-47-3	2.7	80	ug/L	37MW2	2/2	0.31 - 0.31	80	C	10.95	100	Y	**ARBC**
Cobalt, Dissolved	7440-48-4	1.4	8.9	ug/L	37MW2	2/2	0.096 - 0.096	8.9	--	--	--	Y	NSV
Cobalt, Total	7440-48-4	1.6	12	ug/L	37MW2	2/2	0.096 - 0.096	12	--	--	--	Y	NSV
Copper, Dissolved	7440-50-8	1.3	1.6	ug/L	37MW3	2/2	0.33 - 0.33	1.6	N	146	1,300	N	BSL
Copper, Total	7440-50-8	2.3	8.4	ug/L	37MW2	2/2	0.33 - 0.33	8.4	N	146	1,300	N	BSL
Iron, Dissolved	7439-89-6	31	31	ug/L	37MW2	1/2	5.7 - 5.7	31	N	2,555	--	N	BSL
Iron, Total	7439-89-6	320	24,000	ug/L	37MW2	2/2	5.7 - 5.7	24,000	N	2,555	--	Y	**ARBC**
Lead, Total [2]	7439-92-1	5.4	5.4	ug/L	37MW2	1/2	0.33 - 0.33	5.4	--	15	--	N	BSL
Magnesium, Dissolved	7439-95-4	47,000	89,000	ug/L	37MW2	2/2	38 - 38	89,000	--	--	--	Y	NSV
Magnesium, Total	7439-95-4	48,000	130,000	ug/L	37MW2	2/2	38 - 38	130,000	--	--	--	Y	NSV
Manganese, Dissolved	7439-96-5	3.7	260	ug/L	37MW2	2/2	0.43 - 0.43	260	N	73	--	Y	**ARBC**
Manganese, Total	7439-96-5	22	710	ug/L	37MW2	2/2	0.43 - 0.86	710	N	73	--	Y	**ARBC**
Nickel, Dissolved	7440-02-0	3.7	28	ug/L	37MW2	2/2	0.28 - 0.28	28	N	73	--	N	BSL
Nickel, Total	7440-02-0	3.7	62	ug/L	37MW2	2/2	0.28 - 0.28	62	N	73	--	N	BSL
Potassium, Dissolved	7440-09-7	1,100	5,100	ug/L	37MW2	2/2	54 - 54	5,100	--	--	--	Y	NSV
Potassium, Total	7440-09-7	1,100	9,700	ug/L	37MW2	2/2	54 - 54	9,700	--	--	--	Y	NSV
Sodium, Dissolved	7440-23-5	54,000	110,000	ug/L	37MW3	2/2	84 - 84	110,000	--	--	--	Y	NSV
Sodium, Total	7440-23-5	56,000	110,000	ug/L	37MW3	2/2	84 - 84	110,000	--	--	--	Y	NSV
Silver, Total	7440-22-4	0.32	0.32	ug/L	37MW2	1/2	0.12 - 0.12	0.32	N	18.25	--	N	BSL
Vanadium, Dissolved	7440-62-2	1.7	1.7	ug/L	37MW2	1/2	0.83 - 0.83	1.7	N	3.65	--	N	BSL
Vanadium, Total	7440-62-2	0.98	24	ug/L	37MW2	2/2	0.83 - 0.83	24	N	3.65	--	Y	**ARBC**
Zinc, Dissolved	7440-66-6	7.4	20	ug/L	37MW2	2/2	0.84 - 0.84	20	N	1,095	--	N	BSL
Zinc, Total	7440-66-6	7.9	36	ug/L	37MW2	2/2	0.84 - 0.84	36	N	1,095	--	N	BSL
Pesticides													
alpha-BHC	319-84-6	0.056	0.056	ug/L	37MW2 DUP AVG*	1/2	0.0019 - 0.0019	0.056	C	0.0106	--	Y	**ARBC**
alpha-Chlordane [3]	5103-71-9	0.1	0.14	ug/L	37MW2 DUP AVG*	2/2	0.0021 - 0.0021	0.14	C	0.1913	2	N	BSL
beta-BHC [4]	319-85-7	0.0093	0.0093	ug/L	37MW2 DUP AVG*	1/2	0.0032 - 0.0032	0.0093	C	0.0372	--	N	BSL
delta-BHC [4]	319-86-8	0.00465	0.00465	ug/L	37MW2 DUP AVG*	1/2	0.0023 - 0.0023	0.00465	C	0.0106	--	N	BSL
Endosulfan II [5]	33213-65-9	0.013	0.018	ug/L	37MW2 DUP AVG*	2/2	0.0018 - 0.0018	0.018	N	21.9000	--	N	BSL
gamma-Chlordane [3]	5103-74-2	0.058	0.058	ug/L	37MW3	1/2	0.0021 - 0.0021	0.058	C	0.1913	2	N	BSL
Heptachlor Epoxide	1024-57-3	0.0585	0.0585	ug/L	37MW2 DUP AVG*	1/2	0.0021 - 0.0021	0.0585	C	0.0074	0.2	Y	**ARBC**
TCL VOCs													
1,3-Dichlorobenzene	541-73-1	0.21	0.21	ug/L	37MW2	1/3	0.12 - 0.13	0.21	N	1.825	--	N	BSL
Acetone	67-64-1	16	16	ug/L	37MW2	1/3	1.2 - 2.1	16	N	547.5	--	N	BSL
Chloroform	67-66-3	0.28	0.28	ug/L	37MW3	1/3	0.061 - 0.17	0.28	C	0.155	80	Y	**ARBC**
Toluene	108-88-3	0.13	0.25	ug/L	37MW2	3/3	0.072 - 0.16	0.25	N	227.1	1,000	N	BSL
Explosives													
1,3-Dinitrobenzene	99-65-0	0.18	0.18	ug/L	37MW3	1/2	0.071 - 0.071	0.18	N	0.365	--	N	BSL
2,6-Dinitrotoluene	606-20-2	0.59	0.59	ug/L	37MW3	1/2	0.16 - 0.16	0.59	N	3.65	--	N	BSL
2-Amino-4,6-dinitrotoluene	35572-78-2	0.39	0.39	ug/L	37MW3	1/2	0.24 - 0.24	0.39	N	7.3	--	N	BSL
4-Amino-2,6-dinitrotoluene	1946-51-0	0.49	0.49	ug/L	37MW3	1/2	0.22 - 0.22	0.49	N	7.3	--	N	BSL

Table E.2-2.4
Groundwater COPC Selection - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2007)
N = Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level
BSL = Below Tap Water RBC/MCL
DUP AVG = averaged result for duplicate samples

ARBC = Above Tap Water RBC

[1] = Chromium VI RBC used for screening
[2] = USEPA Action Level used for screening
[3] = Chlordane RBC used for screening
[4] = alpha-BHC RBC used for screening
[5] = Endosulfan RBC used for screening

Table E.2-2.5
SWMU 37 Groundwater Non-detects Screening
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adj. Tap Water RBC	Maximum MDL Exceeds SL
TAL Metals								
Aluminum, Dissolved	7429-90-5	ug/L	3	3	44	44	3,650	N
Antimony, Dissolved	7440-36-0	ug/L	2	3	0.44	0.44	1.46	N
Antimony, Total	7440-36-0	ug/L	3	3	0.44	0.44	1.46	N
Arsenic, Dissolved	7440-38-2	ug/L	3	3	0.74	0.74	0.0446	**Y**
Arsenic, Total	7440-38-2	ug/L	2	3	0.74	0.74	0.0446	**Y**
Beryllium, Dissolved	7440-41-7	ug/L	3	3	0.31	0.31	7.3	N
Beryllium, Total	7440-41-7	ug/L	2	3	0.31	0.31	7.3	N
Cadmium, Dissolved	7440-43-9	ug/L	3	3	0.062	0.062	1.825	N
Cadmium, Total	7440-43-9	ug/L	2	3	0.062	0.062	1.825	N
Iron, Dissolved	7439-89-6	ug/L	1	3	5.7	5.7	2,555	N
Lead, Dissolved [1]	7439-92-1	ug/L	3	3	0.33	0.33	15	N
Lead, Total [1]	7439-92-1	ug/L	2	3	0.33	0.33	15	N
Mercury, Dissolved [2]	7439-97-6	ug/L	3	3	0.046	0.046	0.37	N
Mercury, Total [2]	7439-97-6	ug/L	3	3	0.046	0.046	0.37	N
Selenium, Dissolved	7782-49-2	ug/L	2	3	0.92	0.92	18.25	N
Selenium, Total	7782-49-2	ug/L	2	3	0.92	0.92	18.25	N
Silver, Dissolved	7440-22-4	ug/L	3	3	0.12	0.12	18.25	N
Silver, Total	7440-22-4	ug/L	2	3	0.12	0.12	18.25	N
Thallium, Dissolved	7440-28-0	ug/L	3	3	0.17	0.17	0.256	N
Thallium, Total	7440-28-0	ug/L	3	3	0.17	0.17	0.256	N
Vanadium, Dissolved	7440-62-2	ug/L	2	3	0.83	0.83	3.65	N
Pesticides/PCBs								
4,4'-DDD	72-54-8	ug/L	3	3	0.0019	0.0019	0.279	N
4,4'-DDE	72-55-9	ug/L	3	3	0.0027	0.00287	0.197	N
4,4'-DDT	50-29-3	ug/L	3	3	0.002	0.002	0.197	N
Aldrin	309-00-2	ug/L	3	3	0.0079	0.0079	0.0039	**Y**
alpha-BHC	319-84-6	ug/L	2	3	0.0019	0.0019	0.011	N
beta-BHC	319-85-7	ug/L	2	3	0.0032	0.0032	0.0372	N
delta-BHC [3]	319-86-8	ug/L	2	3	0.0023	0.0023	0.011	N
Dieldrin	60-57-1	ug/L	3	3	0.002	0.002	0.0042	N
Endosulfan I	959-98-8	ug/L	3	3	0.0023	0.0023	21.9	N
Endosulfan II [4]	33213-65-9	ug/L	1	3	0.0018	0.0018	21.9	N
Endosulfan Sulfate [4]	1031-07-8	ug/L	3	3	0.0033	0.0033	21.9	N
Endrin	72-20-8	ug/L	3	3	0.002	0.002	1.095	N
Endrin Aldehyde [5]	7421-93-4	ug/L	3	3	0.0029	0.0029	1.095	N
Endrin Ketone [5]	53494-70-5	ug/L	3	3	0.0033	0.0033	1.095	N
gamma-BHC (Lindane)	58-89-9	ug/L	3	3	0.0018	0.0018	0.0515	N
gamma-Chlordane [6]	5103-74-2	ug/L	1	3	0.0021	0.0021	0.191	N
Heptachlor	76-44-8	ug/L	3	3	0.003	0.003	0.0149	N
Heptachlor Epoxide	1024-57-3	ug/L	1	3	0.0021	0.0021	0.0074	N
Methoxychlor	72-43-5	ug/L	3	3	0.0052	0.0052	18.25	N
Toxaphene	8001-35-2	ug/L	3	3	0.1	0.1	0.061	**Y**
Aroclor 1016 [7]	12674-11-2	ug/L	3	3	0.05	0.05	0.255	N
Aroclor 1221	11104-28-2	ug/L	3	3	0.068	0.068	0.0335	**Y**
Aroclor 1232	11141-16-5	ug/L	3	3	0.031	0.031	0.0335	N
Aroclor 1242	53469-21-9	ug/L	3	3	0.035	0.035	0.0335	**Y**
Aroclor 1248	12672-29-6	ug/L	3	3	0.04	0.04	0.0335	**Y**
Aroclor 1254	11097-69-1	ug/L	3	3	0.034	0.034	0.0335	**Y**
Aroclor 1260	11096-82-5	ug/L	3	3	0.034	0.034	0.0335	**Y**
Aroclor 1262	37324-23-5	ug/L	3	3	0.022	0.022	--	NS
Aroclor 1268	11100-14-4	ug/L	3	3	0.049	0.049	--	NS
TCL VOCs								
1,1,1-Trichloroethane	71-55-6	ug/L	4	4	0.11	0.19	913.3	N
1,1,2,2-Tetrachloroethane	79-34-5	ug/L	4	4	0.07	0.1	0.0527	**Y**
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/L	4	4	0.13	0.14	5,938	N
1,1,2-Trichloroethane	79-00-5	ug/L	4	4	0.18	0.21	0.188	**Y**
1,1-Dichloroethane	75-34-3	ug/L	4	4	0.076	0.13	89.65	N
1,1-Dichloroethene	75-35-4	ug/L	4	4	0.13	0.14	35.32	N
1,2,3-Trichlorobenzene	87-61-6	ug/L	4	4	0.13	0.18	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/L	4	4	0.16	0.16	6.083	N
1,2-Dibromo-3-chloropropane	96-12-8	ug/L	4	4	0.29	0.4	0.0002	**Y**
1,2-Dibromoethane	106-93-4	ug/L	4	4	0.22	0.22	0.0053	**Y**
1,2-Dichlorobenzene	95-50-1	ug/L	4	4	0.065	0.12	26.82	N
1,2-Dichloroethane	107-06-2	ug/L	4	4	0.13	0.15	0.116	**Y**
1,2-Dichloropropane	78-87-5	ug/L	4	4	0.1	0.15	0.257	N
1,3-Dichlorobenzene	541-73-1	ug/L	3	4	0.12	0.13	1.825	N
1,4-Dichlorobenzene	106-46-7	ug/L	4	4	0.12	0.13	0.281	N
2-Butanone (MEK)	78-93-3	ug/L	4	4	0.33	0.55	696.8	N
2-Hexanone	591-78-6	ug/L	4	4	0.29	0.42	--	NS
4-Methyl-2-pentanone (MIBK)	108-10-1	ug/L	4	4	0.28	0.38	627.8	N
Acetone	67-64-1	ug/L	3	4	1.2	2.1	547.5	N
Benzene	71-43-2	ug/L	4	4	0.12	0.18	0.336	N
Bromochloromethane	74-97-5	ug/L	4	4	0.18	0.2	--	NS
Bromodichloromethane	75-27-4	ug/L	4	4	0.13	0.19	0.17	**Y**

Table E.2-2.5
SWMU 37 Groundwater Non-detects Screening
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adj. Tap Water RBC	Maximum MDL Exceeds SL
Bromoform	75-25-2	ug/L	4	4	0.15	0.23	8.48	N
Bromomethane	74-83-9	ug/L	4	4	0.18	0.19	0.852	N
Carbon Disulfide	75-15-0	ug/L	4	4	0.18	0.28	104.3	N
Carbon Tetrachloride	56-23-5	ug/L	4	4	0.13	0.15	0.162	N
Chlorobenzene	108-90-7	ug/L	4	4	0.12	0.19	8.96	N
Chloroethane	75-00-3	ug/L	4	4	0.15	0.2	3.638	N
Chloroform	67-66-3	ug/L	3	4	0.061	0.17	0.155	**Y**
Chloromethane	74-87-3	ug/L	4	4	0.06	0.16	18.98	N
cis-1,2-Dichloroethene	156-59-2	ug/L	4	4	0.17	0.23	6.083	N
cis-1,3-Dichloropropene	10061-01-5	ug/L	4	4	0.14	0.25	0.436	N
Cyclohexane	110-82-7	ug/L	4	4	0.14	0.25	1,241	N
Dibromochloromethane	124-48-1	ug/L	4	4	0.14	0.14	0.126	**Y**
Dichlorodifluoromethane	75-71-8	ug/L	4	4	0.17	0.21	34.76	N
Ethylbenzene	100-41-4	ug/L	4	4	0.13	0.14	133.99	N
Isopropylbenzene	98-82-8	ug/L	4	4	0.12	0.15	65.82	N
Methyl Acetate	79-20-9	ug/L	4	4	0.16	0.3	608.3	N
Methyl tert-Butyl Ether	1634-04-4	ug/L	4	4	0.096	0.28	2.637	N
Methylcyclohexane	108-87-2	ug/L	4	4	0.15	0.2	627.8	N
Methylene Chloride	75-09-2	ug/L	4	4	0.051	0.26	4.102	N
Styrene	100-42-5	ug/L	4	4	0.11	0.11	162.35	N
Tetrachloroethene	127-18-4	ug/L	4	4	0.15	0.16	0.104	**Y**
trans-1,2-Dichloroethene	156-60-5	ug/L	4	4	0.16	0.2	10.61	N
trans-1,3-Dichloropropene	10061-02-6	ug/L	4	4	0.16	0.23	0.436	N
Trichloroethene	79-01-6	ug/L	4	4	0.092	0.17	0.0264	**Y**
Trichlorofluoromethane	75-69-4	ug/L	4	4	0.18	0.2	128.8	N
Vinyl Chloride	75-01-4	ug/L	4	4	0.1	0.17	0.015	**Y**
Xylenes	1330-20-7	ug/L	4	4	0.36	0.42	21.26	N
Explosives								
1,3,5-Trinitrobenzene	99-35-4	ug/L	3	3	0.045	0.045	109.5	N
1,3-Dinitrobenzene	99-65-0	ug/L	2	3	0.071	0.071	0.365	N
2,4-Dinitrotoluene	121-14-2	ug/L	3	3	0.092	0.092	7.3	N
2,6-Dinitrotoluene	606-20-2	ug/L	2	3	0.16	0.16	3.65	N
2,4,6-Trinitrotoluene[8]	118-96-7	ug/L	3	3	0.1	0.1	1.83	N
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	2	3	0.24	0.24	7.3	N
2-Nitrotoluene	88-72-2	ug/L	3	3	0.28	0.28	6.083	N
3-Nitrotoluene	99-08-1	ug/L	3	3	0.17	0.17	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	ug/L	2	3	0.22	0.22	7.3	N
4-Nitrotoluene	99-99-0	ug/L	3	3	0.49	0.49	4.186	N
HMX	2691-41-0	ug/L	3	3	0.2	0.2	182.5	N
Nitrobenzene	98-95-3	ug/L	3	3	0.15	0.15	0.353	N
RDX	121-82-4	ug/L	3	3	0.092	0.092	0.609	N
Tetryl	479-45-8	ug/L	3	3	0.15	0.15	14.6	N
Nitroglycerin/PETN								
Nitroglycerin	55-63-0	ug/L	3	3	0.58	0.58	0.365	**Y**
PETN	78-11-5	ug/L	3	3	0.61	0.61	--	NS

Notes:

CAS = Chemical Abstracts Service
ug/L = Microgram per liter
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PETN = Pentaerythritol Tetranitrate
MDL = Method Detection Limit
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

[1] = Lead Action Level used for screening
[2] = Tap Water RBC for methylmercury used for screening
[3] = Chlordane RBC value was used
[4] = Endosulfan RBC value was used
[5] = Endrin RBC value was used
[6] = Alpha-BHC RBC value was used
[7] = Noncarcinogenic Tap Water RBC value for Aroclor 1016 used for screening
[8] = Noncarcinogenic Tap Water RBC values for 2,4,6-Trinitrotoluene used for screening

Table E.2-3.1
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Exposure to Contaminants in SWMU 37 Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Soil	Aluminum	mg/kg	18,310	22,122	29,000	22,122	mg/kg	95% Student's t UCL	ProUCL 4.0
	Arsenic	mg/kg	4.865	6.925	11	6.925	mg/kg	95% Student's t UCL	ProUCL 4.0
	Chromium	mg/kg	94	135.7	200	135.7	mg/kg	95% Student's t UCL	ProUCL 4.0
	Cobalt	mg/kg	4.99	6.124	9.6	6.124	mg/kg	95% Student's t UCL	ProUCL 4.0
	Iron	mg/kg	21,220	24,383	29,000	24,383	mg/kg	95% Student's t UCL	ProUCL 4.0
	Manganese	mg/kg	250.9	341.5	470	341.5	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Mercury	mg/kg	0.913	2.428	3.3	2.428	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Vanadium	mg/kg	25.3	32.6	49	32.6	mg/kg	95% Student's t UCL	ProUCL 4.0
	Aroclor 1254	mg/kg	0.535	0.69	1	0.69	mg/kg	95% KM (t) UCL	ProUCL 4.0

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
* Due to the low frequency of detection, a mean and UCL were not calculated.

Table E.2-3.2
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Exposure to Contaminants in SWMU 37 Total Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Medium: Total Soil
Exposure Medium: Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Total Soil	Aluminum	mg/kg	17,857	19,653	29,000	19,653	mg/kg	95% Student's t UCL	ProUCL 4.0
	Arsenic	mg/kg	3.036	5.881	11	5.881	mg/kg	95% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Chromium	mg/kg	58.57	115.2	200	115.2	mg/kg	95% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Cobalt	mg/kg	7.667	8.906	13	8.906	mg/kg	95% Student's t UCL	ProUCL 4.0
	Iron	mg/kg	23,500	25,458	32,000	25,458	mg/kg	95% Student's t UCL	ProUCL 4.0
	Manganese	mg/kg	317.8	371	640	371	mg/kg	95% Student's t UCL	ProUCL 4.0
	Mercury	mg/kg	0.523	2.382	3.3	2.382	mg/kg	99% KM (Chebyshev) UCL	ProUCL 4.0
	Vanadium	mg/kg	31.05	35.84	49	35.84	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Aroclor 1254	mg/kg	0.421	0.376	1	0.376	mg/kg	95% KM (t) UCL	ProUCL 4.0

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
* Due to the low frequency of detection, a mean and UCL were not calculated.

Table E.2-4.1a
Values used for Daily Intake Equations for Current/Future Scenario - Surface Soil - Exposure Medium Soil - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Maintenance Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = $\frac{CS \times IRS \times EF \times ED \times FI \times CF1}{BW \times AT}$
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 2004	
				EF	Exposure Frequency	50	days/year	(1)	
				FI	Fraction Ingested	1	(unitless)	(2)	
				IRS	Ingestion Rate of Soil	100	mg/day	USEPA, 1991	
Dermal Absorption *	Maintenance Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.1	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 2004	
				EF	Exposure Frequency	50	days/year	(1)	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	

Notes:

(1) Best professional judgement. Based on site maintenance conducted 1 day/week with 2 weeks/year vacation.

(2) Fraction ingested assumed 100%.

*See Table E.1-4.3 for chemical specific dermal absorption fractions

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

cm^2 = square centimeter

USEPA = U.S. Environmental Protection Agency

EPC = Exposure Point Concentration

Table E.2-4.1b
Values used for Daily Intake Equations for Current/Future Scenario - Surface Soil - Exposure Medium Air - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Maintenance Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	50	days/year	(1)	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.5	m^3/hr	USEPA, 1989	
				PEF	Particulate Emission Factor	1.32E+09	m^3/kg	(2)	

Notes:

(1) Best professional judgement. Based on site maintenance conducted 1 day/week with 2 weeks/year vacation.

(2) PEFs provided on Table E.1-4.4

Note: VOCs not identified as COPC in soil; therefore, vapor inhalation pathway not assessed.

USEPA, 1989. Risk Assessment Guidance for Superfund Volume I - Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

m^3/hour = cubic meters per hour

USEPA = U.S. Environmental Protection Agency

Table E.2-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Construction Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	330	mg/day	USEPA, 2002	
	Commercial Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	50	mg/day	USEPA, 2002	
	Resident	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	100	mg/day	USEPA, 1991	
		Child	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	200	mg/day	USEPA, 1991	

Table E.2-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption*	Construction Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.3	mg/(cm^2-event)	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2002	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				EV	Event Frequency	1	events/day	USEPA, 2002	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	
	Commercial Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.1	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	
	Resident	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.07	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	5,700	cm^2	USEPA, 2004	

Table E.2-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption Cont.*	Resident Cont.	Child	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.2	$mg/(cm^2\text{-event})$	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2002	
				SA	Skin Surface Area Available for Contact	2,800	cm^2	USEPA, 2004	

Notes:

(1) Fraction ingested assumed 100%.

*See Table E.1-4.3 for chemical specific dermal absorption fractions

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

cm^2 = square centimeter

USEPA = U.S. Environmental Protection Agency

EPC = Exposure Point Concentration

Table E.2-4.1d
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Air - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Construction Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = CS x IR x EF x ED x ET x 1/PEF / BW x AT
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	2.5	m^3/hr	USEPA, 1991	
				PEF	Particulate Emission Factor	1.17E+06	m^3/kg	(1)	
	Commercial Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = CS x IR x EF x ED x ET x 1/PEF / BW x AT
				ED	Exposure Duration	25	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.0	m^3/hr	USEPA, 1989	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(1)	
	Resident	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = CS x IR x EF x ED x ET x 1/PEF / BW x AT
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	2	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.63	m^3/hr	(2)	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(1)	
		Child	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = CS x IR x EF x ED x ET x 1/PEF / BW x AT
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	6	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.5	m^3/hr	(3)	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(1)	

Notes:

(1) PEFs provided on Table E.1-4.4

(2) The inhalation rate is calculated using a daily long term rate of 15 m^3/day (USEPA, 1991) divided by 24 hours to derive hourly inhalation rate of 0.63 m^3/hour.

(3) The inhalation rate is calculated using a daily long term rate of 12 m^3/day (USEPA, 2003) divided by 24 hours to derive hourly inhalation rate of 0.5 m^3/hour.

Note: VOCs not identified as COPC in soil; therefore, vapor inhalation pathway not assessed.

USEPA, 1989. Risk Assessment Guidance for Superfund Volume I - Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 1997. Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa through Fc.

kg/mg = Kilogram Per Millogram
mg/kg = Milligram Per Kilogram
hr/day = hour per day
m^3/hour = cubic meters per hour
USEPA = U.S. Environmental Protection Agency

Table E.2-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Commercial Worker	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	1	L/day	USEPA, 1991	
	Resident	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	2	L/day	USEPA, 1991	
		Child	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	1	L/day	USEPA, 1991	
Dermal Absorption*	Commercial Worker	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	*Organics:*
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	if $t_{event} \le t^*$, $DA_{event} = 2 \times CF1 \times CF2 \times FA \times Kp \times CW \times [(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	if $t_{event} > t^*$, $DA_{event} = CF1 \times CF2 \times FA \times Kp \times CW \times [(t_{event}/(1+B)) + 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	800	cm^2	(1)	*Inorganics:*
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	$DA_{event} = CF1 \times CF2 \times Kp \times CW \times t_{event}$
				t_{event}	Event Duration	1	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	

Table E.2-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption Continued*	Resident	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	70	kg	USEPA, 1991	*Organics:*
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	if $t_{event} \le t^*$, DA_{event} = 2 x CF1 x CF2 x FA x Kp x CW x $[(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	24	years	USEPA, 1991	if $t_{event} > t^*$, DA_{event} = CF1 x CF2 x FA x Kp x CW x $[(t_{event}/(1+B))+ 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	*Inorganics:*
				SA	Skin Surface Area Available for Contact	18,000	cm^2	USEPA, 2004	DA_{event} = CF1 x CF2 x Kp x CW x t_{event}
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	
				t_{event}	Event Duration	0.58	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	
		Child	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	*Organics:*
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	if $t_{event} \le t^*$, DA_{event} = 2 x CF1 x CF2 x FA x Kp x CW x $[(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	if $t_{event} > t^*$, DA_{event} = CF1 x CF2 x FA x Kp x CW x $[(t_{event}/(1+B))+ 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	6,600	cm^2	USEPA, 2004	*Inorganics:*
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	DA_{event} = CF1 x CF2 x Kp x CW x t_{event}
				t_{event}	Event Duration	1	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	

Table E.2-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

(1) Best Professional Judgement. Based on the mean surface area for hands for men and women.

*See Table E.1-4.6 for chemical specific parameters used to calculate absorbed dose per event

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final.

kg = Kilogram

ug/L = Microgram Per Liter

mg/kg = milligram per kilogram

cm^2 = square centimeter

cm^3 = Cubic Centimeter

L/day = liter/day

USEPA = U.S. Environmental Protection Agency

VDEQ = Virginia Department of Environmental Quality

EPC = Exposure Point Concentration

Table E.2-4.2b
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Air - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Construction Worker	Adult	Trench Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USUSEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USUSEPA, 1991	
				BW	Body Weight	70	kg	USUSEPA, 1991	
				CA	Chemical Concentration in Outdoor Air	calculated	mg/m^3	(1)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	1	years	USUSEPA, 1991	
				EF	Exposure Frequency	125	days/year	VDEQ, 2006	
				ET	Exposure Time	8	hr/day	USUSEPA, 1991	
				IR	Inhalation Rate	2.5	m^3/hr	USUSEPA, 2002	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
	Commercial Worker	Adult	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.0	m^3/hr	USEPA, 1997	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
	Resident	Adult	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	16.4	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.83	m^3/hr	(4)	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
			Vapors while showering with groundwater	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	10,950	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Shower Air	calculated	mg/m^3	(5)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	0.261	hr/day	(6)	
				IR	Inhalation Rate	0.83	m^3/hr	USEPA, 1997	
				FI	Fraction of Exposure, Air	1	unitless	(2)	

Table E.2-4.2b
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Air - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation Cont.	Resident Cont.	Child	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	18	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.5	m^3/hr	(7)	
				FI	Fraction of Exposure, Air	1	unitless	(2)	

Notes:

(1) See Table E.1-4.8 for trench air calculations.

(2) Best Professional Judgement. Based on 100% inhalation fraction.

(3) Chemical Concentration in Air for Indoor Vapors calculated using Johnson and Ettinger Model (See Table E.1-4.6).

(4) The inhalation rate is calculated using a daily long term rate of 20 m^3/day (USEPA, 1991) divided by 24 hours to derive hourly inhalation rate of 0.83 m^3/hour.

(5) Chemical Concentration in Air for Vapors while showering with groundwater calculated using Foster and Chrostowski Inhalation Model (See Table E.1-4.7).

(6) ET calculated using $ET=(Ds+((\exp(-Ra*t))/Ra - ((\exp(Ra(Ds-t))/Ra)))*1hr/60min$

Ds (shower time) =	30	min
t (total time in shower room) =	60	min
Ra (air exchange rate) =	0.01667	per min
ET=	0.261	hour/day

(7) The inhalation rate is calculated using a daily long term rate of 12 m^3/day (USEPA, 2003) divided by 24 hours to derive hourly inhalation rate of 0.5 m^3/hour.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 1997. Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.

USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

VDEQ, 2006. Voluntary Remediation Program Risk Assessment Guidance. www.deq.virginia.gov/vrprisk/raguide.html.

kg = Kilogram
ug/L = Microgram Per Liter
mg/kg = milligram per kilogram
cm^3 = Cubic Centimeter
L/day = liter/day
USEPA = U.S. Environmental Protection Agency
VDEQ = Virginia Department of Environmental Quality

Table E.2-4.3.RME
Dermal Absorption Fractions and Volatilization Factors for Soil - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	ABSd * (m^3/kg)	$VF_{C/I\ Worker}$/ $VF_{Maint.\ Worker}$ (m^3/kg)	$VF_{Const.\ Worker}$ (m^3/kg)	$VF_{Adult\ Resident}$ (m^3/kg)	$VF_{Child\ Resident}$ (m^3/kg)
Aluminum	7429-90-5	1.00E-02	--	--	--	--
Arsenic	7440-38-2	3.00E-02	--	--	--	--
Chromium	7440-47-3	1.00E-02	--	--	--	--
Cobalt	7440-48-4	1.00E-02	--	--	--	--
Iron	7439-89-6	1.00E-02	--	--	--	--
Manganese	7439-96-5	1.00E-02	--	--	--	--
Mercury	7439-97-6	1.00E-02	--	--	--	--
Vanadium	7440-62-2	1.00E-02	--	--	--	--
Aroclor 1254	11097-69-1	1.40E-01	--	--	--	--

Notes:

CAS = Chemical Abstract Service
ABS_d = Dermal Absorption Fraction
VF = Volatilization Factor
D_a = Apparent Diffusivity
m^3/kg = cubic meters per kilogram
cm2/s = centimeter squared per second

*ABS_d values are taken from Exhibit 3-4, Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation and Manual, Part E; Supplemental Guidance for Dermal Risk Assessment, July 2004, and Region III Technical Guidance, Assessing Dermal Exposure in Soil, December 1995.

Volatiles were not identified as COPCs in soil; therefore, VFs not calculated

Table E.2-4.4.RME
PEF Calculations - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Commercial/Industrial Worker

Equation 4-5 from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA, 2002.

$$PEF = Q / C_{wind} \cdot \frac{3{,}600 s/h}{0.036 \cdot (1-V) \cdot (U_m / U_t)\text{^}3 \cdot F(x)}$$

Parameter	Value	
PEF	8.16E+08	
Q/C_{wind}	56.28	calculated below
V	0.5	default
U_m	4.69	default
U_t	11.32	default
F(x)	0.194	default

PEF = particulate emission factor (m^3/kg)
s/h = seconds per hour
Q/Cwind = Inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source (g/m^3-s per kg/m^3)
V = fraction of vegatative cover (unitless)
U_m = mean annual windspeed (m/s)
U_t = equivalent threshold value of windspeed at 7m (m/s)
F(x) = function dependent on U_m/U_t derived using Cowherd et al. (1985)
Site Area = 0.6 acres

Q/C_{wind} calculated in accordance with Exhibit D-2 from USEPA, 2002 using A, B, and C values for Huntington, WV:
$Q/C_{wind} = A*e\text{^}((\ln A_{site} - B)^2/C))$

Q/C_{wind}=	56.28	
A =	9.9253	unitless
B =	18.6636	unitless
C =	211.8862	unitless
A_{site}=	0.6	acres

Table E.2-4.4.RME
PEF Calculations - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Construction Worker

Equation 5-5 from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA, 2002.

$$PEF_{sc} = Q / C_{sr} \cdot \frac{1}{F_D} \cdot \left[\frac{T \cdot A_R}{556 \cdot (W/3)^{0.4} \cdot \frac{(365\ d/yr - p)}{365\ d/yr} \cdot \sum VKT} \right]$$

Parameter	Value	
PEF_{sc}	1.41E+06	
Q/C_{sr}	22.29	calculated
F_D	0.185	default
T (sec)	7,488,000	assumed-see below
A_R (m^2)	300	calculated
W (tons)	8	assumed-see below
p (days/yr)	140	determined-see below
sumVKT (km)	378	assumed-see below

PEF_{sr} = subchronic road particulate emission factor (m^3/kg)
Q/C_{sr} = Inverse of the ratio of the 1-h geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/m2-s per kg/m3)
F_D = dispersion correction factor (unitless)
T = total time over which construction occurs-total time period assumed to be 6 months (52wks x 5days per week x 8 hours per day x 3,600 s per hour)
A_R = surface area of contaminated road segment (m^2)
L_R = length of road segment (assumed to equal to (0.6 acres*43,560 ft^2/acre)$^{1/2}$)
W_R = width of road segment (assumed to be 20 ft)
$A_R = L_R \times W_R \times 0.092903 m^2/ft^2$

A_R= 300 m^2

W = mean vehicle weight assumed to be 8 tons ([(20 cars * 2 tons/car)+(10 trucks*20 tons/truck)]/30 vehicles)
p = number of days with at least 0.01 inches of precipitation (from Exhibit 5-2 140 days/year)
sumVKT = sum of fleet vehicle kilometers traveled during the exposure duration (km)
(30 of vehicles x 0.049 km/day x 52wks x 5 days/wk)

Q/C_{sr} calculated in accordance with Equation 5-6:
using A, B, and C default values:
$Q/C_{sr} = A*e^{((\ln A_s - B)^2/C)}$

Q/C_{sr}=	22.29	g/m^2-s per kg/m^3
A =	12.9351	unitless
B =	5.7383	unitless
C =	71.7711	unitless
A_s =	0.6	acres

Table E.2-4.5
Parameter Values Used for Groundwater - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	FA	Kp (cm/hr)	tau $_{event}$ (hr)	B	t* (hr)
Cobalt	7440-48-4	--	4.0E-04	--	--	--
Manganese	7439-96-5	--	1.0E-03	--	--	--
alpha-BHC	319-84-6	1.0	2.1E-02	4.6E+00	1.4E-01	1.1E+01
Heptachlor Epoxide	1024-57-3	1.0	2.1E-02	1.6E+01	1.6E-01	3.9E+01
Chloroform	67-66-3	1.0	6.8E-03	5.0E-01	2.9E-02	1.2E+00

Notes:

Organic parameter values are taken from Organic values from Organic Chemicals in Water Spreadsheet (http://www.epa.gov/oswer/riskassessment/ragse/index.htm)

Inorganic parameters were taken from Exhibit 3-1, Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual, Part E; Supplemental Guidance for Dermal Risk Assessment. July 2004.

TABLE E.2-4.6
Groundwater Inhalation Indoor Air Concentration Summary - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	C_a mg/m^3
Chloroform	67-66-3	2.80E-01	1.08E-06

Notes:

Indoor Air Concentrations Modeled Using Johnson and Ettinger Model.

Non-default Model Inputs: Depth below grade to bottom of enclosed floor space (15 cm)
Depth below grade to water table (853 cm)
Soil Type (SC)

TABLE E.2-4.7
Groundwater Inhalation Shower Stall Air Concentration Calculations - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	MW g/mole	H atm-m^3/mole	k_l cm/hour	k_g cm/hour	K_L cm/hour	K_{aL} cm/hour	C_{wd} ug/L	S ug/m^3-min	C_a mg/m^3
Chloroform	67-66-3	2.80E-01	119.4	3.7E-03	12.14	1164.91	1.14E+01	1.52E+01	1.11E-01	3.71E-01	2.22E-02

Equations:

k_l (liquid-film transfer coefficient) = $20*(44/MW)^{0.5}$

k_g (gas-film transfer coefficient) = $3000*(18/MW)^{0.5}$

K_L (overall mass transfer coefficient) = $(1/k_l+(R*t/H*k_g))^{-1}$

K_{aL} (overall mass transfer coefficient adjusted to shower water temperature) = $K_L*((T*u_s/T_s*u_l)^{-0.5}$

C_{wd} (VOC concentration leaving shower droplet) = $C_w*(1-\exp(-K_{aL}*t_s/60*d)$

S (VOC generation rate) = C_{wd}*FR/SV

C_a (VOC concentration in shower air) =(S/R_a)*(1mg/1000ug)

Constants:

R (gas constant)	8.20E-05	atm-m^3/mole-K
T (room temperature)	298	K
T_s (water temp)	318	K
u_s (water viscosity at T_s)	0.596	centapoise
u_l (water viscosity at T)	1.002	centapoise
t_s (shower droplet drop time)	2	sec
d (droplet diameter)	1	mm
FR (shower flow rate)	20	L/min
SV (shower room air volume)	6	m^3
R_a (air exchange rate)	0.01667	permin

TABLE E.2-4.8
Groundwater Inhalation Construction Worker Trench Gas Concentration Calculations - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	H_i atm-m^3/mole	D_{air} cm^2/sec	VF L/m^3	C_a mg/m^3
Chloroform	67-66-3	2.80E-01	3.67E-03	1.04E-01	8.52E-03	2.38E-06

Notes:

Exposure-point Concentrations calculated using VDEQ VRP Model for construction/utility workers in a trench: deep Goundwater greater than 15 feet

Equations:

$VF = (H_i * D_{air} * AC_{vad}^{3.33} * A * F * CF1 * CF2 * CF3)/(R * T * L_d * ACH * V * Por_{vad}^2)$

$C_a = C_W * VF * CF4$

Constants:

H_i (Henry's Law Constant)	chem spec	atm-m^3/mol
D_{air} (diffusion coefficient in air)	chem spec	cm^2/s
AC_{vad} (volumetric air content in vadose zone soil)	0.25	cm^3/cm^3
L (length of trench)	2.44	m
W (width of trench)	0.91	m
A (area of trench - L*W)	2.23	m^2
F (fraction of floor through which contaminant can enter)	1	untiless
R (gas constant)	8.2E-05	atm-m^3/mole-K
T (average system absolute temp)	298	K
L_d (dist. b/w trench bottom and groundwater)	369	cm
d (depth of trench)	4.57	m
V (volume of trench)	10.19	m^3
ACH (air changes per hour)	2	per hour
Por_{vad} (total soil porosity in vadose zone)	0.44	cm^3/cm^3
CF1	0.001	L/cm^3
CF2	10,000	cm^2/m^2
CF3	3600	sec/hour
CF4	0.001	mg/ug

Table E.2-5.1
Non-Cancer Toxicity Data - Oral/Dermal - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
			Value	Units		Value	Units			Source(s)	Date(s)
Aluminum	7429-90-5	Chronic	1.00E+00	mg/kg-day	1	1.00E+00	mg/kg-day	developmental CNS	100	PPRTV	07/26/2001
Arsenic	7440-38-2	Chronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	skin/ vascular	3	IRIS	06/17/2008
Arsenic	7440-38-2	Subchronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	skin	3	HEAST	07/31/1997
Chromium(2)	7440-47-3	Chronic	3.00E-03	mg/kg-day	0.025	7.50E-05	mg/kg-day	GI tract/fetus/bone marrow/liver	900	IRIS	06/17/2008
Chromium(2)	7440-47-3	Subchronic	2.00E-02	mg/kg-day	0.025	5.00E-04	mg/kg-day	GI tract/fetus/bone marrow/liver	100	HEAST	07/31/1997
Cobalt	7440-48-4	Chronic	2.00E-02	mg/kg-day	1	2.00E-02	mg/kg-day	blood	10	PPRTV	01/15/2002
Iron	7439-89-6	Chronic	7.00E-01	mg/kg-day	1	7.00E-01	mg/kg-day	blood/ liver/ GI tract	1	PPTRV	01/05/1999
Manganese	7439-96-5	Chronic	2.00E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	CNS	1	IRIS	06/17/2008
Mercury (3)	7439-97-6	Chronic	3.00E-04	mg/kg-day	0.07	2.10E-05	mg/kg-day	immune system	1000	IRIS	06/17/2008
Mercury (3)	7439-97-6	Subchronic	3.00E-03	mg/kg-day	0.07	2.10E-04	mg/kg-day	immune system	NA	HEAST	error
Vanadium	7440-62-2	Chronic	1.00E-03	mg/kg-day	0.026	2.60E-05	mg/kg-day	kidney	NA	NCEA, Region III	10/25/2005
Vanadium	7440-62-2	Subchronic	7.00E-03	mg/kg-day	0.026	1.80E-04	mg/kg-day	kidney/ blood	100	HEAST	07/31/1997
Aroclor 1254	11097-69-1	Chronic	2.00E-05	mg/kg-day	1	2.00E-05	mg/kg-day	eyes	300	IRIS	06/17/2008
Aroclor 1254	11097-69-1	Subchronic	5.00E-05	mg/kg-day	1	5.00E-05	mg/kg-day	immune system	100	HEAST	07/31/1997
alpha-BHC	319-84-6	NA	NA	NA	1	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	1024-57-3	Chronic	1.30E-05	mg/kg-day	1	1.30E-05	mg/kg-day	liver	1000	IRIS	06/17/2008
Heptachlor Epoxide	1024-57-3	Subchronic	1.30E-05	mg/kg-day	1	1.30E-05	mg/kg-day	liver	1000	HEAST	07/31/1997
Chloroform	67-66-3	Chronic	1.00E-02	mg/kg-day	1	1.00E-02	mg/kg-day	liver	100	IRIS	06/17/2008
Chloroform	67-66-3	Subchronic	1.00E-02	mg/kg-day	1	1.00E-02	mg/kg-day	liver	1000	HEAST	07/31/1997

Notes:

CAS = Chemical Abstract Service
RfD = Reference Dose
mg/(kg-d) = milligrams per kilogram day
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables

PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available
(1) Oral absorption efficiency for dermal from Risk Assessment Guidance for Superfund (RAGS), Volume I:
Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005. 2004.
(2) Chromium VI toxicity value used
(3) Mercuric Chloride value used

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III, and HEAST.
For IRIS values, the date of the IRIS search is provided.
For HEAST values, the date of HEAST is provided.
For Region III values, the date of the Region III RBC Table is provided.
For PPRTV/NCEA, date of paper is provided.

Table E.2-5.2
Non-Cancer Toxicity Data - Inhalation - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
			Value	Units	Value	Units			Source(s)	Date(s)
Aluminum	7429-90-5	Chronic	1.00E-03	mg/m3	1.00E-03	mg/kg-day	CNS	300	PPRTV, Region III	10/11/2007
Arsenic	7440-38-2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium(1)	7440-47-3	Chronic	1.00E-04	mg/m3	2.90E-05	mg/kg-day	respiratory	300	IRIS	06/17/2008
Cobalt	7440-48-4	Chronic	2.00E-05	mg/m3	5.70E-06	mg/kg-day	respiratory	100	PPRTV	01/15/2002
Iron	7439-89-6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	7439-96-5	Chronic	5.00E-05	mg/m3	1.43E-05	mg/kg-day	CNS	1000	IRIS	06/17/2008
Mercury	7439-97-6	Chronic	3.00E-04	mg/m3	8.60E-05	mg/kg-day	CNS	30	IRIS	06/17/2008
Mercury	7439-97-6	Subchronic	3.00E-04	mg/m3	8.60E-05	mg/kg-day	CNS	30	HEAST	07/31/1997
Vanadium	7440-62-2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	NA	NA
alpha-BHC	319-84-6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor Epoxide	1024-57-3	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	67-66-3	Chronic	4.90E-02	mg/m3	1.40E-02	mg/kg-day	respiratory	NA	NCEA, Region III	10/11/2007

Notes:

RfC = Reference Concentration
RfD = Reference Dose
mg/m^3 = milligrams per cubic meter
mg/(kg-d) = milligrams per kilogram day
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available

(1) Toxicity data for chromium VI particulates

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III, VDEQ, and HEAST.
For IRIS values, the date of the IRIS search is provided.
For PPRTV values, the date of the paper is provided.
For Region III values, the date of the Region III RBC Table is provided.
RfDi (mg/kg-day) = RfC (mg/m3) x 20 m3/day x 1/70 kg

Table E.2-6.1
Cancer Toxicity Data - Oral/Dermal - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
		Value	Units		Value	Units		Source(s)	Date(s)
Aluminum	7429-90-5	NA	NA	1	NA	NA	NA	NA	NA
Antimony	7440-36-0	NA	NA	0.15	NA	NA	NA	NA	NA
Arsenic	7440-38-2	1.50E+00	1/(mg/kg-day)	1	1.50E+00	1/(mg/kg-day)	A	IRIS	06/17/2008
Cadmium	7440-43-9	NA	NA	0.025	NA	NA	NA	NA	NA
Chromium[2]	7440-47-3	NA	NA	0.025	NA	NA	Cannot Be Determined	NA	NA
Cobalt	7440-48-4	NA	NA	1	NA	NA	NA	NA	NA
Iron	7439-89-6	NA	NA	1	NA	NA	NA	NA	NA
Manganese	7439-96-5	NA	NA	0.04	NA	NA	D	NA	NA
Mercury[3]	7439-97-6	NA	NA	0.07	NA	NA	C	IRIS	06/17/2008
Thallium	7440-28-0	NA	NA	1	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NA	NA	0.026	NA	NA	NA	NA	NA
Zinc	7440-66-6	NA	NA	1	NA	NA	D	NA	NA
Aroclor 1254	11097-69-1	2.00E+00	1/(mg/kg-day)	1	2.00E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
Aroclor 1260	11096-82-5	2.00E+00	1/(mg/kg-day)	1	2.00E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
alpha-BHC	319-84-6	6.30E+00	1/(mg/kg-day)	1	6.30E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
Heptachlor Epoxide	1024-57-3	6.30E+00	1/(mg/kg-day)	1	6.30E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
Chloroform	67-66-3	NA	NA	1	NA	NA	B2	NA	NA

Notes:

CSF = Cancer Slope Factor
mg/(kg-d) = Milligrams Per Kilogram Day
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NA = Not Available
1986 Cancer Guideline Description:
A = Human carcinogen
B1 = Probable human carcinogen - indicates that limited human data are available.
B2 = Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C = Possible human carcinogen
D = Not classifiable as a human carcinogen

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III and VDEQ.
For IRIS values, the date of the IRIS search is provided.

(1) Oral absorption efficiency for dermal from Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. . EPA/540/R/99/005. 2004
(2) Chromium VI toxicity data used.
(3) Mercuric Chloride toxicity data used.

Table E.2-6.2
Cancer Toxicity Data - Inhalation - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	CSF	
		Value	Units	Value	Units		Source(s)	Date(s)
Aluminum	7429-90-5	NA	NA	NA	NA	NA	NA	NA
Antimony	7440-36-0	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	4.30E+00	1/(mg/m3)	1.50E+01	1/(mg/kg-day)	A	IRIS	06/17/2008
Cadmium	7440-43-9	1.80E+00	1/(mg/m3)	6.30E+00	1/(mg/kg-day)	B1	IRIS	06/17/2008
Chromium(1)	7440-47-3	1.20E+01	1/(mg/m3)	4.10E+01	1/(mg/kg-day)	A	IRIS	06/17/2008
Cobalt	7440-48-4	2.80E+00	1/(mg/m3)	9.80E+00	1/(mg/kg-day)	B1	PPRTV	01/15/2002
Iron	7439-89-6	NA	NA	NA	NA	NA	NA	NA
Manganese	7439-96-5	NA	NA	NA	NA	D	NA	NA
Mercury	7439-97-6	NA	NA	NA	NA	D	NA	NA
Thallium	7440-28-0	NA	NA	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NA	NA	NA	NA	NA	NA	NA
Zinc	7440-66-6	NA	NA	NA	NA	D	NA	NA
Aroclor 1254	11097-69-1	5.71E-01	1/(mg/m3)	2.00E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
Aroclor 1260	11096-82-5	5.71E-01	1/(mg/m3)	2.00E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
alpha-BHC	319-84-6	1.80E+00	1/(mg/m3)	6.30E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
Heptachlor Epoxide	1024-57-3	1.80E+00	1/(mg/m3)	6.30E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
Chloroform	67-66-3	2.31E-02	1/(mg/m3)	8.10E-02	1/(mg/kg-day)	B2	IRIS	06/17/2008

Notes:

CSF = Cancer Slope Factor
mg/(kg-d) = Milligrams Per Kilogram Day
USEPA = U.S. Environmental Protection Agency
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available
(1) = Chromium VI toxicity data used
CSF = Unit Risk ($1/mg/m^3$) x 70 kg x 1 day/20 m^3

1986 Cancer Guideline Description:
A = Human carcinogen
B1 = Probable human carcinogen - indicates that limited human data are available.
B2 = Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C = Possible human carcinogen
D = Not classifiable as a human carcinogen

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III and VDEQ.
For IRIS values, the date of the IRIS search is provided.
For NCEA, Region III values, the date of the Region III RBC Table is provided.
For PPRTV values, the date of the paper is provided.

TABLE E.2-7.1.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Maintenance Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Soil	Soil	Ingestion	Aluminum	22,122	mg/kg	1.55E-03	mg/kg-day	--	--	--	4.33E-03	mg/kg-day	1.00E+00	mg/kg-day	4.E-03
				Arsenic	6.925	mg/kg	4.84E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	7.3.E-07	1.36E-06	mg/kg-day	3.00E-04	mg/kg-day	5.E-03
				Chromium	135.7	mg/kg	9.48E-06	mg/kg-day	--	--	--	2.66E-05	mg/kg-day	3.00E-03	mg/kg-day	9.E-03
				Cobalt	6.124	mg/kg	4.28E-07	mg/kg-day	--	--	--	1.20E-06	mg/kg-day	2.00E-02	mg/kg-day	6.E-05
				Iron	24,383	mg/kg	1.70E-03	mg/kg-day	--	--	--	4.77E-03	mg/kg-day	7.00E-01	mg/kg-day	7.E-03
				Manganese	341.5	mg/kg	2.39E-05	mg/kg-day	--	--	--	6.68E-05	mg/kg-day	2.00E-02	mg/kg-day	3.E-03
				Mercury	2.428	mg/kg	1.70E-07	mg/kg-day	--	--	--	4.75E-07	mg/kg-day	3.00E-04	mg/kg-day	2.E-03
				Vanadium	32.6	mg/kg	2.28E-06	mg/kg-day	--	--	--	6.38E-06	mg/kg-day	1.00E-03	mg/kg-day	6.E-03
				Aroclor 1254	0.59	mg/kg	4.12E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	8.2.E-08	1.15E-07	mg/kg-day	2.00E-05	mg/kg-day	6.E-03
			Exp. Route Total								8.E-07					4.E-02
			Dermal Absorption	Aluminum	22,122	mg/kg	5.10E-05	mg/kg-day	--	--	--	1.43E-04	mg/kg-day	1.00E+00	mg/kg-day	1.E-04
				Arsenic	6.925	mg/kg	4.79E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	7.E-08	1.34E-07	mg/kg-day	3.00E-04	mg/kg-day	4.E-04
				Chromium	135.7	mg/kg	3.13E-07	mg/kg-day	--	--	--	8.76E-07	mg/kg-day	7.50E-05	mg/kg-day	1.E-02
				Cobalt	6.124	mg/kg	1.41E-08	mg/kg-day	--	--	--	3.95E-08	mg/kg-day	2.00E-02	mg/kg-day	2.E-06
				Iron	24,383	mg/kg	5.62E-05	mg/kg-day	--	--	--	1.57E-04	mg/kg-day	7.00E-01	mg/kg-day	2.E-04
				Manganese	341.5	mg/kg	7.88E-07	mg/kg-day	--	--	--	2.21E-06	mg/kg-day	8.00E-04	mg/kg-day	3.E-03
				Mercury	2.428	mg/kg	5.60E-09	mg/kg-day	--	--	--	1.57E-08	mg/kg-day	2.10E-05	mg/kg-day	7.E-04
				Vanadium	32.6	mg/kg	7.52E-08	mg/kg-day	--	--	--	2.11E-07	mg/kg-day	2.60E-05	mg/kg-day	8.E-03
				Aroclor 1254	0.59	mg/kg	1.91E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	4.E-08	5.33E-08	mg/kg-day	2.00E-05	mg/kg-day	3.E-03
			Exp. Route Total								1.E-07					3.E-02
		Exposure Point Total									9.E-07					7.E-02
	Exposure Medium Total										9.2.E-07					7.E-02
	Air	Fugitive Dust	Inhalation	Aluminum	22,122	mg/kg	2.27E-07	mg/kg-day	--	--	--	6.37E-07	mg/kg-day	1.00E-03	mg/kg-day	6.E-04
				Arsenic	6.925	mg/kg	7.12E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	1.E-09	1.99E-10	mg/kg-day	--	--	--
				Chromium	135.7	mg/kg	1.40E-09	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	6.E-08	3.91E-09	mg/kg-day	2.90E-05	mg/kg-day	1.E-04
				Cobalt	6.124	mg/kg	6.30E-11	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	6.E-10	1.76E-10	mg/kg-day	5.70E-06	mg/kg-day	3.E-05
				Iron	24,383	mg/kg	2.51E-07	mg/kg-day	--	--	--	7.02E-07	mg/kg-day	--	--	--
				Manganese	341.5	mg/kg	3.51E-09	mg/kg-day	--	--	--	9.83E-09	mg/kg-day	1.43E-05	mg/kg-day	7.E-04
				Mercury	2.428	mg/kg	2.50E-11	mg/kg-day	--	--	--	6.99E-11	mg/kg-day	8.60E-05	mg/kg-day	8.E-07
				Vanadium	32.6	mg/kg	3.35E-10	mg/kg-day	--	--	--	9.38E-10	mg/kg-day	--	--	--
				Aroclor 1254	0.59	mg/kg	6.07E-12	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-11	1.70E-11	mg/kg-day	--	--	--
			Exp. Route Total								6.E-08					1.E-03
		Exposure Point Total									6.E-08					1.E-03
	Exposure Medium Total										6.E-08					1.E-03
Soil Total											1.E-06					7.E-02
											Total of Receptor Risks Across All Media	1.E-06		Total of Receptor Hazards Across All Media		7.E-02

TABLE E.2-7.2.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Maintenance Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	19,653	mg/kg	1.37E-03	mg/kg-day	--	--	--	3.85E-03	mg/kg-day	1.00E+00	mg/kg-day	4.E-03
				Arsenic	5.881	mg/kg	4.11E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	6.2.E-07	1.15E-06	mg/kg-day	3.00E-04	mg/kg-day	4.E-03
				Chromium	115.2	mg/kg	8.05E-06	mg/kg-day	--	--	--	2.25E-05	mg/kg-day	3.00E-03	mg/kg-day	8.E-03
				Cobalt	8.906	mg/kg	6.22E-07	mg/kg-day	--	--	--	1.74E-06	mg/kg-day	2.00E-02	mg/kg-day	9.E-05
				Iron	25,458	mg/kg	1.78E-03	mg/kg-day	--	--	--	4.98E-03	mg/kg-day	7.00E-01	mg/kg-day	7.E-03
				Manganese	371	mg/kg	2.59E-05	mg/kg-day	--	--	--	7.26E-05	mg/kg-day	2.00E-02	mg/kg-day	4.E-03
				Mercury	2.382	mg/kg	1.66E-07	mg/kg-day	--	--	--	4.66E-07	mg/kg-day	3.00E-04	mg/kg-day	2.E-03
				Vanadium	35.84	mg/kg	2.50E-06	mg/kg-day	--	--	--	7.01E-06	mg/kg-day	1.00E-03	mg/kg-day	7.E-03
				Aroclor 1254	0.376	mg/kg	2.63E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	5.3.E-08	7.36E-08	mg/kg-day	2.00E-05	mg/kg-day	4.E-03
			Exp. Route Total								6.7.E-07					4.E-02
			Dermal Absorption	Aluminum	19,653	mg/kg	4.53E-05	mg/kg-day	--	--	--	1.27E-04	mg/kg-day	1.00E+00	mg/kg-day	1.E-04
				Arsenic	5.881	mg/kg	4.07E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	6.E-08	1.14E-07	mg/kg-day	3.00E-04	mg/kg-day	4.E-04
				Chromium	115.2	mg/kg	2.66E-07	mg/kg-day	--	--	--	7.44E-07	mg/kg-day	7.50E-05	mg/kg-day	1.E-02
				Cobalt	8.906	mg/kg	2.05E-08	mg/kg-day	--	--	--	5.75E-08	mg/kg-day	2.00E-02	mg/kg-day	3.E-06
				Iron	25,458	mg/kg	5.87E-05	mg/kg-day	--	--	--	1.64E-04	mg/kg-day	7.00E-01	mg/kg-day	2.E-04
				Manganese	371	mg/kg	8.56E-07	mg/kg-day	--	--	--	2.40E-06	mg/kg-day	8.00E-04	mg/kg-day	3.E-03
				Mercury	2.382	mg/kg	5.49E-09	mg/kg-day	--	--	--	1.54E-08	mg/kg-day	2.10E-05	mg/kg-day	7.E-04
				Vanadium	35.84	mg/kg	8.27E-08	mg/kg-day	--	--	--	2.31E-07	mg/kg-day	2.60E-05	mg/kg-day	9.E-03
				Aroclor 1254	0.376	mg/kg	1.21E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-08	3.40E-08	mg/kg-day	2.00E-05	mg/kg-day	2.E-03
			Exp. Route Total								9.E-08					2.E-02
		Exposure Point Total									7.5.E-07					6.E-02
	Exposure Medium Total										7.5.E-07					6.E-02
	Air	Fugitive Dust	Inhalation	Aluminum	19,653	mg/kg	2.02E-07	mg/kg-day	--	--	--	5.66E-07	mg/kg-day	1.00E-03	mg/kg-day	6.E-04
				Arsenic	5.881	mg/kg	6.05E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	9.E-10	1.69E-10	mg/kg-day	--	--	--
				Chromium	115.2	mg/kg	1.18E-09	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	5.E-08	3.32E-09	mg/kg-day	2.90E-05	mg/kg-day	1.E-04
				Cobalt	8.906	mg/kg	9.16E-11	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	9.E-10	2.56E-10	mg/kg-day	5.70E-06	mg/kg-day	4.E-05
				Iron	25,458	mg/kg	2.62E-07	mg/kg-day	--	--	--	7.33E-07	mg/kg-day	--	--	--
				Manganese	371	mg/kg	3.81E-09	mg/kg-day	--	--	--	1.07E-08	mg/kg-day	1.43E-05	mg/kg-day	7.E-04
				Mercury	2.382	mg/kg	2.45E-11	mg/kg-day	--	--	--	6.86E-11	mg/kg-day	8.60E-05	mg/kg-day	8.E-07
				Vanadium	35.84	mg/kg	3.68E-10	mg/kg-day	--	--	--	1.03E-09	mg/kg-day	--	--	--
				Aroclor 1254	0.376	mg/kg	3.87E-12	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	8.E-12	1.08E-11	mg/kg-day	--	--	--
			Exp. Route Total								5.E-08					1.E-03
		Exposure Point Total									5.E-08					1.E-03
	Exposure Medium Total										5.E-08					1.E-03
Soil Total											8.E-07					6.E-02
											Total of Receptor Risks Across All Media	8.E-07		Total of Receptor Hazards Across All Media		6.E-02

TABLE E.2-7.3.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Commercial Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	19,653	mg/kg	3.43E-03	mg/kg-day	--	--	--	9.61E-03	mg/kg-day	1.00E+00	mg/kg-day	1.E-02
				Arsenic	5.881	mg/kg	1.03E-06	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.E-06	2.88E-06	mg/kg-day	3.00E-04	mg/kg-day	1.E-02
				Chromium	115.2	mg/kg	2.01E-05	mg/kg-day	--	--	--	5.64E-05	mg/kg-day	3.00E-03	mg/kg-day	2.E-02
				Cobalt	8.906	mg/kg	1.56E-06	mg/kg-day	--	--	--	4.36E-06	mg/kg-day	2.00E-02	mg/kg-day	2.E-04
				Iron	25,458	mg/kg	4.45E-03	mg/kg-day	--	--	--	1.25E-02	mg/kg-day	7.00E-01	mg/kg-day	2.E-02
				Manganese	371	mg/kg	6.48E-05	mg/kg-day	--	--	--	1.82E-04	mg/kg-day	2.00E-02	mg/kg-day	9.E-03
				Mercury	2.382	mg/kg	4.16E-07	mg/kg-day	--	--	--	1.17E-06	mg/kg-day	3.00E-04	mg/kg-day	4.E-03
				Vanadium	35.84	mg/kg	6.26E-06	mg/kg-day	--	--	--	1.75E-05	mg/kg-day	1.00E-03	mg/kg-day	2.E-02
				Aroclor 1254	0.376	mg/kg	6.57E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-07	1.84E-07	mg/kg-day	2.00E-05	mg/kg-day	9.E-03
			Exp. Route Total								1.7.E-06					1.E-01
			Dermal Absorption	Aluminum	19,653	mg/kg	2.27E-04	mg/kg-day	--	--	--	6.35E-04	mg/kg-day	1.00E+00	mg/kg-day	6.E-04
				Arsenic	5.881	mg/kg	2.03E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	3.E-07	5.70E-07	mg/kg-day	3.00E-04	mg/kg-day	2.E-03
				Chromium	115.2	mg/kg	1.33E-06	mg/kg-day	--	--	--	3.72E-06	mg/kg-day	7.50E-05	mg/kg-day	5.E-02
				Cobalt	8.906	mg/kg	1.03E-07	mg/kg-day	--	--	--	2.88E-07	mg/kg-day	2.00E-02	mg/kg-day	1.E-05
				Iron	25,458	mg/kg	2.94E-04	mg/kg-day	--	--	--	8.22E-04	mg/kg-day	7.00E-01	mg/kg-day	1.E-03
				Manganese	371	mg/kg	4.28E-06	mg/kg-day	--	--	--	1.20E-05	mg/kg-day	8.00E-04	mg/kg-day	1.E-02
				Mercury	2.382	mg/kg	2.75E-08	mg/kg-day	--	--	--	7.69E-08	mg/kg-day	2.10E-05	mg/kg-day	4.E-03
				Vanadium	35.84	mg/kg	4.13E-07	mg/kg-day	--	--	--	1.16E-06	mg/kg-day	2.60E-05	mg/kg-day	4.E-02
				Aroclor 1254	0.376	mg/kg	6.07E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-07	1.70E-07	mg/kg-day	2.00E-05	mg/kg-day	8.E-03
			Exp. Route Total								4.E-07					1.E-01
		Exposure Point Total									2.E-06					2.E-01
	Exposure Medium Total										2.E-06					2.E-01

TABLE E.2-7.3.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Commercial Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Fugitive Dust	Inhalation	Aluminum	19,653	mg/kg	6.74E-07	mg/kg-day	--	--	--	1.89E-06	mg/kg-day	1.00E-03	mg/kg-day	2.E-03
				Arsenic	5.881	mg/kg	2.02E-10	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	3.E-09	5.64E-10	mg/kg-day	--	--	--
				Chromium	115.2	mg/kg	3.95E-09	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	2.E-07	1.11E-08	mg/kg-day	2.90E-05	mg/kg-day	4.E-04
				Cobalt	8.906	mg/kg	3.05E-10	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	3.E-09	8.55E-10	mg/kg-day	5.70E-06	mg/kg-day	1.E-04
				Iron	25,458	mg/kg	8.72E-07	mg/kg-day	--	--	--	2.44E-06	mg/kg-day	--	--	--
				Manganese	371	mg/kg	1.27E-08	mg/kg-day	--	--	--	3.56E-08	mg/kg-day	1.43E-05	mg/kg-day	2.E-03
				Mercury	2.382	mg/kg	8.16E-11	mg/kg-day	--	--	--	2.29E-10	mg/kg-day	8.60E-05	mg/kg-day	3.E-06
				Vanadium	35.84	mg/kg	1.23E-09	mg/kg-day	--	--	--	3.44E-09	mg/kg-day	--	--	--
				Aroclor 1254	0.376	mg/kg	1.29E-11	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	3.E-11	3.61E-11	mg/kg-day	--	--	--
			Exp. Route Total								2.E-07					5.E-03
		Exposure Point Total									2.E-07					5.E-03
	Exposure Medium Total										2.E-07					5.E-03
Soil Total											2.E-06					2.E-01
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	8.9	ug/L	3.11E-05	mg/kg-day	--	--	--	8.71E-05	mg/kg-day	2.00E-02	mg/kg-day	4.E-03
				Manganese	260	ug/L	9.09E-04	mg/kg-day	--	--	--	2.54E-03	mg/kg-day	2.00E-02	mg/kg-day	1.E-01
				alpha-BHC	0.056	ug/L	1.96E-07	mg/kg-day	6.30E+00	mg/kg-day $^{-1}$	1.E-06	5.48E-07	mg/kg-day	--	--	--
				Heptachlor Epoxide	0.059	ug/L	2.06E-07	mg/kg-day	6.30E+00	mg/kg-day $^{-1}$	1.E-06	5.77E-07	mg/kg-day	1.30E-05	mg/kg-day	4.E-02
				Chloroform	0.28	ug/L	9.78E-07	mg/kg-day	--	--	--	2.74E-06	mg/kg-day	1.00E-02	mg/kg-day	3.E-04
			Exp. Route Total								3.E-06					2.E-01
			Dermal Absorption	Cobalt	8.9	ug/L	9.95E-09	mg/kg-day	--	--	--	2.79E-08	mg/kg-day	2.00E-02	mg/kg-day	1.E-06
				Manganese	260	ug/L	7.27E-07	mg/kg-day	--	--	--	2.04E-06	mg/kg-day	8.00E-04	mg/kg-day	3.E-03
				alpha-BHC	0.056	ug/L	1.24E-08	mg/kg-day	6.30E+00	mg/kg-day $^{-1}$	8.E-08	3.48E-08	mg/kg-day	--	--	--
				Heptachlor Epoxide	0.059	ug/L	5.37E-08	mg/kg-day	6.30E+00	mg/kg-day $^{-1}$	3.E-07	1.50E-07	mg/kg-day	1.30E-05	mg/kg-day	1.E-02
				Chloroform	0.28	ug/L	1.49E-09	mg/kg-day	--	--	--	4.18E-09	mg/kg-day	1.00E-02	mg/kg-day	4.E-07
			Exp. Route Total								4.E-07					1.E-02
		Exposure Point Total									3.E-06					2.E-01
	Exposure Medium Total										3.E-06					2.E-01
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.08E-06	mg/m^3	3.02E-08	mg/kg-day	8.10E-02	mg/kg-day $^{-1}$	2.E-09	8.45E-08	mg/kg-day	1.40E-02	mg/kg-day	6.E-06
			Exp. Route Total								2.E-09					6.E-06
		Exposure Point Total									2.E-09					6.E-06
	Exposure Medium Total										2.E-09					6.E-06
Groundwater Total											3.E-06					2.E-01
											Total of Receptor Risks Across All Media					4.E-01
											5.E-06	Total of Receptor Hazards Across All Media				

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.2-4.6)

TABLE E.2-7.4.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Construction Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	19,653	mg/kg	9.07E-04	mg/kg-day	--	--	--	6.35E-02	mg/kg-day	1.00E+00	mg/kg-day	6.E-02
				Arsenic	5.881	mg/kg	2.71E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	4.E-07	1.90E-05	mg/kg-day	3.00E-04	mg/kg-day	6.E-02
				Chromium	115.2	mg/kg	5.31E-06	mg/kg-day	--	--	--	3.72E-04	mg/kg-day	2.00E-02	mg/kg-day	2.E-02
				Cobalt	8.906	mg/kg	4.11E-07	mg/kg-day	--	--	--	2.88E-05	mg/kg-day	2.00E-02	mg/kg-day	1.E-03
				Iron	25,458	mg/kg	1.17E-03	mg/kg-day	--	--	--	8.22E-02	mg/kg-day	3.00E-01	mg/kg-day	3.E-01
				Manganese	371	mg/kg	1.71E-05	mg/kg-day	--	--	--	1.20E-03	mg/kg-day	2.00E-02	mg/kg-day	6.E-02
				Mercury	2.382	mg/kg	1.10E-07	mg/kg-day	--	--	--	7.69E-06	mg/kg-day	--	--	--
				Vanadium	35.84	mg/kg	1.65E-06	mg/kg-day	--	--	--	1.16E-04	mg/kg-day	7.00E-03	mg/kg-day	2.E-02
				Aroclor 1254	0.376	mg/kg	1.73E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	3.E-08	1.21E-06	mg/kg-day	5.00E-05	mg/kg-day	2.E-02
			Exp. Route Total								4.E-07					5.E-01
			Dermal Absorption	Aluminum	19,653	mg/kg	2.72E-05	mg/kg-day	--	--	--	1.90E-03	mg/kg-day	1.00E+00	mg/kg-day	2.E-03
				Arsenic	5.881	mg/kg	2.44E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	4.E-08	1.71E-06	mg/kg-day	3.00E-04	mg/kg-day	6.E-03
				Chromium	115.2	mg/kg	1.59E-07	mg/kg-day	--	--	--	1.12E-05	mg/kg-day	5.00E-04	mg/kg-day	2.E-02
				Cobalt	8.906	mg/kg	1.23E-08	mg/kg-day	--	--	--	8.63E-07	mg/kg-day	2.00E-02	mg/kg-day	4.E-05
				Iron	25,458	mg/kg	3.52E-05	mg/kg-day	--	--	--	2.47E-03	mg/kg-day	3.00E-01	mg/kg-day	8.E-03
				Manganese	371	mg/kg	5.13E-07	mg/kg-day	--	--	--	3.59E-05	mg/kg-day	8.00E-04	mg/kg-day	4.E-02
				Mercury	2.382	mg/kg	3.30E-09	mg/kg-day	--	--	--	2.31E-07	mg/kg-day	--	--	--
				Vanadium	35.84	mg/kg	4.96E-08	mg/kg-day	--	--	--	3.47E-06	mg/kg-day	1.80E-04	mg/kg-day	2.E-02
				Aroclor 1254	0.376	mg/kg	7.28E-09	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-08	5.10E-07	mg/kg-day	5.00E-05	mg/kg-day	1.E-02
			Exp. Route Total								5.E-08					1.E-01
		Exposure Point Total									5.E-07					6.E-01
	Exposure Medium Total										5.E-07					6.E-01

TABLE E.2-7.4.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Construction Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Fugitive Dust	Inhalation	Aluminum	19,653	mg/kg	3.89E-05	mg/kg-day	--	--	--	2.72E-03	mg/kg-day	1.00E-03	mg/kg-day	3.E+00
				Arsenic	5.881	mg/kg	1.16E-08	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	2.E-07	8.15E-07	mg/kg-day	--	--	--
				Chromium	115.2	mg/kg	2.28E-07	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	9.E-06	1.60E-05	mg/kg-day	2.90E-05	mg/kg-day	6.E-01
				Cobalt	8.906	mg/kg	1.76E-08	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	2.E-07	1.23E-06	mg/kg-day	5.70E-06	mg/kg-day	2.E-01
				Iron	25,458	mg/kg	5.04E-05	mg/kg-day	--	--	--	3.53E-03	mg/kg-day	--	--	--
				Manganese	371	mg/kg	7.34E-07	mg/kg-day	--	--	--	5.14E-05	mg/kg-day	1.43E-05	mg/kg-day	4.E+00
				Mercury	2.382	mg/kg	4.71E-09	mg/kg-day	--	--	--	3.30E-07	mg/kg-day	8.60E-05	mg/kg-day	4.E-03
				Vanadium	35.84	mg/kg	7.09E-08	mg/kg-day	--	--	--	4.96E-06	mg/kg-day	--	--	--
				Aroclor 1254	0.376	mg/kg	7.44E-10	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-09	5.21E-08	mg/kg-day	--	--	--
			Exp. Route Total								1.E-05					7.E+00
		Exposure Point Total									1.E-05					7.E+00
	Exposure Medium Total										1.E-05					7.E+00
Soil Total											1.E-05					8.E+00
Groundwater	Air	Upward Migration of Vapors from Groundwater Trench Vapors (1)	Inhalation	Chloroform	2.38E-06	mg/m^3	3.33E-09	mg/kg-day	8.10E-02	mg/kg-day $^{-1}$	3.E-10	2.33E-07	mg/kg-day	5.70E-06	mg/kg-day	4.E-02
			Exp. Route Total								3.E-10					4.E-02
		Exposure Point Total									3.E-10					4.E-02
	Exposure Medium Total										3.E-10					4.E-02
Groundwater Total											3.E-10					4.E-02
											Total of Receptor Risks Across All Media	1.E-05		Total of Receptor Hazards Across All Media		8.E+00

(1) See Table E.2-4.8 for trench vapor calculations

TABLE E.2-7.5.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Soil	Soil	Ingestion	Aluminum	22,122	mg/kg	1.04E-02	mg/kg-day	--	--	--	3.03E-02	mg/kg-day	1.00E+00	mg/kg-day	3.E-02
				Arsenic	6.925	mg/kg	3.25E-06	mg/kg-day	1.50E+00	mg/kg-day^{-1}	5.E-06	9.49E-06	mg/kg-day	3.00E-04	mg/kg-day	3.E-02
				Chromium	135.7	mg/kg	6.37E-05	mg/kg-day	--	--	--	1.86E-04	mg/kg-day	3.00E-03	mg/kg-day	6.E-02
				Cobalt	6.124	mg/kg	2.88E-06	mg/kg-day	--	--	--	8.39E-06	mg/kg-day	2.00E-02	mg/kg-day	4.E-04
				Iron	24,383	mg/kg	1.15E-02	mg/kg-day	--	--	--	3.34E-02	mg/kg-day	7.00E-01	mg/kg-day	5.E-02
				Manganese	341.5	mg/kg	1.60E-04	mg/kg-day	--	--	--	4.68E-04	mg/kg-day	2.00E-02	mg/kg-day	2.E-02
				Mercury	2.428	mg/kg	1.14E-06	mg/kg-day	--	--	--	3.33E-06	mg/kg-day	3.00E-04	mg/kg-day	1.E-02
				Vanadium	32.6	mg/kg	1.53E-05	mg/kg-day	--	--	--	4.47E-05	mg/kg-day	1.00E-03	mg/kg-day	4.E-02
				Aroclor 1254	0.59	mg/kg	2.77E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	6.E-07	8.08E-07	mg/kg-day	2.00E-05	mg/kg-day	4.E-02
			Exp. Route Total								5.E-06					3.E-01
			Dermal Absorption	Aluminum	22,122	mg/kg	4.15E-04	mg/kg-day	--	--	--	1.21E-03	mg/kg-day	1.00E+00	mg/kg-day	1.E-03
				Arsenic	6.925	mg/kg	3.89E-07	mg/kg-day	1.50E+00	mg/kg-day^{-1}	6.E-07	1.14E-06	mg/kg-day	3.00E-04	mg/kg-day	4.E-03
				Chromium	135.7	mg/kg	2.54E-06	mg/kg-day	--	--	--	7.42E-06	mg/kg-day	7.50E-05	mg/kg-day	1.E-01
				Cobalt	6.124	mg/kg	1.15E-07	mg/kg-day	--	--	--	3.35E-07	mg/kg-day	2.00E-02	mg/kg-day	2.E-05
				Iron	24,383	mg/kg	4.57E-04	mg/kg-day	--	--	--	1.33E-03	mg/kg-day	7.00E-01	mg/kg-day	2.E-03
				Manganese	341.5	mg/kg	6.40E-06	mg/kg-day	--	--	--	1.87E-05	mg/kg-day	8.00E-04	mg/kg-day	2.E-02
				Mercury	2.428	mg/kg	4.55E-08	mg/kg-day	--	--	--	1.33E-07	mg/kg-day	2.10E-05	mg/kg-day	6.E-03
				Vanadium	32.6	mg/kg	6.11E-07	mg/kg-day	--	--	--	1.78E-06	mg/kg-day	2.60E-05	mg/kg-day	7.E-02
				Aroclor 1254	0.59	mg/kg	1.55E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	3.E-07	4.51E-07	mg/kg-day	2.00E-05	mg/kg-day	2.E-02
			Exp. Route Total								9.E-07					2.E-01
		Exposure Point Total									6.E-06					5.E-01
	Exposure Medium Total										6.E-06					5.E-01
	Air	Fugitive Dust	Inhalation	Aluminum	22,122	mg/kg	2.11E-07	mg/kg-day	--	--	--	6.17E-07	mg/kg-day	1.00E-03	mg/kg-day	6.E-04
				Arsenic	6.925	mg/kg	6.62E-11	mg/kg-day	1.50E+01	mg/kg-day^{-1}	1.E-09	1.93E-10	mg/kg-day	--	--	--
				Chromium	135.7	mg/kg	1.30E-09	mg/kg-day	4.10E+01	mg/kg-day^{-1}	5.E-08	3.78E-09	mg/kg-day	2.90E-05	mg/kg-day	1.E-04
				Cobalt	6.124	mg/kg	5.85E-11	mg/kg-day	9.80E+00	mg/kg-day^{-1}	6.E-10	1.71E-10	mg/kg-day	5.70E-06	mg/kg-day	3.E-05
				Iron	24,383	mg/kg	2.33E-07	mg/kg-day	--	--	--	6.80E-07	mg/kg-day	--	--	--
				Manganese	341.5	mg/kg	3.26E-09	mg/kg-day	--	--	--	9.52E-09	mg/kg-day	1.43E-05	mg/kg-day	7.E-04
				Mercury	2.428	mg/kg	2.32E-11	mg/kg-day	--	--	--	6.77E-11	mg/kg-day	8.60E-05	mg/kg-day	8.E-07
				Vanadium	32.6	mg/kg	3.12E-10	mg/kg-day	--	--	--	9.09E-10	mg/kg-day	--	--	--
				Aroclor 1254	0.59	mg/kg	5.64E-12	mg/kg-day	2.00E+00	mg/kg-day^{-1}	1.E-11	1.64E-11	mg/kg-day	--	--	--
			Exp. Route Total								5.E-08					1.E-03
		Exposure Point Total									5.E-08					1.E-03
	Exposure Medium Total										5.E-08					1.E-03
Soil Total											6.E-06					5.E-01

TABLE E.2-7.5.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	8.9	ug/L	8.36E-05	mg/kg-day	--	--	--	2.44E-04	mg/kg-day	2.00E-02	mg/kg-day	1.E-02
				Manganese	260	ug/L	2.44E-03	mg/kg-day	--	--	--	7.12E-03	mg/kg-day	2.00E-02	mg/kg-day	4.E-01
				alpha-BHC	0.056	ug/L	5.26E-07	mg/kg-day	6.30E+00	$mg/kg-day^{-1}$	3.E-06	1.53E-06	mg/kg-day	--	--	--
				Heptachlor Epoxide	0.059	ug/L	5.54E-07	mg/kg-day	6.30E+00	$mg/kg-day^{-1}$	3.E-06	1.62E-06	mg/kg-day	1.30E-05	mg/kg-day	1.E-01
				Chloroform	0.28	ug/L	2.63E-06	mg/kg-day	--	--	--	7.67E-06	mg/kg-day	1.00E-02	mg/kg-day	8.E-04
			Exp. Route Total								6.8.E-06					5.E-01
			Dermal Absorption	Cobalt	8.9	ug/L	1.75E-07	mg/kg-day	--	--	--	5.09E-07	mg/kg-day	2.00E-02	mg/kg-day	3.E-05
				Manganese	260	ug/L	1.27E-05	mg/kg-day	--	--	--	3.72E-05	mg/kg-day	8.00E-04	mg/kg-day	5.E-02
				alpha-BHC	0.056	ug/L	3.60E-07	mg/kg-day	6.30E+00	$mg/kg-day^{-1}$	2.E-06	1.05E-06	mg/kg-day	--	--	--
				Heptachlor Epoxide	0.059	ug/L	1.60E-06	mg/kg-day	6.30E+00	$mg/kg-day^{-1}$	1.E-05	4.68E-06	mg/kg-day	1.30E-05	mg/kg-day	4.E-01
				Chloroform	0.28	ug/L	2.97E-08	mg/kg-day	--	--	--	8.68E-08	mg/kg-day	1.00E-02	mg/kg-day	9.E-06
			Exp. Route Total								1.E-05					4.E-01
		Exposure Point Total									2.E-05					9.E-01
	Exposure Medium Total										2.E-05					9.E-01
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.08E-06	mg/m^3	6.90E-08	mg/kg-day	8.10E-02	$mg/kg-day^{-1}$	6.E-09	2.01E-07	mg/kg-day	1.40E-02	mg/kg-day	1.E-05
			Exp. Route Total								6.E-09					1.E-05
		Exposure Point Total									6.E-09					1.E-05
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	2.22E-02	mg/m^3	2.27E-05	mg/kg-day	8.10E-02	$mg/kg-day^{-1}$	2.E-06	5.29E-05	mg/kg-day	1.40E-02	mg/kg-day	4.E-03
			Exp. Route Total								2.E-06					4.E-03
		Exposure Point Total									2.E-06					4.E-03
	Exposure Medium Total										2.E-06					4.E-03
Groundwater Total											2.E-05					9.E-01
											Total of Receptor Risks Across All Media					3.E-05
																Total of Receptor Hazards Across All Media	1.E+00

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.2-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.2-4.7)

TABLE E.2-7.6.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	19,653	mg/kg	9.23E-03	mg/kg-day	--	--	--	2.69E-02	mg/kg-day	1.00E+00	mg/kg-day	3.E-02
				Arsenic	5.881	mg/kg	2.76E-06	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	4.E-06	8.06E-06	mg/kg-day	3.00E-04	mg/kg-day	3.E-02
				Chromium	115.2	mg/kg	5.41E-05	mg/kg-day	--	--	--	1.58E-04	mg/kg-day	3.00E-03	mg/kg-day	5.E-02
				Cobalt	8.906	mg/kg	4.18E-06	mg/kg-day	--	--	--	1.22E-05	mg/kg-day	2.00E-02	mg/kg-day	6.E-04
				Iron	25,458	mg/kg	1.20E-02	mg/kg-day	--	--	--	3.49E-02	mg/kg-day	7.00E-01	mg/kg-day	5.E-02
				Manganese	371	mg/kg	1.74E-04	mg/kg-day	--	--	--	5.08E-04	mg/kg-day	2.00E-02	mg/kg-day	3.E-02
				Mercury	2.382	mg/kg	1.12E-06	mg/kg-day	--	--	--	3.26E-06	mg/kg-day	3.00E-04	mg/kg-day	1.E-02
				Vanadium	35.84	mg/kg	1.68E-05	mg/kg-day	--	--	--	4.91E-05	mg/kg-day	1.00E-03	mg/kg-day	5.E-02
				Aroclor 1254	0.376	mg/kg	1.77E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	4.E-07	5.15E-07	mg/kg-day	2.00E-05	mg/kg-day	3.E-02
			Exp. Route Total								4.E-06					3.E-01
			Dermal Absorption	Aluminum	19,653	mg/kg	3.68E-04	mg/kg-day	--	--	--	1.07E-03	mg/kg-day	1.00E+00	mg/kg-day	1.E-03
				Arsenic	5.881	mg/kg	3.31E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	5.E-07	9.64E-07	mg/kg-day	3.00E-04	mg/kg-day	3.E-03
				Chromium	115.2	mg/kg	2.16E-06	mg/kg-day	--	--	--	6.30E-06	mg/kg-day	7.50E-05	mg/kg-day	8.E-02
				Cobalt	8.906	mg/kg	1.67E-07	mg/kg-day	--	--	--	4.87E-07	mg/kg-day	2.00E-02	mg/kg-day	2.E-05
				Iron	25,458	mg/kg	4.77E-04	mg/kg-day	--	--	--	1.39E-03	mg/kg-day	7.00E-01	mg/kg-day	2.E-03
				Manganese	371	mg/kg	6.95E-06	mg/kg-day	--	--	--	2.03E-05	mg/kg-day	8.00E-04	mg/kg-day	3.E-02
				Mercury	2.382	mg/kg	4.46E-08	mg/kg-day	--	--	--	1.30E-07	mg/kg-day	2.10E-05	mg/kg-day	6.E-03
				Vanadium	35.84	mg/kg	6.72E-07	mg/kg-day	--	--	--	1.96E-06	mg/kg-day	2.60E-05	mg/kg-day	8.E-02
				Aroclor 1254	0.376	mg/kg	9.86E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-07	2.88E-07	mg/kg-day	2.00E-05	mg/kg-day	1.E-02
			Exp. Route Total								7.E-07					2.E-01
		Exposure Point Total									5.E-06					5.E-01
	Exposure Medium Total										5.E-06					5.E-01
	Air	Fugitive Dust	Inhalation	Aluminum	19,653	mg/kg	1.88E-07	mg/kg-day	--	--	--	5.48E-07	mg/kg-day	1.00E-03	mg/kg-day	5.E-04
				Arsenic	5.881	mg/kg	5.62E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	8.E-10	1.64E-10	mg/kg-day	--	--	--
				Chromium	115.2	mg/kg	1.10E-09	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	5.E-08	3.21E-09	mg/kg-day	2.90E-05	mg/kg-day	1.E-04
				Cobalt	8.906	mg/kg	8.51E-11	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	8.E-10	2.48E-10	mg/kg-day	5.70E-06	mg/kg-day	4.E-05
				Iron	25,458	mg/kg	2.43E-07	mg/kg-day	--	--	--	7.10E-07	mg/kg-day	--	--	--
				Manganese	371	mg/kg	3.55E-09	mg/kg-day	--	--	--	1.03E-08	mg/kg-day	1.43E-05	mg/kg-day	7.E-04
				Mercury	2.382	mg/kg	2.28E-11	mg/kg-day	--	--	--	6.64E-11	mg/kg-day	8.60E-05	mg/kg-day	8.E-07
				Vanadium	35.84	mg/kg	3.43E-10	mg/kg-day	--	--	--	9.99E-10	mg/kg-day	--	--	--
				Aroclor 1254	0.376	mg/kg	3.59E-12	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	7.E-12	1.05E-11	mg/kg-day	--	--	--
			Exp. Route Total								5.E-08					1.E-03
		Exposure Point Total									5.E-08					1.E-03
	Exposure Medium Total										5.E-08					1.E-03
Soil Total											5.E-06					5.E-01

TABLE E.2-7.6.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	8.9	ug/L	8.36E-05	mg/kg-day	--	--	--	2.44E-04	mg/kg-day	2.00E-02	mg/kg-day	1.E-02
				Manganese	260	ug/L	2.44E-03	mg/kg-day	--	--	--	7.12E-03	mg/kg-day	2.00E-02	mg/kg-day	4.E-01
				alpha-BHC	0.056	ug/L	5.26E-07	mg/kg-day	6.30E+00	mg/kg-day^{-1}	3.E-06	1.53E-06	mg/kg-day	--	--	--
				Heptachlor Epoxide	0.059	ug/L	5.54E-07	mg/kg-day	6.30E+00	mg/kg-day^{-1}	3.E-06	1.62E-06	mg/kg-day	1.30E-05	mg/kg-day	1.E-01
				Chloroform	0.28	ug/L	2.63E-06	mg/kg-day	--	--	--	7.67E-06	mg/kg-day	1.00E-02	mg/kg-day	8.E-04
			Exp. Route Total								6.8.E-06					5.E-01
			Dermal	Cobalt	8.9	ug/L	1.75E-07	mg/kg-day	--	--	--	5.09E-07	mg/kg-day	2.00E-02	mg/kg-day	3.E-05
			Absorption	Manganese	260	ug/L	1.27E-05	mg/kg-day	--	--	--	3.72E-05	mg/kg-day	8.00E-04	mg/kg-day	5.E-02
				alpha-BHC	0.056	ug/L	3.60E-07	mg/kg-day	6.30E+00	mg/kg-day^{-1}	2.E-06	1.05E-06	mg/kg-day	--	--	--
				Heptachlor Epoxide	0.059	ug/L	1.60E-06	mg/kg-day	6.30E+00	mg/kg-day^{-1}	1.E-05	4.68E-06	mg/kg-day	1.30E-05	mg/kg-day	4.E-01
				Chloroform	0.28	ug/L	2.97E-08	mg/kg-day	--	--	--	8.68E-08	mg/kg-day	1.00E-02	mg/kg-day	9.E-06
			Exp. Route Total								1.E-05					4.E-01
		Exposure Point Total									2.E-05					9.E-01
	Exposure Medium Total										2.E-05					9.E-01
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.08E-06	mg/m^3	6.90E-08	mg/kg-day	8.10E-02	mg/kg-day^{-1}	6.E-09	2.01E-07	mg/kg-day	1.40E-02	mg/kg-day	1.E-05
			Exp. Route Total								6.E-09					1.E-05
		Exposure Point Total									6.E-09					1.E-05
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	2.22E-02	mg/m^3	2.27E-05	mg/kg-day	8.10E-02	mg/kg-day^{-1}	2.E-06	5.29E-05	mg/kg-day	1.40E-02	mg/kg-day	4.E-03
			Exp. Route Total								2.E-06					4.E-03
		Exposure Point Total									2.E-06					4.E-03
	Exposure Medium Total										2.E-06					4.E-03
Groundwater Total											2.E-05					9.E-01
											Total of Receptor Risks Across All Media					3.E-05
												Total of Receptor Hazards Across All Media				1.E+00

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.2-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.2-4.7)

TABLE E.2-7.7.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Soil	Soil	Ingestion	Aluminum	22,122	mg/kg	2.42E-02	mg/kg-day	--	--	--	2.83E-01	mg/kg-day	1.00E+00	mg/kg-day	3.E-01
				Arsenic	6.925	mg/kg	7.59E-06	mg/kg-day	1.50E+00	mg/kg-day^{-1}	1.E-05	8.85E-05	mg/kg-day	3.00E-04	mg/kg-day	3.E-01
				Chromium	135.7	mg/kg	1.49E-04	mg/kg-day	--	--	--	1.73E-03	mg/kg-day	3.00E-03	mg/kg-day	6.E-01
				Cobalt	6.124	mg/kg	6.71E-06	mg/kg-day	--	--	--	7.83E-05	mg/kg-day	2.00E-02	mg/kg-day	4.E-03
				Iron	24,383	mg/kg	2.67E-02	mg/kg-day	--	--	--	3.12E-01	mg/kg-day	7.00E-01	mg/kg-day	4.E-01
				Manganese	341.5	mg/kg	3.74E-04	mg/kg-day	--	--	--	4.37E-03	mg/kg-day	2.00E-02	mg/kg-day	2.E-01
				Mercury	2.428	mg/kg	2.66E-06	mg/kg-day	--	--	--	3.10E-05	mg/kg-day	3.00E-04	mg/kg-day	1.E-01
				Vanadium	32.6	mg/kg	3.57E-05	mg/kg-day	--	--	--	4.17E-04	mg/kg-day	1.00E-03	mg/kg-day	4.E-01
				Aroclor 1254	0.59	mg/kg	6.47E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	1.E-06	7.54E-06	mg/kg-day	2.00E-05	mg/kg-day	4.E-01
			Exp. Route Total								1.E-05					3.E+00
			Dermal Absorption	Aluminum	22,122	mg/kg	6.79E-04	mg/kg-day	--	--	--	7.92E-03	mg/kg-day	1.00E+00	mg/kg-day	8.E-03
				Arsenic	6.925	mg/kg	6.37E-07	mg/kg-day	1.50E+00	mg/kg-day^{-1}	1.E-06	7.44E-06	mg/kg-day	3.00E-04	mg/kg-day	2.E-02
				Chromium	135.7	mg/kg	4.16E-06	mg/kg-day	--	--	--	4.86E-05	mg/kg-day	7.50E-05	mg/kg-day	6.E-01
				Cobalt	6.124	mg/kg	1.88E-07	mg/kg-day	--	--	--	2.19E-06	mg/kg-day	2.00E-02	mg/kg-day	1.E-04
				Iron	24,383	mg/kg	7.48E-04	mg/kg-day	--	--	--	8.73E-03	mg/kg-day	7.00E-01	mg/kg-day	1.E-02
				Manganese	341.5	mg/kg	1.05E-05	mg/kg-day	--	--	--	1.22E-04	mg/kg-day	8.00E-04	mg/kg-day	2.E-01
				Mercury	2.428	mg/kg	7.45E-08	mg/kg-day	--	--	--	8.69E-07	mg/kg-day	2.10E-05	mg/kg-day	4.E-02
				Vanadium	32.6	mg/kg	1.00E-06	mg/kg-day	--	--	--	1.17E-05	mg/kg-day	2.60E-05	mg/kg-day	4.E-01
				Aroclor 1254	0.59	mg/kg	2.53E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	5.E-07	2.96E-06	mg/kg-day	2.00E-05	mg/kg-day	1.E-01
			Exp. Route Total								1.E-06					1.E+00
		Exposure Point Total									1.E-05					4.E+00
	Exposure Medium Total										1.E-05					4.E+00
	Air	Fugitive Dust	Inhalation	Aluminum	22,122	mg/kg	4.46E-07	mg/kg-day	--	--	--	5.20E-06	mg/kg-day	1.00E-03	mg/kg-day	5.E-03
				Arsenic	6.925	mg/kg	1.40E-10	mg/kg-day	1.50E+01	mg/kg-day^{-1}	2.E-09	1.63E-09	mg/kg-day	--	--	--
				Chromium	135.7	mg/kg	2.73E-09	mg/kg-day	4.10E+01	mg/kg-day^{-1}	1.E-07	3.19E-08	mg/kg-day	2.90E-05	mg/kg-day	1.E-03
				Cobalt	6.124	mg/kg	1.23E-10	mg/kg-day	9.80E+00	mg/kg-day^{-1}	1.E-09	1.44E-09	mg/kg-day	5.70E-06	mg/kg-day	3.E-04
				Iron	24,383	mg/kg	4.91E-07	mg/kg-day	--	--	--	5.73E-06	mg/kg-day	--	--	--
				Manganese	341.5	mg/kg	6.88E-09	mg/kg-day	--	--	--	8.03E-08	mg/kg-day	1.43E-05	mg/kg-day	6.E-03
				Mercury	2.428	mg/kg	4.89E-11	mg/kg-day	--	--	--	5.71E-10	mg/kg-day	8.60E-05	mg/kg-day	7.E-06
				Vanadium	32.6	mg/kg	6.57E-10	mg/kg-day	--	--	--	7.66E-09	mg/kg-day	--	--	--
				Aroclor 1254	0.59	mg/kg	1.19E-11	mg/kg-day	2.00E+00	mg/kg-day^{-1}	2.E-11	1.39E-10	mg/kg-day	--	--	--
			Exp. Route Total								1.E-07					1.E-02
		Exposure Point Total									1.E-07					1.E-02
	Exposure Medium Total										1.E-07					1.E-02
Soil Total											1.E-05					4.E+00

TABLE E.2-7.7.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	8.9	ug/L	4.88E-05	mg/kg-day	--	--	--	5.69E-04	mg/kg-day	2.00E-02	mg/kg-day	3.E-02
				Manganese	260	ug/L	1.42E-03	mg/kg-day	--	--	--	1.66E-02	mg/kg-day	2.00E-02	mg/kg-day	8.E-01
				alpha-BHC	0.056	ug/L	3.07E-07	mg/kg-day	6.30E+00	mg/kg-day^{-1}	2.E-06	3.58E-06	mg/kg-day	--	--	--
				Heptachlor Epoxide	0.059	ug/L	3.23E-07	mg/kg-day	6.30E+00	mg/kg-day^{-1}	2.E-06	3.77E-06	mg/kg-day	1.30E-05	mg/kg-day	3.E-01
				Chloroform	0.28	ug/L	1.53E-06	mg/kg-day	--	--	--	1.79E-05	mg/kg-day	1.00E-02	mg/kg-day	2.E-03
			Exp. Route Total								4.E-06					1.E+00
			Dermal Absorption	Cobalt	8.9	ug/L	1.29E-07	mg/kg-day	--	--	--	1.50E-06	mg/kg-day	2.00E-02	mg/kg-day	8.E-05
				Manganese	260	ug/L	9.40E-06	mg/kg-day	--	--	--	1.10E-04	mg/kg-day	8.00E-04	mg/kg-day	1.E-01
				alpha-BHC	0.056	ug/L	1.61E-07	mg/kg-day	6.30E+00	mg/kg-day^{-1}	1.E-06	1.88E-06	mg/kg-day	--	--	--
				Heptachlor Epoxide	0.059	ug/L	6.94E-07	mg/kg-day	6.30E+00	mg/kg-day^{-1}	4.E-06	8.10E-06	mg/kg-day	1.30E-05	mg/kg-day	6.E-01
				Chloroform	0.28	ug/L	1.93E-08	mg/kg-day	--	--	--	2.25E-07	mg/kg-day	1.00E-02	mg/kg-day	2.E-05
			Exp. Route Total								5.E-06					8.E-01
		Exposure Point Total									9.E-06					2.E+00
	Exposure Medium Total										9.E-06					2.E+00
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.08E-06	mg/m^3	5.33E-08	mg/kg-day	8.10E-02	mg/kg-day^{-1}	4.E-09	6.21E-07	mg/kg-day	1.40E-02	mg/kg-day	4.E-05
			Exp. Route Total								4.E-09					4.E-05
		Exposure Point Total									4.E-09					4.E-05
	Exposure Medium Total										4.E-09					4.E-05
Groundwater Total											9.E-06					2.E+00
											Total of Receptor Risks Across All Media					6.E+00

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.2-4.6)

TABLE E.2-7.8.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	19,653	mg/kg	2.15E-02	mg/kg-day	--	--	--	2.51E-01	mg/kg-day	1.00E+00	mg/kg-day	3.E-01
				Arsenic	5.881	mg/kg	6.44E-06	mg/kg-day	1.50E+00	mg/kg-day^{-1}	1.E-05	7.52E-05	mg/kg-day	3.00E-04	mg/kg-day	3.E-01
				Chromium	115.2	mg/kg	1.26E-04	mg/kg-day	--	--	--	1.47E-03	mg/kg-day	3.00E-03	mg/kg-day	5.E-01
				Cobalt	8.906	mg/kg	9.76E-06	mg/kg-day	--	--	--	1.14E-04	mg/kg-day	2.00E-02	mg/kg-day	6.E-03
				Iron	25,458	mg/kg	2.79E-02	mg/kg-day	--	--	--	3.25E-01	mg/kg-day	7.00E-01	mg/kg-day	5.E-01
				Manganese	371	mg/kg	4.07E-04	mg/kg-day	--	--	--	4.74E-03	mg/kg-day	2.00E-02	mg/kg-day	2.E-01
				Mercury	2.382	mg/kg	2.61E-06	mg/kg-day	--	--	--	3.05E-05	mg/kg-day	3.00E-04	mg/kg-day	1.E-01
				Vanadium	35.84	mg/kg	3.93E-05	mg/kg-day	--	--	--	4.58E-04	mg/kg-day	1.00E-03	mg/kg-day	5.E-01
				Aroclor 1254	0.376	mg/kg	4.12E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	8.E-07	4.81E-06	mg/kg-day	2.00E-05	mg/kg-day	2.E-01
			Exp. Route Total								1.E-05					2.5.E+00
			Dermal Absorption	Aluminum	19,653	mg/kg	6.03E-04	mg/kg-day	--	--	--	7.04E-03	mg/kg-day	1.00E+00	mg/kg-day	7.E-03
				Arsenic	5.881	mg/kg	5.41E-07	mg/kg-day	1.50E+00	mg/kg-day^{-1}	8.E-07	6.32E-06	mg/kg-day	3.00E-04	mg/kg-day	2.E-02
				Chromium	115.2	mg/kg	3.53E-06	mg/kg-day	--	--	--	4.12E-05	mg/kg-day	7.50E-05	mg/kg-day	5.E-01
				Cobalt	8.906	mg/kg	2.73E-07	mg/kg-day	--	--	--	3.19E-06	mg/kg-day	2.00E-02	mg/kg-day	2.E-04
				Iron	25,458	mg/kg	7.81E-04	mg/kg-day	--	--	--	9.11E-03	mg/kg-day	7.00E-01	mg/kg-day	1.E-02
				Manganese	371	mg/kg	1.14E-05	mg/kg-day	--	--	--	1.33E-04	mg/kg-day	8.00E-04	mg/kg-day	2.E-01
				Mercury	2.382	mg/kg	7.31E-08	mg/kg-day	--	--	--	8.53E-07	mg/kg-day	2.10E-05	mg/kg-day	4.E-02
				Vanadium	35.84	mg/kg	1.10E-06	mg/kg-day	--	--	--	1.28E-05	mg/kg-day	2.60E-05	mg/kg-day	5.E-01
				Aroclor 1254	0.376	mg/kg	1.62E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	3.E-07	1.88E-06	mg/kg-day	2.00E-05	mg/kg-day	9.E-02
			Exp. Route Total								1.E-06					1.E+00
		Exposure Point Total									1.E-05					3.9.E+00
	Exposure Medium Total										1.E-05					3.9.E+00
	Air	Fugitive Dust	Inhalation	Aluminum	19,653	mg/kg	3.96E-07	mg/kg-day	--	--	--	4.62E-06	mg/kg-day	1.00E-03	mg/kg-day	5.E-03
				Arsenic	5.881	mg/kg	1.19E-10	mg/kg-day	1.50E+01	mg/kg-day^{-1}	2.E-09	1.38E-09	mg/kg-day	--	--	--
				Chromium	115.2	mg/kg	2.32E-09	mg/kg-day	4.10E+01	mg/kg-day^{-1}	1.E-07	2.71E-08	mg/kg-day	2.90E-05	mg/kg-day	9.E-04
				Cobalt	8.906	mg/kg	1.79E-10	mg/kg-day	9.80E+00	mg/kg-day^{-1}	2.E-09	2.09E-09	mg/kg-day	5.70E-06	mg/kg-day	4.E-04
				Iron	25,458	mg/kg	5.13E-07	mg/kg-day	--	--	--	5.98E-06	mg/kg-day	--	--	--
				Manganese	371	mg/kg	7.48E-09	mg/kg-day	--	--	--	8.72E-08	mg/kg-day	1.43E-05	mg/kg-day	6.E-03
				Mercury	2.382	mg/kg	4.80E-11	mg/kg-day	--	--	--	5.60E-10	mg/kg-day	8.60E-05	mg/kg-day	7.E-06
				Vanadium	35.84	mg/kg	7.22E-10	mg/kg-day	--	--	--	8.43E-09	mg/kg-day	--	--	--
				Aroclor 1254	0.376	mg/kg	7.58E-12	mg/kg-day	2.00E+00	mg/kg-day^{-1}	2.E-11	8.84E-11	mg/kg-day	--	--	--
			Exp. Route Total								1.E-07					1.E-02
		Exposure Point Total									1.E-07					1.E-02
	Exposure Medium Total										1.E-07					1.E-02
Soil Total											1.E-05					3.9.E+00

TABLE E.2-7.8.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	8.9	ug/L	4.88E-05	mg/kg-day	--	--	--	5.69E-04	mg/kg-day	2.00E-02	mg/kg-day	3.E-02
				Manganese	260	ug/L	1.42E-03	mg/kg-day	--	--	--	1.66E-02	mg/kg-day	2.00E-02	mg/kg-day	8.E-01
				alpha-BHC	0.056	ug/L	3.07E-07	mg/kg-day	6.30E+00	mg/kg-day^{-1}	2.E-06	3.58E-06	mg/kg-day	--	--	--
				Heptachlor Epoxide	0.059	ug/L	3.23E-07	mg/kg-day	6.30E+00	mg/kg-day^{-1}	2.E-06	3.77E-06	mg/kg-day	1.30E-05	mg/kg-day	3.E-01
				Chloroform	0.28	ug/L	1.53E-06	mg/kg-day	--	--	--	1.79E-05	mg/kg-day	1.00E-02	mg/kg-day	2.E-03
			Exp. Route Total								4.E-06					1.E+00
			Dermal Absorption	Cobalt	8.9	ug/L	1.29E-07	mg/kg-day	--	--	--	1.50E-06	mg/kg-day	2.00E-02	mg/kg-day	8.E-05
				Manganese	260	ug/L	9.40E-06	mg/kg-day	--	--	--	1.10E-04	mg/kg-day	8.00E-04	mg/kg-day	1.E-01
				alpha-BHC	0.056	ug/L	1.61E-07	mg/kg-day	6.30E+00	mg/kg-day^{-1}	1.E-06	1.88E-06	mg/kg-day	--	--	--
				Heptachlor Epoxide	0.059	ug/L	6.94E-07	mg/kg-day	6.30E+00	mg/kg-day^{-1}	4.E-06	8.10E-06	mg/kg-day	1.30E-05	mg/kg-day	6.E-01
				Chloroform	0.28	ug/L	1.93E-08	mg/kg-day	--	--	--	2.25E-07	mg/kg-day	1.00E-02	mg/kg-day	2.E-05
			Exp. Route Total								5.E-06					8.E-01
		Exposure Point Total									9.E-06					2.E+00
	Exposure Medium Total										9.E-06					2.E+00
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.08E-06	mg/m^3	5.33E-08	mg/kg-day	8.10E-02	mg/kg-day^{-1}	4.E-09	6.21E-07	mg/kg-day	1.40E-02	mg/kg-day	4.E-05
			Exp. Route Total								4.E-09					4.E-05
		Exposure Point Total									4.E-09					4.E-05
	Exposure Medium Total										4.E-09					4.E-05
Groundwater Total											9.E-06					2.E+00
											Total of Receptor Risks Across All Media					6.E+00

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.2-4.6)

TABLE E.2-7.9.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Future
Receptor Population	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Surface Soil	Soil	Soil	Ingestion	Aluminum	22,122	mg/kg	--
				Arsenic	6.93	mg/kg	2.E-05
				Chromium	135.7	mg/kg	--
				Cobalt	6.124	mg/kg	--
				Iron	24,383	mg/kg	--
				Manganese	341.5	mg/kg	--
				Mercury	2.428	mg/kg	--
				Vanadium	32.6	mg/kg	--
				Aroclor 1254	0.59	mg/kg	2.E-06
			Exp. Route Total				2.E-05
			Dermal Absorption	Aluminum	22,122	mg/kg	--
				Arsenic	6.925	mg/kg	2.E-06
				Chromium	135.7	mg/kg	--
				Cobalt	6.124	mg/kg	--
				Iron	24,383	mg/kg	--
				Manganese	341.5	mg/kg	--
				Mercury	2.428	mg/kg	--
				Vanadium	32.6	mg/kg	--
				Aroclor 1254	0.59	mg/kg	8.E-07
			Exp. Route Total				2.E-06
		Exposure Point Total					2.E-05
	Exposure Medium Total						2.E-05
	Air	Fugitive Dust	Inhalation	Aluminum	22,122	mg/kg	--
				Arsenic	6.925	mg/kg	3.E-09
				Chromium	135.7	mg/kg	2.E-07
				Cobalt	6.124	mg/kg	2.E-09
				Iron	24,383	mg/kg	--
				Manganese	341.5	mg/kg	--
				Mercury	2.428	mg/kg	--
				Vanadium	32.6	mg/kg	--
				Aroclor 1254	0.59	mg/kg	4.E-11
			Exp. Route Total				2.E-07
		Exposure Point Total					2.E-07
	Exposure Medium Total						2.E-07
Soil Total							2.E-05

TABLE E.2-7.9.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Future
Receptor Population	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	8.9	ug/L	--
				Manganese	260	ug/L	--
				alpha-BHC	0.056	ug/L	5.E-06
				Heptachlor Epoxide	0.059	ug/L	6.E-06
				Chloroform	0.28	ug/L	--
			Exp. Route Total				1.E-05
			Dermal Absorption	Cobalt	8.9	ug/L	--
				Manganese	260	ug/L	--
				alpha-BHC	0.056	ug/L	3.E-06
				Heptachlor Epoxide	0.059	ug/L	1.E-05
				Chloroform	0.28	ug/L	--
			Exp. Route Total				2.E-05
		Exposure Point Total					3.E-05
	Exposure Medium Total						3.E-05
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.08E-06	mg/m^3	1.E-08
			Exp. Route Total				1.E-08
		Exposure Point Total					1.E-08
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	0.022	mg/m^3	2.E-06
			Exp. Route Total				2.E-06
		Exposure Point Total					2.E-06
	Exposure Medium Total						2.E-06
Groundwater Total							3.E-05
							5.E-05

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.2-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.2-4.7)

TABLE E.2-7.10.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Future
Receptor Population	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Total Soil	Soil	Soil	Ingestion	Aluminum	19,653	mg/kg	--
				Arsenic	5.881	mg/kg	1.E-05
				Chromium	115.2	mg/kg	--
				Cobalt	8.906	mg/kg	--
				Iron	25,458	mg/kg	--
				Manganese	371	mg/kg	--
				Mercury	2.382	mg/kg	--
				Vanadium	35.84	mg/kg	--
				Aroclor 1254	0.376	mg/kg	1.E-06
			Exp. Route Total				1.E-05
			Dermal Absorption	Aluminum	19,653	mg/kg	--
				Arsenic	5.881	mg/kg	1.E-06
				Chromium	115.2	mg/kg	--
				Cobalt	8.906	mg/kg	--
				Iron	25,458	mg/kg	--
				Manganese	371	mg/kg	--
				Mercury	2.382	mg/kg	--
				Vanadium	35.84	mg/kg	--
				Aroclor 1254	0.376	mg/kg	5.E-07
			Exp. Route Total				2.E-06
		Exposure Point Total					2.E-05
	Exposure Medium Total						2.E-05
	Air	Fugitive Dust	Inhalation	Aluminum	19,653	mg/kg	--
				Arsenic	5.881	mg/kg	3.E-09
				Chromium	115.2	mg/kg	1.E-07
				Cobalt	8.906	mg/kg	3.E-09
				Iron	25,458	mg/kg	--
				Manganese	371	mg/kg	--
				Mercury	2.382	mg/kg	--
				Vanadium	35.84	mg/kg	--
				Aroclor 1254	0.376	mg/kg	2.E-11
			Exp. Route Total				1.E-07
		Exposure Point Total					1.E-07
	Exposure Medium Total						1.E-07
Soil Total							2.E-05

TABLE E.2-7.10.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 37
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Future
Receptor Population	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	8.9	ug/L	--
				Manganese	260	ug/L	--
				alpha-BHC	0.056	ug/L	5.E-06
				Heptachlor Epoxide	0.059	ug/L	6.E-06
				Chloroform	0.28	ug/L	--
			Exp. Route Total				1.E-05
			Dermal Absorption	Cobalt	8.9	ug/L	--
				Manganese	260	ug/L	--
				alpha-BHC	0.056	ug/L	3.E-06
				Heptachlor Epoxide	0.059	ug/L	1.E-05
				Chloroform	0.28	ug/L	--
			Exp. Route Total				2.E-05
		Exposure Point Total					3.E-05
	Exposure Medium Total						3.E-05
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	1.08E-06	mg/m^3	1.E-08
			Exp. Route Total				1.E-08
		Exposure Point Total					1.E-08
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	0.022	mg/m^3	2.E-06
			Exp. Route Total				2.E-06
		Exposure Point Total					2.E-06
	Exposure Medium Total						2.E-06
Groundwater Total							3.E-05
							5.E-05

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.2-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.2-4.7)

TABLE E.2-9.1.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Maintenance Worker - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Receptor Population:	Maintenance Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	4.E-03	--	1.E-04	4.E-03
			Arsenic	7.3.E-07	--	7.E-08	8.E-07	Arsenic	skin/ vascular	5.E-03	--	4.E-04	5.E-03
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	9.E-03	--	1.E-02	2.E-02
			Cobalt	--	--	--	--	Cobalt	blood	6.E-05	--	2.E-06	6.E-05
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	7.E-03	--	2.E-04	7.E-03
			Manganese	--	--	--	--	Manganese	CNS	3.E-03	--	3.E-03	6.E-03
			Mercury	--	--	--	--	Mercury	immune system	2.E-03	--	7.E-04	2.E-03
			Vanadium	--	--	--	--	Vanadium	kidney	6.E-03	--	8.E-03	1.E-02
			Aroclor 1254	8.2.E-08	--	4.E-08	1.E-07	Aroclor 1254	eyes	6.E-03	--	3.E-03	8.E-03
				8.E-07	--	1.E-07	9.2.E-07			4.E-02	--	3.E-02	7.E-02
		Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	6.E-04	--	6.E-04
			Arsenic	--	1.E-09	--	1.E-09	Arsenic	NA	--	--	--	--
			Chromium	--	6.E-08	--	6.E-08	Chromium	respiratory	--	1.E-04	--	1.E-04
			Cobalt	--	6.E-10	--	6.E-10	Cobalt	respiratory	--	3.E-05	--	3.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	7.E-04	--	7.E-04
			Mercury	--	--	--	--	Mercury	CNS	--	8.E-07	--	8.E-07
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	1.E-11	--	1.E-11	Aroclor 1254	NA	--	--	--	--
				--	6.E-08	--	6.E-08			--	1.E-03	--	1.E-03
						Total Risk Across Soil	1.E-06					Total Hazard Index Across Soil	7.E-02

Total Risk Across All Media and All Exposure Routes	1.E-06

Total Hazard Index Across All Media and All Exposure Routes	7.E-02

Total blood HI across all media =	7.E-03
Total CNS HI across all media =	1.E-02
Total skin HI across all media =	5.E-03
Total respiratory HI across all media =	2.E-04
Total GI tract HI across all media =	3.E-02
Total kidney HI across all media =	1.E-02
Total liver HI across all media =	3.E-02
Total vascular HI across all media =	5.E-03
Total eyes HI across all media =	8.E-03
Total bone marrow HI across all media =	2.E-02
Total fetus HI across all media =	2.E-02

TABLE E.2-9.2.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Maintenance Worker - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Receptor Population:	Maintenance Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	4.E-03	--	1.E-04	4.E-03
			Arsenic	6.2.E-07	--	6.E-08	7.E-07	Arsenic	skin/ vascular	4.E-03	--	4.E-04	4.E-03
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	8.E-03	--	1.E-02	2.E-02
			Cobalt	--	--	--	--	Cobalt	blood	9.E-05	--	3.E-06	9.E-05
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	7.E-03	--	2.E-04	7.E-03
			Manganese	--	--	--	--	Manganese	CNS	4.E-03	--	3.E-03	7.E-03
			Mercury	--	--	--	--	Mercury	immune system	2.E-03	--	7.E-04	2.E-03
			Vanadium	--	--	--	--	Vanadium	kidney	7.E-03	--	9.E-03	2.E-02
			Aroclor 1254	5.3.E-08	--	2.E-08	8.E-08	Aroclor 1254	eyes	4.E-03	--	2.E-03	5.E-03
				7.E-07	--	9.E-08	7.5.E-07			4.E-02	--	2.E-02	6.E-02
		Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	6.E-04	--	6.E-04
			Arsenic	--	9.E-10	--	9.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	5.E-08	--	5.E-08	Chromium	respiratory	--	1.E-04	--	1.E-04
			Cobalt	--	9.E-10	--	9.E-10	Cobalt	respiratory	--	4.E-05	--	4.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	7.E-04	--	7.E-04
			Mercury	--	--	--	--	Mercury	CNS	--	8.E-07	--	8.E-07
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	8.E-12	--	8.E-12	Aroclor 1254	NA	--	--	--	--
				--	5.E-08	--	5.E-08			--	1.E-03	--	1.E-03
							Total Risk Across Soil						Total Hazard Index Across Soil
							8.E-07						6.E-02

Total Risk Across All Media and All Exposure Routes	8.E-07

Total Hazard Index Across All Media and All Exposure Routes	6.E-02

Total blood HI across all media =	7.E-03
Total CNS HI across all media =	1.E-02
Total skin HI across all media =	4.E-03
Total respiratory HI across all media =	2.E-04
Total GI tract HI across all media =	2.E-02
Total kidney HI across all media =	2.E-02
Total liver HI across all media =	2.E-02
Total vascular HI across all media =	4.E-03
Total eyes HI across all media =	5.E-03
Total bone marrow HI across all media =	2.E-02
Total fetus HI across all media =	2.E-02

TABLE E.2-9.3.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Commercial Worker - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Commercial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	1.E-02	--	6.E-04	1.E-02
			Arsenic	2.E-06	--	3.E-07	2.E-06	Arsenic	skin/ vascular	1.E-02	--	2.E-03	1.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	2.E-02	--	5.E-02	7.E-02
			Cobalt	--	--	--	--	Cobalt	blood	2.E-04	--	1.E-05	2.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	2.E-02	--	1.E-03	2.E-02
			Manganese	--	--	--	--	Manganese	CNS	9.E-03	--	1.E-02	2.E-02
			Mercury	--	--	--	--	Mercury	immune system	4.E-03	--	4.E-03	8.E-03
			Vanadium	--	--	--	--	Vanadium	kidney	2.E-02	--	4.E-02	6.E-02
			Aroclor 1254	1.E-07	--	1.E-07	3.E-07	Aroclor 1254	eyes	9.E-03	--	8.E-03	2.E-02
			Total	1.7.E-06	--	4.E-07	2.E-06	Total		1.E-01	--	1.E-01	2.E-01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	2.E-03	--	2.E-03
			Arsenic	--	3.E-09	--	3.E-09	Arsenic	NA	--	--	--	--
			Chromium	--	2.E-07	--	2.E-07	Chromium	respiratory	--	4.E-04	--	4.E-04
			Cobalt	--	3.E-09	--	3.E-09	Cobalt	respiratory	--	1.E-04	--	1.E-04
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	2.E-03	--	2.E-03
			Mercury	--	--	--	--	Mercury	CNS	--	3.E-06	--	3.E-06
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	3.E-11	--	3.E-11	Aroclor 1254	NA	--	--	--	--
			Total	--	2.E-07	--	2.E-07	Total		--	5.E-03	--	5.E-03
Groundwater	Groundwater	Groundwater used as Tapwater	Cobalt	--	--	--	--	Cobalt	blood	4.E-03	--	1.E-06	4.E-03
			Manganese	--	--	--	--	Manganese	CNS	1.E-01	--	3.E-03	1.E-01
			alpha-BHC	1.E-06	--	8.E-08	1.E-06	alpha-BHC	NA	--	--	--	--
			Heptachlor Epoxide	1.E-06	--	3.E-07	2.E-06	Heptachlor Epoxide	liver	4.E-02	--	1.E-02	6.E-02
			Chloroform	--	--	--	--	Chloroform	liver	3.E-04	--	4.E-07	3.E-04
			Total	3.E-06	--	4.E-07	3.E-06	Total		2.E-01	--	1.E-02	2.E-01
	Air	Air (Indoor Air)	Chloroform	--	2.E-09	--	2.E-09	Chloroform	respiratory	--	6.E-06	--	6.E-06
				--	2.E-09	--	2.E-09			--	6.E-06	--	6.E-06
						Total Risk Across Soil	2.E-06					Total Hazard Index Across Soil	2.E-01
						Total Risk Across Groundwater	3.E-06					Total Hazard Index Across Groundwater	2.E-01
						Total Risk Across All Media and All Exposure Routes	5.E-06					Total Hazard Index Across All Media and All Exposure Routes	4.E-01

Total blood HI across all media =	2.E-02
Total CNS HI across all media =	2.E-01
Total skin HI across all media =	1.E-02
Total respiratory HI across all media =	5.E-04
Total GI tract HI across all media =	9.E-02
Total kidney HI across all media =	6.E-02
Total liver HI across all media =	1.E-01
Total vascular HI across all media =	1.E-02
Total eyes HI across all media =	2.E-02
Total bone marrow HI across all media =	7.E-02
Total fetus HI across all media =	7.E-02

TABLE E.2-9.4.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Construction Worker - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	6.E-02	--	2.E-03	7.E-02
			Arsenic	4.E-07	--	4.E-08	4.E-07	Arsenic	skin/ vascular	6.E-02	--	6.E-03	7.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	2.E-02	--	2.E-02	4.E-02
			Cobalt	--	--	--	--	Cobalt	blood	1.E-03	--	4.E-05	1.E-03
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	3.E-01	--	8.E-03	3.E-01
			Manganese	--	--	--	--	Manganese	CNS	6.E-02	--	4.E-02	1.E-01
			Mercury	--	--	--	--	Mercury	immune system	--	--	--	--
			Vanadium	--	--	--	--	Vanadium	kidney	2.E-02	--	2.E-02	4.E-02
			Aroclor 1254	3.E-08	--	1.E-08	5.E-08	Aroclor 1254	eyes	2.E-02	--	1.E-02	3.E-02
			Total	4.E-07	--	5.E-08	5.E-07	Total		5.E-01	--	1.E-01	6.E-01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	2.7.E+00	--	2.7.E+00
			Arsenic	--	2.E-07	--	2.E-07	Arsenic	NA	--	--	--	--
			Chromium	--	9.E-06	--	9.E-06	Chromium	respiratory	--	6.E-01	--	6.E-01
			Cobalt	--	2.E-07	--	2.E-07	Cobalt	respiratory	--	2.E-01	--	2.E-01
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	4.E+00	--	3.6.E+00
			Mercury	--	--	--	--	Mercury	CNS	--	4.E-03	--	4.E-03
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	1.E-09	--	1.E-09	Aroclor 1254	NA	--	--	--	--
			Total	--	1.E-05	--	1.E-05	Total		--	7.1.E+00	--	7.E+00
		Air (Trench Air)	Chloroform	--	3.E-10	--	3.E-10	Chloroform	respiratory	--	4.E-02	--	4.E-02
				--	3.E-10	--	3.E-10			--	4.E-02	--	4.E-02
							Total Risk Across Soil	1.E-05					Total Hazard Index Across Soil	8.E+00
							Total Risk Across Groundwater	3.E-10					Total Hazard Index Across Groundwater	4.E-02

Total Risk Across All Media and All Exposure Routes: 1.E-05

Total Hazard Index Across All Media and All Exposure Routes: 8.E+00

Total blood HI across all media =	3.E-01
Total CNS HI across all media =	6.E+00
Total skin HI across all media =	7.E-02
Total respiratory HI across all media =	8.E-01
Total GI tract HI across all media =	3.E-01
Total kidney HI across all media =	4.E-02
Total liver HI across all media =	3.E-01
Total vascular HI across all media =	7.E-02
Total eyes HI across all media =	3.E-02
Total bone marrow HI across all media =	4.E-02
Total fetus HI across all media =	4.E-02

TABLE E.2-9.5.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Adult Resident - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	3.E-02	--	1.E-03	3.E-02
			Arsenic	5.E-06	--	6.E-07	5.E-06	Arsenic	skin/ vascular	3.E-02	--	4.E-03	4.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	6.E-02	--	1.E-01	2.E-01
			Cobalt	--	--	--	--	Cobalt	blood	4.E-04	--	2.E-05	4.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-02	--	2.E-03	5.E-02
			Manganese	--	--	--	--	Manganese	CNS	2.E-02	--	2.E-02	5.E-02
			Mercury	--	--	--	--	Mercury	immune system	1.E-02	--	6.E-03	2.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	4.E-02	--	7.E-02	1.E-01
			Aroclor 1254	6.E-07	--	3.E-07	9.E-07	Aroclor 1254	eyes	4.E-02	--	2.E-02	6.E-02
			Total	5.E-06	--	9.E-07	6.E-06	Total		3.E-01	--	2.E-01	5.E-01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	6.E-04	--	6.E-04
			Arsenic	--	1.E-09	--	1.E-09	Arsenic	NA	--	--	--	--
			Chromium	--	5.E-08	--	5.E-08	Chromium	respiratory	--	1.E-04	--	1.E-04
			Cobalt	--	6.E-10	--	6.E-10	Cobalt	respiratory	--	3.E-05	--	3.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	7.E-04	--	7.E-04
			Mercury	--	--	--	--	Mercury	CNS	--	8.E-07	--	8.E-07
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	1.E-11	--	1.E-11	Aroclor 1254	NA	--	--	--	--
			Total	--	5.E-08	--	5.E-08	Total		--	1.E-03	--	1.E-03
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	1.E-02	--	3.E-05	1.E-02
			Manganese	--	--	--	--	Manganese	CNS	4.E-01	--	5.E-02	4.E-01
			alpha-BHC	3.E-06	--	2.E-06	6.E-06	alpha-BHC	NA	--	--	--	--
			Heptachlor Epoxide	3.E-06	--	1.E-05	1.E-05	Heptachlor Epoxide	liver	1.E-01	--	4.E-01	5.E-01
			Chloroform	--	--	--	--	Chloroform	liver	8.E-04	--	9.E-06	8.E-04
			Total	6.8.E-06	--	1.E-05	2.E-05	Total		4.9.E-01	--	4.E-01	9.E-01
	Air	Air (Indoor Air)	Chloroform	--	6.E-09	--	6.E-09	Chloroform	respiratory	--	1.E-05	--	1.E-05
				--	6.E-09	--	6.E-09			--	1.E-05	--	1.E-05
		Air (Shower Air)	Chloroform	--	2.E-06	--	2.E-06	Chloroform	respiratory	--	4.E-03	--	4.E-03
				--	2.E-06	--	2.E-06			--	4.E-03	--	4.E-03
						Total Risk Across Soil	6.E-06					Total Hazard Index Across Soil	5.E-01
						Total Risk Across Groundwater	2.E-05					Total Hazard Index Across Groundwater	9.E-01
						Total Risk Across All Media and All Exposure Routes	3.E-05					Total Hazard Index Across All Media and All Exposure Routes	1.E+00

Total blood HI across all media =	6.E-02
Total CNS HI across all media =	5.E-01
Total skin HI across all media =	4.E-02
Total respiratory HI across all media =	4.E-03
Total GI tract HI across all media =	2.E-01
Total kidney HI across all media =	1.E-01
Total liver HI across all media =	7.E-01
Total vascular HI across all media =	4.E-02
Total eyes HI across all media =	6.E-02
Total bone marrow HI across all media =	2.E-01
Total fetus HI across all media =	2.E-01

TABLE E.2-9.6.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Adult Resident - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	3.E-02	--	1.E-03	3.E-02
			Arsenic	4.E-06	--	5.E-07	5.E-06	Arsenic	skin/ vascular	3.E-02	--	3.E-03	3.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	5.E-02	--	8.E-02	1.E-01
			Cobalt	--	--	--	--	Cobalt	blood	6.E-04	--	2.E-05	6.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-02	--	2.E-03	5.E-02
			Manganese	--	--	--	--	Manganese	CNS	3.E-02	--	3.E-02	5.E-02
			Mercury	--	--	--	--	Mercury	immune system	1.E-02	--	6.E-03	2.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	5.E-02	--	8.E-02	1.E-01
			Aroclor 1254	4.E-07	--	2.E-07	6.E-07	Aroclor 1254	eyes	3.E-02	--	1.E-02	4.E-02
			Total	4.E-06	--	7.E-07	5.E-06	Total		3.E-01	--	2.E-01	5.E-01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-04	--	5.E-04
			Arsenic	--	8.E-10	--	8.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	5.E-08	--	5.E-08	Chromium	respiratory	--	1.E-04	--	1.E-04
			Cobalt	--	8.E-10	--	8.E-10	Cobalt	respiratory	--	4.E-05	--	4.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	7.E-04	--	7.E-04
			Mercury	--	--	--	--	Mercury	CNS	--	8.E-07	--	8.E-07
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	7.E-12	--	7.E-12	Aroclor 1254	NA	--	--	--	--
			Total	--	5.E-08	--	5.E-08	Total		--	1.E-03	--	1.E-03
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	1.E-02	--	3.E-05	1.E-02
			Manganese	--	--	--	--	Manganese	CNS	4.E-01	--	5.E-02	4.E-01
			alpha-BHC	3.E-06	--	2.E-06	6.E-06	alpha-BHC	NA	--	--	--	--
			Heptachlor Epoxide	3.E-06	--	1.E-05	1.E-05	Heptachlor Epoxide	liver	1.E-01	--	4.E-01	5.E-01
			Chloroform	--	--	--	--	Chloroform	liver	8.E-04	--	9.E-06	8.E-04
			Total	6.8.E-06	--	1.E-05	2.E-05	Total		4.9.E-01	--	4.E-01	9.E-01
	Air	Air (Indoor Air)	Chloroform	--	6.E-09	--	6.E-09	Chloroform	respiratory	--	1.E-05	--	1.E-05
				--	6.E-09	--	6.E-09			--	1.E-05	--	1.E-05
		Air (Shower Air)	Chloroform	--	2.E-06	--	2.E-06	Chloroform	respiratory	--	4.E-03	--	4.E-03
				--	2.E-06	--	2.E-06			--	4.E-03	--	4.E-03

Total Risk Across Soil	5.E-06	Total Hazard Index Across Soil	5.E-01
Total Risk Across Groundwater	2.E-05	Total Hazard Index Across Groundwater	9.E-01
Total Risk Across All Media and All Exposure Routes	3.E-05	Total Hazard Index Across All Media and All Exposure Routes	1.E+00

Total blood HI across all media =	6.E-02
Total CNS HI across all media =	5.E-01
Total skin HI across all media =	3.E-02
Total respiratory HI across all media =	4.E-03
Total GI tract HI across all media =	2.E-01
Total kidney HI across all media =	1.E-01
Total liver HI across all media =	7.E-01
Total vascular HI across all media =	3.E-02
Total eyes HI across all media =	4.E-02
Total bone marrow HI across all media =	1.E-01
Total fetus HI across all media =	1.E-01

TABLE E.2-9.7.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Child Resident - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	3.E-01	--	8.E-03	3.E-01
			Arsenic	1.E-05	--	1.E-06	1.E-05	Arsenic	skin/ vascular	3.E-01	--	2.E-02	3.E-01
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	6.E-01	--	6.E-01	1.E+00
			Cobalt	--	--	--	--	Cobalt	blood	4.E-03	--	1.E-04	4.E-03
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	4.E-01	--	1.E-02	5.E-01
			Manganese	--	--	--	--	Manganese	CNS	2.E-01	--	2.E-01	4.E-01
			Mercury	--	--	--	--	Mercury	immune system	1.E-01	--	4.E-02	1.E-01
			Vanadium	--	--	--	--	Vanadium	kidney	4.E-01	--	4.E-01	9.E-01
			Aroclor 1254	1.E-06	--	5.E-07	2.E-06	Aroclor 1254	eyes	4.E-01	--	1.E-01	5.E-01
			Total	1.E-05	--	1.E-06	1.E-05	Total		3.E+00	--	1.E+00	4.E+00
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-03	--	5.E-03
			Arsenic	--	2.E-09	--	2.E-09	Arsenic	NA	--	--	--	--
			Chromium	--	1.E-07	--	1.E-07	Chromium	respiratory	--	1.E-03	--	1.E-03
			Cobalt	--	1.E-09	--	1.E-09	Cobalt	respiratory	--	3.E-04	--	3.E-04
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	6.E-03	--	6.E-03
			Mercury	--	--	--	--	Mercury	CNS	--	7.E-06	--	7.E-06
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	2.E-11	--	2.E-11	Aroclor 1254	NA	--	--	--	--
			Total	--	1.E-07	--	1.E-07	Total		--	1.E-02	--	1.E-02
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	3.E-02	--	8.E-05	3.E-02
			Manganese	--	--	--	--	Manganese	CNS	8.E-01	--	1.E-01	1.E+00
			alpha-BHC	2.E-06	--	1.E-06	3.E-06	alpha-BHC	NA	--	--	--	--
			Heptachlor Epoxide	2.E-06	--	4.E-06	6.E-06	Heptachlor Epoxide	liver	3.E-01	--	6.E-01	9.E-01
			Chloroform	--	--	--	--	Chloroform	liver	2.E-03	--	2.E-05	2.E-03
			Total	4.E-06	--	5.E-06	9.E-06	Total		1.E+00	--	8.E-01	2.E+00
	Air	Air (Indoor Air)	Chloroform	--	4.E-09	--	4.E-09	Chloroform	respiratory	--	4.E-05	--	4.E-05
				--	4.E-09	--	4.E-09			--	4.E-05	--	4.E-05

Total Risk Across Soil	1.E-05	Total Hazard Index Across Soil	4.E+00
Total Risk Across Groundwater	9.E-06	Total Hazard Index Across Groundwater	2.E+00
Total Risk Across All Media and All Exposure Routes	2.E-05	Total Hazard Index Across All Media and All Exposure Routes	6.E+00

Total blood HI across all media =	5.E-01
Total CNS HI across all media =	2.E+00
Total skin HI across all media =	3.E-01
Total respiratory HI across all media =	1.E-03
Total GI tract HI across all media =	2.E+00
Total kidney HI across all media =	9.E-01
Total liver HI across all media =	3.E+00
Total vascular HI across all media =	3.E-01
Total eyes HI across all media =	5.E-01
Total bone marrow HI across all media =	1.E+00
Total fetus HI across all media =	1.E+00

TABLE E.2-9.8.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Child Resident - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	3.E-01	--	7.E-03	3.E-01
			Arsenic	1.E-05	--	8.E-07	1.E-05	Arsenic	skin/ vascular	3.E-01	--	2.E-02	3.E-01
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	5.E-01	--	5.E-01	1.E+00
			Cobalt	--	--	--	--	Cobalt	blood	6.E-03	--	2.E-04	6.E-03
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-01	--	1.E-02	5.E-01
			Manganese	--	--	--	--	Manganese	CNS	2.E-01	--	2.E-01	4.E-01
			Mercury	--	--	--	--	Mercury	immune system	1.E-01	--	4.E-02	1.E-01
			Vanadium	--	--	--	--	Vanadium	kidney	5.E-01	--	5.E-01	1.E+00
			Aroclor 1254	8.E-07	--	3.E-07	1.E-06	Aroclor 1254	eyes	2.E-01	--	9.E-02	3.E-01
			Total	1.E-05	--	1.E-06	1.E-05	Total		3.E+00	--	1.E+00	4.E+00
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-03	--	5.E-03
			Arsenic	--	2.E-09	--	2.E-09	Arsenic	NA	--	--	--	--
			Chromium	--	1.E-07	--	1.E-07	Chromium	respiratory	--	9.E-04	--	9.E-04
			Cobalt	--	2.E-09	--	2.E-09	Cobalt	respiratory	--	4.E-04	--	4.E-04
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	6.E-03	--	6.E-03
			Mercury	--	--	--	--	Mercury	CNS	--	7.E-06	--	7.E-06
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	2.E-11	--	2.E-11	Aroclor 1254	NA	--	--	--	--
			Total	--	1.E-07	--	1.E-07	Total		--	1.E-02	--	1.E-02
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	3.E-02	--	8.E-05	3.E-02
			Manganese	--	--	--	--	Manganese	CNS	8.E-01	--	1.E-01	1.E+00
			alpha-BHC	2.E-06	--	1.E-06	3.E-06	alpha-BHC	NA	--	--	--	--
			Heptachlor Epoxide	2.E-06	--	4.E-06	6.E-06	Heptachlor Epoxide	liver	3.E-01	--	6.E-01	9.E-01
			Chloroform	--	--	--	--	Chloroform	liver	2.E-03	--	2.E-05	2.E-03
			Total	4.E-06	--	5.E-06	9.E-06	Total		1.E+00	--	8.E-01	2.E+00
	Air	Air (Indoor Air)	Chloroform	--	4.E-09	--	4.E-09	Chloroform	respiratory	--	4.E-05	--	4.E-05
				--	4.E-09	--	4.E-09			--	4.E-05	--	4.E-05

Total Risk Across Soil	1.E-05
Total Risk Across Groundwater	9.E-06
Total Risk Across All Media and All Exposure Routes	2.E-05

Total Hazard Index Across Soil	4.E+00
Total Hazard Index Across Groundwater	2.E+00
Total Hazard Index Across All Media and All Exposure Routes	6.E+00

Total blood HI across all media =	5.E-01
Total CNS HI across all media =	2.E+00
Total skin HI across all media =	3.E-01
Total respiratory HI across all media =	1.E-03
Total GI tract HI across all media =	2.E+00
Total kidney HI across all media =	1.E+00
Total liver HI across all media =	2.E+00
Total vascular HI across all media =	3.E-01
Total eyes HI across all media =	3.E-01
Total bone marrow HI across all media =	1.E+00
Total fetus HI across all media =	1.E+00

TABLE E.2-9.9.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Lifetime Resident - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--
			Arsenic	2.E-05	--	2.E-06	2.E-05
			Chromium	--	--	--	--
			Cobalt	--	--	--	--
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Mercury	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	2.E-06	--	8.E-07	3.E-06
			Total	2.E-05	--	2.4.E-06	2.E-05
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--
			Arsenic	--	3.E-09	--	3.E-09
			Chromium	--	2.E-07	--	2.E-07
			Cobalt	--	2.E-09	--	2.E-09
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Mercury	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	--	4.E-11	--	4.E-11
			Total	--	2.E-07	--	2.E-07
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--
			Manganese	--	--	--	--
			alpha-BHC	5.E-06	--	3.E-06	9.E-06
			Heptachlor Epoxide	6.E-06	--	1.E-05	2.E-05
			Chloroform	--	--	--	--
			Total	1.E-05	--	2.E-05	3.E-05
	Air	Air (Indoor Air)	Chloroform	--	1.E-08	--	1.E-08
				--	1.E-08	--	1.E-08
		Air (Shower Air)	Chloroform	--	2.E-06	--	2.E-06
				--	2.E-06	--	2.E-06
						Total Risk Across Soil	2.E-05
						Total Risk Across Groundwater	3.E-05
						Total Risk Across All Media and All Exposure Routes	5.E-05

TABLE E.2-9.10.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Lifetime Resident - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--
			Arsenic	1.E-05	--	1.E-06	2.E-05
			Chromium	--	--	--	--
			Cobalt	--	--	--	--
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Mercury	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	1.E-06	--	5.E-07	2.E-06
			Total	1.E-05	--	1.8.E-06	2.E-05
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--
			Arsenic	--	3.E-09	--	3.E-09
			Chromium	--	1.E-07	--	1.E-07
			Cobalt	--	3.E-09	--	3.E-09
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Mercury	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	--	2.E-11	--	2.E-11
			Total	--	1.E-07	--	1.E-07
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--
			Manganese	--	--	--	--
			alpha-BHC	5.E-06	--	3.E-06	9.E-06
			Heptachlor Epoxide	6.E-06	--	1.E-05	2.E-05
			Chloroform	--	--	--	--
			Total	1.E-05	--	2.E-05	3.E-05
	Air	Air (Indoor Air)	Chloroform	--	1.E-08	--	1.E-08
				--	1.E-08	--	1.E-08
		Air (Shower Air)	Chloroform	--	2.E-06	--	2.E-06
				--	2.E-06	--	2.E-06
						Total Risk Across Soil	2.E-05
						Total Risk Across Groundwater	3.E-05

Total Risk Across All Media and All Exposure Routes	5.E-05

TABLE E.2-10.1.RME
RME Risk Assessment Summary: Construction Worker - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	None Identified					None Identified		--	--	--	--
			Total	--	--	--	--	Total		--	--	--	--
	Air	Air	None Identified					Aluminum	CNS	--	2.7.E+00	--	2.7.E+00
								Manganese	CNS	--	3.6.E+00	--	3.6.E+00
			Total	--	--	--	--	Total		--	6.3.E+00	--	6.3.E+00
Groundwater	Groundwater	Groundwater	None Identified					None Identified					
			Total	--	--	--	--	Total		--	--	--	--
							Total Risk Across Soil	--					Total Hazard Index Across Soil	6.E+00
							Total Risk Across Groundwater	--					Total Hazard Index Across Groundwater	--
							Total Risk Across All Media and All Exposure Routes	--					Total Hazard Index Across All Media and All Exposure Routes	6.E+00
													Total CNS HI across all media =	6.E+00

TABLE E.2-10.2.RME
RME Risk Assessment Summary: Child Resident - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	developmental CNS	3.E-01	--	8.E-03	3.E-01
			Chromium	GI tract/fetus/bone marrow/liver	6.E-01	--	6.E-01	1.E+00
			Iron	blood/ liver/ GI tract	4.5.E-01	--	1.2.E-02	5.E-01
			Manganese	CNS	2.2.E-01	--	1.5.E-01	4.E-01
			Total		1.5.E+00	--	8.E-01	2.E+00
	Air	Air	None Identified		--	--	--	--
			Total		--	--	--	--
Groundwater	Groundwater	Groundwater Used as Tapwater	Cobalt	blood	2.8.E-02	--	7.5.E-05	3.E-02
			Heptachlor Epoxide	liver	2.9.E-01	--	6.2.E-01	9.E-01
			Total		2.8.E-02	--	7.5.E-05	3.E-02

Total Hazard Index Across Soil	2.E+00
Total Hazard Index Across Groundwater	3.E-02
Total Hazard Index Across All Media and All Exposure Routes	2.E+00
Total CNS HI across all media =	6.6.E-01
Total GI tract HI across all media =	1.7.E+00
Total liver HI across all media =	2.6.E+00

TABLE E.2-10.3.RME
RME Risk Assessment Summary: Child Resident - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	developmental CNS	3.E-01	--	7.E-03	3.E-01
			Chromium	GI tract/fetus/bone marrow/liver	5.E-01	--	5.E-01	1.E+00
			Iron	blood/ liver/ GI tract	4.6.E-01	--	1.3.E-02	5.E-01
			Manganese	CNS	2.4.E-01	--	1.7.E-01	4.E-01
			Total		1.4.E+00	--	7.E-01	2.E+00
	Air	Air	None Identified		--	--	--	--
			Total		--	--	--	--
Groundwater	Groundwater	Groundwater Used as Tapwater	Cobalt	blood	2.8.E-02	--	7.5.E-05	3.E-02
			Heptachlor Epoxide	liver	2.9.E-01	--	6.2.E-01	9.E-01
			Total		2.8.E-02	--	7.5.E-05	9.E-01

Total Hazard Index Across Soil	2.E+00
Total Hazard Index Across Groundwater	9.E-01
Total Hazard Index Across All Media and All Exposure Routes	3.E+00
Total CNS HI across all media =	6.6.E-01
Total GI tract HI across all media =	1.5.E+00
Total liver HI across all media =	2.4.E+00

IRON MARGIN OF EXPOSURE EVALUATION

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Table 1
Iron "Margin of Exposure" Evaluation - SWMU 37
SMWUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Total Soil - Child Resident				
Iron EPC (mg/kg)	Child Daily Intake Estimate* (mg/day)	RDA for Child 6 mths to 4 years Old	Child Daily Intake** (mg/kg-day)	Provisional RfD (mg/kg-day)
25,458	4.9	10 mg/day	0.33	0.7

* See Table 2 for equations used to calculated daily intake estimates.
** Default weight of 15 kg used for child

Table 2
Iron "Margin of Exposure" Evaluation - SWMU 37
SMWUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion-Total Soil	Resident	Child	SWMU 37	AT-NC	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	Chronic
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	MDC or EPC	Daily = CS*IRS*EF*ED*FI*CF1 / BW*AT
				ED	Exposure Duration	6	years	USEPA, 1991	Intake
				EF	Exposure Frequency	350	days/year	USEPA, 1991	(mg/day)
				FI	Fraction Ingested	1	(unitless)	default	
				IRS	Ingestion Rate of Soil	200	mg/day	USEPA, 1991	

Notes:

MDC = Maximum Detected Concentration

EPC = Exposure Point Concentration

kg = kilogram

mg/kg = milligram per kilogram

mg/day = milligram per day

kg/mg = kilogram per milligram

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

APPENDIX E.3

SWMU 38 AND AOC Q HHRA
RAGS D TABLES AND IRON "MARGIN OF EXPOSURE" EVALUATION

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Table E.3-1
Selection of Exposure Pathways - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Surface Soil	Surface Soil	Surface Soil	Maintenance Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
						Dermal Absorption	Quant	Receptor could come into contact with surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
		Air	Ambient Air Above Surface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil. [1]
	Subsurface Soil	Subsurface Soil	Subsurface Soil	Maintenance Worker	Adult	Ingestion	None	Receptor is not likely to ingest subsurface soil from the site since maintenance does not include excavation.
						Dermal Absorption	None	Receptor is not likely to come in contact with subsurface soil from the site since maintenance does not include excavation.
		Air	Ambient Air Above Subsurface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	None	Receptor is not likely to inhale particulates from ambient air above the subsurface soil since maintenance activities do not include excavation. [1]
	Groundwater [2]	Groundwater	Groundwater	Maintenance Worker	Adult	Ingestion	None	Receptor is not likely to ingest groundwater from the site during maintenance activities.
						Dermal Absorption	None	Receptor is not likely to contact groundwater from the site during maintenance activities.
		Air	Upward Migration of Vapors from Groundwater (Outdoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
			Upward Migration of Vapors from Groundwater (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors.
			Vapors while Showering	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
Future	Surface Soil	Surface Soil	Surface Soil	Maintenance Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
						Dermal Absorption	Quant	Receptor could come into contact with surface soil from the site while conducting routine maintenance activities (i.e., mowing lawns).
				Commerical/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil while working on site.
						Dermal Absorption	Quant	Receptor could contact surface soil while working on site.
				Construction Worker	Adult	Ingestion	Quant	Receptor could ingest surface soil from the site during construction activities.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil from the site during construction activities.
				Resident	Child	Ingestion	Quant	Receptor could ingest surface soil while living on site.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil while living on site.
					Adult	Ingestion	Quant	Receptor could ingest surface soil while living on site.
						Dermal Absorption	Quant	Receptor could come into contact with surface soil while living on site.
					Child/Adult	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to surface soil. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
		Air	Ambient Air Above Surface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while working on site. [1]
				Commerical/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while working on site. [1]
				Construction Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while working on site. [1]
				Resident	Child	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while living on site. [1]
					Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the surface soil while living on site. [1]
					Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to surface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]

Table E.3-1
Selection of Exposure Pathways - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Cont.	Surface Soil Cont.	Air Cont.	Upward Migration of Vapors from Soil (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into building. [1]
				Construction Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Resident	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [1]
					Child	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [1]
					Child/Adult	Inhalation	None	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to surface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]
	Subsurface Soil	Subsurface Soil	Subsurface Soil	Maintenance Worker	Adult	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction activities while conducting routine maintenance activities.
						Dermal Absorption	Quant	Receptor could come in contact with subsurface soil when mixed with surface soil from construction activities while conducting routine maintenance activities.
				Commerical/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a commercial/industrial facility.
						Dermal Absorption	Quant	Receptor could contact subsurface soil when mixed with surface soil from construction of a commercial/industrial facility.
				Construction Worker	Adult	Ingestion	Quant	Receptor could ingest subsurface soil from the site while during construction activities.
						Dermal Absorption	Quant	Receptor could come into contact with subsurface soil from the site during construction activities.
				Resident	Child	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a residence.
						Dermal Absorption	Quant	Receptor could come in contact with subsurface soil when mixed with surface soil from construction of a residence.
					Adult	Ingestion	Quant	Receptor could ingest subsurface soil when mixed with surface soil from construction of a residence.
						Dermal Absorption	Quant	Receptor could come in contact with subsurface soil when mixed with surface soil from construction of a residence.
					Child/Adult	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to subsurface soil. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
		Air	Ambient Air Above Subsurface Soil (Particulates) [1]	Maintenance Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction activities while conducting routine maintenance activities. [1]
				Commerical/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a commercial/industrial facility. [1]
				Construction Worker	Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil during construction activities. [1]
				Resident	Child	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a residence. [1]
					Adult	Inhalation	Quant	Receptor could inhale particulates from ambient air above the subsurface soil when mixed with surface soil from construction of a residence. [1]
					Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to subsurface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]

Table E.3-1
Selection of Exposure Pathways - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Cont.	Subsurface Soil Cont.	Air Cont.	Upward Migration of Vapors from Soil (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into building.[1]
				Construction Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors. [1]
				Resident	Adult	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence. [1]
					Child	Inhalation	None	Receptor not likely to inhale VOCs from soil via vapor intrusion into residence.[1]
					Child/Adult	Inhalation	None	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to subsurface soil. The non-cancer hazard evaluations are treated separately for child and adult resident. [1]
	Groundwater [2]	Groundwater	Groundwater	Maintenance Worker	Adult	Ingestion	None	Receptor is not likely to ingest groundwater from the site during maintenance activities.
						Dermal Absorption	None	Receptor is not likely to contact groundwater from the site during maintenance activities.
				Commercial/Industrial Worker	Adult	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply for industrial process.
				Construction Worker	Adult	Ingestion	None	Due to the depth to groundwater (approximately 20-25 ft bgs), the receptor is not likely to ingest groundwater during excavation activities.
						Dermal Absorption	None	Due to the depth to groundwater (approximately 20-25 ft bgs), the receptor is not likely to contact groundwater during excavation activities.
				Resident	Adult	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply.
					Child	Ingestion	Quant	Receptor could ingest groundwater used as a water supply.
						Dermal Absorption	Quant	Receptor could come into contact with groundwater used as a water supply.
					Child/Adult	Ingestion	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.
						Dermal Absorption	Quant	
		Air	Upward Migration of Vapors from Groundwater (Outdoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
				Construction Worker	Adult	Inhalation	Quant	Receptor could inhale vapors that migrated upward from groundwater to during excavation activities.
				Resident	Adult	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
					Child	Inhalation	None	Receptor is not likely to inhale vapors that migrated upward from groundwater to ambient air in any significant quantities.
					Child/Adult	Inhalation	None	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.[2]
			Upward Migration of Vapors from Groundwater (Indoors)	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors.
				Commercial/Industrial Worker	Adult	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into building.
				Construction Worker	Adult	Inhalation	None	Receptor is assumed to be outdoors.
				Resident	Adult	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into residence.
					Child	Inhalation	Quant	Receptor could inhale VOCs from groundwater via vapor intrusion into residence.

Table E.3-1
Selection of Exposure Pathways - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future Cont.	Groundwater Cont.	Air Cont.	Upward Migration of Vapors from Groundwater (Indoors) Cont.	Resident Cont.	Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. The non-cancer hazard evaluations are treated separately for child and adult resident.[2]
			Vapors while Showering	Maintenance Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
				Commercial/Industrial Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
				Construction Worker	Adult	Inhalation	None	Receptor is assumed not to shower on-site.
				Resident	Adult	Inhalation	Quant	Receptor could inhale vapors from groundwater while showering.
					Child	Inhalation	None	Receptor is assumed not to shower.
					Child/Adult	Inhalation	Quant	The cancer risk estimates for the adult resident (24 years) and child resident (6 years) are added together (30 years) to address lifetime exposure to groundwater. Since the shower scenario applies only to the adult resident, the lifetime resident exposure will be equivalent to that of the adult resident.[2]

Notes:
[1] VOCs not identified as COPCs in soil; therefore, vapors via inhalation pathway not assessed

[2] Groundwater from the surface aquifer is not currently used at the sites for potable or non-potable water supply.

Table E.3-2.1
SWMU 38 and AOC Q COPC Determination - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Surface Soil

Exposure point	CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Screening Toxicity Value (N/C)		Potential ARAR/TBC Value		Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Surface Soil		**TAL Metals**														
	7429-90-5	Aluminum	7,820	26,400	mg/kg	38SB3A	13/13	1.83 - 100	26,400	7,821	N	102,200	N	IND	Y	**ARES**
	7440-36-0	Antimony	0.0355	0.39	mg/kg	38SB10A	12/13	0.042 - 0.0518	0.39	3.13	N	40.88	N	IND	N	BSL
	7440-38-2	Arsenic	0.635	5.1	mg/kg	38SB10A	13/13	0.0232 - 0.071	5.1	0.426	C	1.91	C	IND	Y	***ARES/IND***
	7440-39-3	Barium	87	160	mg/kg	38SB9A	13/13	0.106 - 0.53	160	1,564	N	20,440	N	IND	N	BSL
	7440-41-7	Beryllium	0.465	0.91	mg/kg	38SB3A	13/13	0.021 - 0.0391	0.91	15.64	N	204.4	N	IND	N	BSL
	7440-43-9	Cadmium	0.95	1.9	mg/kg	38SB3A	13/13	0.11 - 0.182	1.9	3.911	N	51.1	N	IND	N	BSL
	7440-70-2	Calcium	943	27,600	mg/kg	38SB1A	13/13	4.2 - 166	27,600	--	--	1,095,000	--	RDA	N	BSL
	7440-47-3	Chromium[1]	12	82	mg/kg	38SB3A	13/13	0.72 - 0.912	82	23.46	N	306.6	N	IND	Y	**ARES**
	7440-48-4	Cobalt	5.9	12	mg/kg	38SB9A	13/13	0.208 - 0.37	12	--	--	--	--	--	Y	NSV
	7440-50-8	Copper	6.0	85	mg/kg	38SB3A	13/13	0.044 - 0.368	85	312.9	N	4,088	N	IND	N	BSL
	7439-89-6	Iron	12,700	30,700	mg/kg	38SB3A	13/13	0.48 - 212	30,700	5,475	N	71,540	N	IND	Y	**ARES**
	7439-92-1	Lead[2]	7.2	52	mg/kg	38SB1A	13/13	0.0218 - 0.218	52	400	--	750	--	AL	N	BSL
	7439-95-4	Magnesium	2,220	5,590	mg/kg	38SB3A	13/13	3.21 - 16.05	5,590	--	--	156,400	--	RDA	N	BSL
	7439-96-5	Manganese	319	600	mg/kg	38SB5A	13/13	0.16 - 2.64	600	156.4	N	2,044	N	IND	Y	**ARES**
	7439-97-6	Mercury[3]	0.01	0.27	mg/kg	38SB10A	12/13	0.0075 - 0.0077	0.27	2.35	--	30.66	--	IND	N	BSL
	7440-02-0	Nickel	8.5	35	mg/kg	38SB3A	13/13	0.0356 - 0.036	35	156.4	N	2,044	N	IND	N	BSL
	7440-09-7	Potassium	1,050	2,410	mg/kg	38SB3A	13/13	5 - 25	2,410	--	--	2,607,000	--	RDA	N	BSL
	7782-49-2	Selenium	0.11	0.67	mg/kg	QSB3A	13/13	0.0502 - 0.089	0.67	39.11	N	511	N	IND	N	BSL
	7440-22-4	Silver	0.035	0.14	mg/kg	38SB3A	13/13	0.0044 - 0.013	0.14	39.11	N	511	N	IND	N	BSL
	7440-23-5	Sodium	27	68	mg/kg	38SB8A	13/13	8.92 - 13	68	--	--	625,700	--	RDA	N	BSL
	7440-28-0	Thallium	0.1	0.24	mg/kg	38SB8A	13/13	0.0049 - 0.027	0.24	0.548	N	7.154	N	IND	N	BSL
	7440-62-2	Vanadium	15	43	mg/kg	38SB8A	13/13	0.034 - 0.207	43	7.821	N	102.2	N	IND	Y	**ARES**
	7440-66-6	Zinc	45.5	120	mg/kg	38SB5A	13/13	0.517 - 1	120	2,346	N	30,660	N	IND	N	BSL
		Pesticides/PCBs														
	959-98-8	Endosulfan I[4]	2.6E-03	2.6E-03	mg/kg	38SB7A DUP AVG	1/10	0.001 - 0.0014	2.6E-03	4.7E+01	N	6.1E+02	N	IND	N	BSL
	72-20-8	Endrin	1.1E-03	3.5E-03	mg/kg	38SB7A DUP AVG	4/10	0.000417 - 0.00083	3.5E-03	2.3E+00	N	3.1E+01	N	IND	N	BSL
	11097-69-1	Aroclor 1254[5]	1.7E-02	5.7E-01	mg/kg	38SB1A	9/10	0.0042 - 0.0068	5.7E-01	1.6E-01	N	1.4E+00	C	IND	Y	**ARES**
		TCL VOCs														
	78-93-3	2-Butanone (MEK)	2.3E-02	2.6E-02	mg/kg	38SB2A	3/6	0.0058 - 0.0089	2.6E-02	4.7E+03	N	6.1E+04	N	IND	N	BSL
	67-64-1	Acetone	4.2E-02	2.0E-01	mg/kg	38SB2A	6/6	0.0058 - 0.0089	2.0E-01	7.0E+03	N	9.2E+04	N	IND	N	BSL
	110-82-7	Cyclohexane	5.6E-04	5.6E-04	mg/kg	QSB1A DUP AVG	1/6	0.000367 - 0.000562	5.6E-04	--	--	--	--	--	Y	NSV
	100-41-4	Ethylbenzene	5.2E-04	5.2E-04	mg/kg	QSB1A DUP AVG	1/6	0.000491 - 0.000753	5.2E-04	7.8E+02	N	1.0E+04	N	IND	N	BSL
	108-87-2	Methylcyclohexane	2.4E-03	2.4E-03	mg/kg	QSB1A DUP AVG	1/6	0.00098 - 0.0015	2.4E-03	--	--	--	--	--	Y	NSV
	75-09-2	Methylene chloride	4.5E-03	6.8E-03	mg/kg	QSB3A	3/6	0.00326 - 0.005	6.8E-03	8.5E+01	C	3.8E+02	C	IND	N	BSL
	108-88-3	Toluene	3.0E-03	3.0E-03	mg/kg	38SB2A	1/6	0.000538 - 0.000826	3.0E-03	6.3E+02	N	8.2E+03	N	IND	N	BSL
	1330-20-7	Xylenes	2.2E-03	2.2E-03	mg/kg	QSB1A DUP AVG	1/6	0.000488 - 0.000749	2.2E-03	1.6E+03	N	2.0E+04	N	IND	N	BSL
		TCL SVOCs														
	121-14-2	2,4-Dinitrotoluene	9.9E-02	1.2E-01	mg/kg	38SB1A	3/6	0.00378 - 0.0567	1.2E-01	1.6E+01	N	2.0E+02	N	IND	N	BSL
	--	Dinitrotoluene Mix	9.9E-02	1.2E-01	mg/kg	38SB1A	3/6	--	1.2E-01	9.4E-01	C	4.2E+00	C	IND	N	BSL
	59-50-7	4-Chloro-3-Methylphenol[6]	1.1E-02	2.5E-02	mg/kg	38SB2A	3/6	0.00625 - 0.0938	2.5E-02	3.9E+02	N	5.1E+03	N	IND	N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	4.6E-02	1.3E+00	mg/kg	38SB3A	6/6	0.00248 - 0.0373	1.3E+00	4.6E+01	C	2.0E+02	C	IND	N	BSL
	85-68-7	Butyl Benzyl Phthalate	4.4E-02	5.2E-02	mg/kg	38SB2A	2/6	0.00538 - 0.0806	5.2E-02	1.6E+03	N	2.0E+04	N	IND	N	BSL
	84-74-2	Di-n-butylphthalate	2.6E-02	1.4E+01	mg/kg	38SB1A	6/6	0.00458 - 0.0688	1.4E+01	7.8E+02	N	1.0E+04	N	IND	N	BSL
	84-66-2	Diethylphthalate	4.0E-03	1.9E-02	mg/kg	QSB1A DUP AVG	4/6	0.00228 - 0.0342	1.9E-02	6.3E+03	N	8.2E+04	N	IND	N	BSL
	206-44-0	Fluoranthene	2.8E-03	1.7E-01	mg/kg	38SB3A	4/6	0.00282 - 0.306	1.7E-01	3.1E+02	N	4.1E+03	N	IND	N	BSL
	86-30-6	N-Nitrosodiphenylamine	1.9E-02	1.6E-01	mg/kg	38SB3A	4/6	0.0057 - 0.0855	1.6E-01	1.3E+02	C	5.8E+02	C	IND	N	BSL
	85-01-8	Phenanthrene[7]	3.0E-03	1.1E-01	mg/kg	38SB3A	3/6	0.00276 - 0.0414	1.1E-01	2.3E+02	N	3.1E+03	N	IND	N	BSL
	129-00-0	Pyrene	2.5E-03	9.0E-02	mg/kg	38SB3A	4/6	0.00178 - 0.0266	9.0E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
		TCL Explosives														
	121-14-2	2,4-Dinitrotoluene	2.6E-01	2.6E-01	mg/kg	QSB1A DUP AVG	1/14	0.1 - 0.142	2.6E-01	1.6E+01	N	2.0E+02	N	IND	N	BSL
	--	Dinitrotoluene Mix	2.6E-01	2.6E-01	mg/kg	QSB1A DUP AVG	1/14	--	2.6E-01	9.4E-01	C	4.2E+00	C	IND	N	BSL
		Cyanide (mg/kg)														
	57-12-5	Cyanide	3.0E-01	2.2E+00	mg/kg	QSB3A	4/6	0.0356 - 0.0356	2.2E+00	1.6E+02	N	2.0E+03	N	IND	N	BSL

Notes:

COPC = Chemical of Potential Concern
CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
ARAR = Applicable, Relevant, and Appropriate Requirement
TBC = To-Be-Considered
IND = Adjusted Industrial RBC

RDA = Recommended Daily Allowance
AL = USEPA Action Level
-- = No Value Available
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
N/C = Noncarcinogenic/Carcinogenic per EPA RBC Table (October 2007)

[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan RBC value was used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol RBC value was used
[7] = Pyrene RBC value was used

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table E.3-2.2
SWMU 38 and AOC Q COPC Determination - Total Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Total Soil
Exposure Medium:	Total Soil

Exposure point	CAS #	Chemical	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	Screening Toxicity Value (N/C)		Potential ARAR/TBC Value		Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion
Total Soil		**TAL Metals**														
	7429-90-5	Aluminum	7,820	26,400	mg/kg	38SB3A	29/29	1.83 - 100	26,400	7,821	N	102,200	N	IND	Y	**ARES**
	7440-36-0	Antimony	0.0355	0.39	mg/kg	38SB10A	23/29	0.042 - 0.0518	0.39	3.13	N	40.88	N	IND	N	BSL
	7440-38-2	Arsenic	0.635	5.1	mg/kg	38SB10A	29/29	0.0232 - 0.071	5.1	0.426	C	1.91	C	IND	Y	***ARES/IND***
	7440-39-3	Barium	75	180	mg/kg	38SB9B	29/29	0.106 - 0.53	180	1,564	N	20,440	N	IND	N	BSL
	7440-41-7	Beryllium	0.31	0.93	mg/kg	38SB3B	29/29	0.021 - 0.0391	0.93	15.64	N	204.4	N	IND	N	BSL
	7440-43-9	Cadmium	0.95	2	mg/kg	38SB9B	29/29	0.11 - 0.182	2	3.91	N	51.1	N	IND	N	BSL
	7440-70-2	Calcium	943	27,600	mg/kg	38SB1A	29/29	4.2 - 166	27,600	--	--	1,095,000	--	RDA	N	BSL
	7440-47-3	Chromium[1]	12	82	mg/kg	38SB3A	29/29	0.72 - 0.912	82	23.46	N	306.6	N	IND	Y	**ARES**
	7440-48-4	Cobalt	5.9	13	mg/kg	38SB1B	29/29	0.208 - 0.37	13	--	--	--	--	--	Y	NSV
	7440-50-8	Copper	6	85	mg/kg	38SB3A	29/29	0.044 - 0.368	85	312.9	N	4,088	N	IND	N	BSL
	7439-89-6	Iron	12,700	32,200	mg/kg	38SB1B	29/29	0.48 - 212	32,200	5,475	N	71,540	N	IND	Y	**ARES**
	7439-92-1	Lead[2]	5.5	52	mg/kg	38SB1A	29/29	0.0218 - 0.218	52	400	--	750	--	AL	N	BSL
	7439-95-4	Magnesium	2,220	8,240	mg/kg	38SB1C	29/29	3.21 - 16.05	8,240	--	--	156,400	--	RDA	N	BSL
	7439-96-5	Manganese	273	600	mg/kg	38SB5A	29/29	0.16 - 2.64	600	156.4	N	2,044	N	IND	Y	**ARES**
	7439-97-6	Mercury[3]	0.01	0.27	mg/kg	38SB10A	25/29	0.0075 - 0.0077	0.27	2.35	--	30.66	--	IND	N	BSL
	7440-02-0	Nickel	8.5	35	mg/kg	38SB3A	29/29	0.0356 - 0.036	35	156.4	N	2,044	N	IND	N	BSL
	7440-09-7	Potassium	1,050	2,410	mg/kg	38SB3A	29/29	5 - 25	2,410	--	--	2,607,000	--	RDA	N	BSL
	7782-49-2	Selenium	0.11	0.78	mg/kg	38SB3B	28/29	0.0502 - 0.089	0.78	39.11	N	511	N	IND	N	BSL
	7440-22-4	Silver	0.033	0.14	mg/kg	38SB3A	29/29	0.0044 - 0.013	0.14	39.11	N	511	N	IND	N	BSL
	7440-23-5	Sodium	27	75	mg/kg	38SB8B	29/29	8.92 - 13	75	--	--	625,700	--	RDA	N	BSL
	7440-28-0	Thallium	0.1	0.25	mg/kg	38SB1B	29/29	0.0049 - 0.027	0.25	0.548	N	7.154	N	IND	N	BSL
	7440-62-2	Vanadium	15	50	mg/kg	38SB1B	29/29	0.034 - 0.207	50	7.821	N	102.2	N	IND	Y	**ARES**
	7440-66-6	Zinc	45	120	mg/kg	38SB5A	29/29	0.517 - 1	120	2,346	N	30,660	N	IND	N	BSL
		Pesticides/PCBs														
	959-98-8	Endosulfan I[4]	2.6E-03	2.6E-03	mg/kg	38SB7A DUP AVG	1/18	0.001 - 0.0014	2.6E-03	4.7E+01	N	6.1E+02	N	IND	N	BSL
	72-20-8	Endrin	1.1E-03	3.5E-03	mg/kg	38SB7A DUP AVG	4/18	0.000417 - 0.00083	3.5E-03	2.3E+00	N	3.1E+01	N	IND	N	BSL
	11097-69-1	Aroclor 1254[5]	1.7E-02	5.7E-01	mg/kg	38SB1A	9/18	0.0042 - 0.0068	5.7E-01	1.6E-01	N	1.4E+00	C	IND	Y	**ARES**
		TCL VOCs														
	78-93-3	2-Butanone (MEK)	2.0E-02	2.8E-02	mg/kg	38SB3C	7/14	0.00575 - 0.0089	2.8E-02	4.7E+03	N	6.1E+04	N	IND	N	BSL
	67-64-1	Acetone	2.4E-02	2.0E-01	mg/kg	38SB2A	14/14	0.00575 - 0.0089	2.0E-01	7.0E+03	N	9.2E+04	N	IND	N	BSL
	156-59-2	cis-1,2-Dichloroethene	9.7E-03	9.7E-03	mg/kg	38SB2B DUP AVG	1/14	0.000817 - 0.00126	9.7E-03	7.8E+01	N	1.0E+03	N	IND	N	BSL
	110-82-7	Cyclohexane	5.6E-04	5.6E-04	mg/kg	QSB1A DUP AVG	1/14	0.000363 - 0.000562	5.6E-04	--	--	--	--	--	Y	NSV
	100-41-4	Ethylbenzene	5.2E-04	5.2E-04	mg/kg	QSB1A DUP AVG	1/14	0.000486 - 0.000753	5.2E-04	7.8E+02	N	1.0E+04	N	IND	N	BSL
	108-87-2	Methylcyclohexane	2.4E-03	2.4E-03	mg/kg	QSB1A DUP AVG	1/14	0.000972 - 0.0015	2.4E-03	--	--	--	--	--	Y	NSV
	75-09-2	Methylene chloride	4.5E-03	6.8E-03	mg/kg	QSB3A	6/14	0.00323 - 0.005	6.8E-03	8.5E+01	C	3.8E+02	C	IND	N	BSL
	108-88-3	Toluene	4.9E-04	3.0E-03	mg/kg	38SB2A	3/14	0.000534 - 0.000826	3.0E-03	6.3E+02	N	8.2E+03	N	IND	N	BSL
	1330-20-7	Xylenes	2.2E-03	2.2E-03	mg/kg	QSB1A DUP AVG	1/14	0.000484 - 0.000749	2.2E-03	1.6E+03	N	2.0E+04	N	IND	N	BSL
		TCL SVOCs														
	121-14-2	2,4-Dinitrotoluene	9.9E-02	1.2E-01	mg/kg	38SB1A	3/14	0.00347 - 0.0567	1.2E-01	1.6E+01	N	2.0E+02	N	IND	N	BSL
		Dinitrotoluene Mix	9.9E-02	1.2E-01	mg/kg	38SB1A	3/14	--	1.2E-01	9.4E-01	C	4.2E+00	C	IND	N	BSL
	59-50-7	4-Chloro-3-Methylphenol[6]	9.0E-03	2.9E-02	mg/kg	QSB1B	10/14	0.00573 - 0.0938	2.9E-02	3.9E+02	N	5.1E+03	N	IND	N	BSL
	117-81-7	Bis(2-ethylhexyl) Phthalate	4.5E-02	1.3E+00	mg/kg	38SB3A	14/14	0.00228 - 0.0373	1.3E+00	4.6E+01	C	2.0E+02	C	IND	N	BSL
	85-68-7	Butyl Benzyl Phthalate	4.1E-02	5.2E-02	mg/kg	38SB2A	3/14	0.00493 - 0.0806	5.2E-02	1.6E+03	N	2.0E+04	N	IND	N	BSL
	105-60-2	Caprolactam	5.7E-02	1.3E-01	mg/kg	38SB3C	2/14	0.00702 - 0.115	1.3E-01	3.9E+06	N	5.1E+07	N	IND	N	BSL
	84-74-2	Di-n-butylphthalate	2.3E-02	1.4E+01	mg/kg	38SB1A	14/14	0.0042 - 0.0688	1.4E+01	7.8E+02	N	1.0E+04	N	IND	N	BSL
	84-66-2	Diethylphthalate	3.5E-03	1.9E-02	mg/kg	QSB1A DUP AVG	12/14	0.00209 - 0.0342	1.9E-02	6.3E+03	N	8.2E+04	N	IND	N	BSL
	206-44-0	Fluoranthene	2.8E-03	1.7E-01	mg/kg	38SB3A	5/14	0.00259 - 0.306	1.7E-01	3.1E+02	N	4.1E+03	N	IND	N	BSL
	86-30-6	N-Nitrosodiphenylamine	1.7E-02	1.6E-01	mg/kg	38SB3A	5/14	0.00523 - 0.0855	1.6E-01	1.3E+02	C	5.8E+02	C	IND	N	BSL
	85-01-8	Phenanthrene[7]	3.0E-03	1.1E-01	mg/kg	38SB3A	4/14	0.00253 - 0.0414	1.1E-01	2.3E+02	N	3.1E+03	N	IND	N	BSL
	129-00-0	Pyrene	2.5E-03	9.0E-02	mg/kg	38SB3A	5/14	0.00163 - 0.0266	9.0E-02	2.3E+02	N	3.1E+03	N	IND	N	BSL
		TCL Explosives														
	121-14-2	2,4-Dinitrotoluene	2.6E-01	2.6E-01	mg/kg	QSB1A DUP AVG	1/30	0.1 - 0.142	2.6E-01	1.6E+01	N	2.0E+02	N	IND	N	BSL
	--	Dinitrotoluene Mix	2.6E-01	2.6E-01	mg/kg	QSB1A DUP AVG	1/30	--	2.6E-01	9.4E-01	C	4.2E+00	C	IND	N	BSL
		Cyanide (mg/kg)														
	57-12-5	Cyanide	3.0E-02	2.2E+00	mg/kg	QSB3A	10/14	0.0356 - 0.0356	2.2E+00	1.6E+02	N	2.0E+03	N	IND	N	BSL

Notes:

COPC = Chemical of Potential Concern
CAS = Chemical Abstracts Service
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
SVOC = Semivolatile Organic Compound
mg/kg = Milligram Per Kilogram
ARAR = Applicable, Relevant, and Appropriate Requirement
TBC = To-Be-Considered
IND = Adjusted Industrial RBC

RDA = Recommended Daily Allowance
AL = USEPA Action Level
-- = No Value Available
RBC = USEPA Region III Risk-Based Concentration
(RBC) values from the October 11, 2007,
RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
N/C = Noncarcinogenic/Carcinogenic per EPA RBC Table (October 2007)

[1] = Chromium VI RBC value was used
[2] = Lead criteria are Action Levels; see USEPA Region III guidance
[3] = Mercuric chloride soil RBC value used
[4] = Endosulfan RBC value was used
[5] = Noncarcinogenic Residential RBC value for Aroclor 1254 was used for screening
[6] = 3-Methylphenol RBC value was used
[7] = Pyrene RBC value was used

ARES = Above Residential RBC
ARES/IND = Above Residential RBC/Industrial RBC
BSL = Below Residential/Industrial RBC Screening Levels
NSV = No Screening Value Available

Table E.3-2.3
Non-detected Chemicals MDL Screening for SWMU 38 - Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
TAL Metals								
Antimony	7440-36-0	mg/kg	6	33	0.0518	0.0518	3.13	N
Mercury [1]	7439-97-6	mg/kg	5	33	0.0077	0.0077	2.35	N
Selenium	7782-49-2	mg/kg	1	33	0.089	0.089	39.11	N
Pesticides/PCBs								
4,4'-DDD	72-54-8	ug/kg	18	18	0.333	1.7	2.7E+03	N
4,4'-DDE	72-55-9	ug/kg	18	18	0.245	1.4	1.9E+03	N
4,4'-DDT	50-29-3	ug/kg	18	18	0.252	1.6	1.9E+03	N
Aldrin	309-00-2	ug/kg	18	18	0.426	0.84	3.8E+01	N
alpha-BHC	319-84-6	ug/kg	18	18	0.4	0.54	1.0E+02	N
alpha-Chlordane [2]	5103-71-9	ug/kg	18	18	0.608	1	1.8E+03	N
beta-BHC	319-85-7	ug/kg	18	18	0.76	1.58	3.5E+02	N
delta-BHC [3]	319-86-8	ug/kg	18	18	1.1	1.4	1.0E+02	N
Dieldrin	60-57-1	ug/kg	18	18	0.433	0.71	4.0E+01	N
Endosulfan I [4]	959-98-8	ug/kg	17	18	1	1.3	4.7E+04	N
Endosulfan II [4]	33213-65-9	ug/kg	18	18	0.3	1.3	4.7E+04	N
Endosulfan Sulfate [4]	1031-07-8	ug/kg	18	18	0.704	1.5	4.7E+04	N
Endrin	72-20-8	ug/kg	14	18	0.417	0.67	2.3E+03	N
Endrin Aldehyde [5]	7421-93-4	ug/kg	18	18	1.2	1.6	2.3E+03	N
Endrin Ketone [5]	53494-70-5	ug/kg	18	18	0.385	1.6	2.3E+03	N
gamma-BHC (Lindane)	58-89-9	ug/kg	18	18	0.272	0.99	4.9E+02	N
gamma-Chlordane [2]	5103-74-2	ug/kg	18	18	0.53	0.984	1.8E+03	N
Heptachlor	76-44-8	ug/kg	18	18	0.987	1.9	1.4E+02	N
Heptachlor Epoxide	1024-57-3	ug/kg	18	18	0.47	0.64	7.0E+01	N
Methoxychlor	72-43-5	ug/kg	18	18	0.392	2	3.9E+04	N
Toxaphene	8001-35-2	ug/kg	18	18	25	35	5.8E+02	N
Aroclor 1016	12674-11-2	ug/kg	18	18	4.7	22.4	5.5E+02	N
Aroclor 1221	11104-28-2	ug/kg	18	18	2.8	11	3.2E+02	N
Aroclor 1232	11141-16-5	ug/kg	18	18	7	13	3.2E+02	N
Aroclor 1242	53469-21-9	ug/kg	18	18	4.2	25	3.2E+02	N
Aroclor 1248	12672-29-6	ug/kg	18	18	6	8.2	3.2E+02	N
Aroclor 1254 [6]	11097-69-1	ug/kg	9	18	5.1	5.4	1.6E+02	N
Aroclor 1260	11096-82-5	ug/kg	18	18	9.8	25	3.2E+02	N
Aroclor 1262	37324-23-5	ug/kg	16	16	5.9	8	--	NS
Aroclor 1268	11100-14-4	ug/kg	16	16	5	6.8	--	NS
Herbicides								
2,4,5-T	93-76-5	ug/kg	2	2	2.8	28	7.8E+04	N
2,4,5-TP (Silvex)	93-72-1	ug/kg	2	2	5.6	56	6.3E+04	N
2,4-D	94-75-7	ug/kg	2	2	22.4	224	7.8E+04	N
2,4-DB	94-82-6	ug/kg	2	2	86.8	868	6.3E+04	N
Dalapon	75-99-0	ug/kg	2	2	79.8	798	2.3E+05	N
Dicamba	1918-00-9	ug/kg	2	2	2.8	28	2.3E+05	N
Dichlorprop	120-36-5	ug/kg	2	2	23.8	238	--	NS
Dinoseb	88-85-7	ug/kg	2	2	29.4	29.4	7.8E+03	N
MCPA	94-74-6	ug/kg	2	2	1,950	19,500	3.9E+03	**Y**
MCPP	93-65-2	ug/kg	2	2	7,080	70,800	7.8E+03	**Y**
TCL VOCs								
1,1,1-Trichloroethane	71-55-6	ug/kg	14	18	0.46	0.758	1.6E+07	N
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	14	18	0.705	1.16	3.2E+03	N
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/kg	14	18	0.82	1.35	2.3E+08	N
1,1,2-Trichloroethane	79-00-5	ug/kg	14	18	0.64	1.06	1.1E+04	N
1,1-Dichloroethane	75-34-3	ug/kg	14	18	0.782	1.29	1.6E+06	N
1,1-Dichloroethene	75-35-4	ug/kg	14	18	0.792	1.3	3.9E+05	N
1,2,3-Trichlorobenzene	87-61-6	ug/kg	14	18	0.588	0.968	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/kg	14	18	0.443	0.73	7.8E+04	N
1,2-Dibromo-3-chloropropane	96-12-8	ug/kg	14	18	2.25	3.7	2.0E+02	N
1,2-Dibromoethane	106-93-4	ug/kg	14	18	0.74	1.22	3.2E+02	N
1,2-Dichlorobenzene	95-50-1	ug/kg	14	18	0.523	0.862	7.0E+05	N
1,2-Dichloroethane	107-06-2	ug/kg	14	18	0.465	0.767	7.0E+03	N
1,2-Dichloropropane	78-87-5	ug/kg	14	18	0.633	1.04	9.4E+03	N
1,3-Dichlorobenzene	541-73-1	ug/kg	14	18	0.289	0.477	2.3E+04	N
1,4-Dichlorobenzene	106-46-7	ug/kg	14	18	0.767	1.26	2.7E+04	N
2-Butanone	78-93-3	ug/kg	8	18	5.4	8.9	4.7E+06	N
2-Hexanone	591-78-6	ug/kg	14	18	2.44	4.02	--	NS
4-Methyl-2-pentanone	108-10-1	ug/kg	14	18	1.58	2.6	--	NS
Benzene	71-43-2	ug/kg	14	18	0.569	0.938	1.2E+04	N
Bromochloromethane	74-97-5	ug/kg	14	18	0.822	1.35	--	NS
Bromodichloromethane	75-27-4	ug/kg	14	18	0.541	0.892	1.0E+04	N
Bromoform	75-25-2	ug/kg	14	18	0.624	1.03	8.1E+04	N
Bromomethane	74-83-9	ug/kg	14	18	1.62	2.67	1.1E+04	N
Carbon Disulfide	75-15-0	ug/kg	14	18	1.57	2.58	7.8E+05	N
Carbon Tetrachloride	56-23-5	ug/kg	14	18	0.503	0.829	4.9E+03	N
Chlorobenzene	108-90-7	ug/kg	14	18	0.714	1.18	1.6E+05	N
Chloroethane	75-00-3	ug/kg	14	18	1.46	2.4	2.2E+05	N

Table E.3-2.3
Non-detected Chemicals MDL Screening for SWMU 38 - Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
Chloroform	67-66-3	ug/kg	14	18	0.482	0.794	7.8E+04	N
Chloromethane	74-87-3	ug/kg	14	18	0.901	1.48	--	NS
cis-1,2-Dichloroethene	156-59-2	ug/kg	13	18	0.767	1.26	7.8E+04	N
cis-1,3-Dichloropropene[7]	10061-01-5	ug/kg	14	18	0.53	0.874	6.4E+03	N
Cyclohexane	110-82-7	ug/kg	13	18	0.341	0.562	--	NS
Dibromochloromethane	124-48-1	ug/kg	14	18	0.558	0.92	7.6E+03	N
Dichlorodifluoromethane	75-71-8	ug/kg	14	18	0.721	1.19	1.6E+06	N
Ethylbenzene	100-41-4	ug/kg	13	18	0.457	0.753	7.8E+05	N
Isopropylbenzene	98-82-8	ug/kg	14	18	0.59	0.972	7.8E+05	N
Methyl Acetate	79-20-9	ug/kg	14	18	3.75	6.18	7.8E+06	N
Methyl tert-Butyl Ether	1634-04-4	ug/kg	14	18	0.692	1.14	1.6E+05	N
Methylcyclohexane	108-87-2	ug/kg	13	18	0.913	1.5	--	NS
Methylene Chloride	75-09-2	ug/kg	8	18	3.03	5	8.5E+04	N
Styrene	100-42-5	ug/kg	14	18	0.477	0.787	1.6E+06	N
Tetrachloroethene	127-18-4	ug/kg	14	18	0.662	1.09	1.2E+03	N
Toluene	108-88-3	ug/kg	11	18	0.501	0.826	6.3E+05	N
trans-1,2-Dichloroethene	156-60-5	ug/kg	14	18	0.759	1.25	1.6E+05	N
trans-1,3-Dichloropropene[7]	10061-02-6	ug/kg	14	18	0.563	0.927	6.4E+03	N
Trichloroethene	79-01-6	ug/kg	14	18	0.731	1.21	1.6E+03	N
Trichlorofluoromethane	75-69-4	ug/kg	14	18	0.802	1.32	2.3E+06	N
Vinyl Chloride	75-01-4	ug/kg	14	18	0.4	0.659	9.0E+01	N
Xylenes	1330-20-7	ug/kg	13	18	0.455	0.749	1.6E+06	N
TCL SVOCs								
1,1'-Biphenyl	92-52-4	ug/kg	14	18	2.71	44.3	3.9E+05	N
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/kg	14	18	31.6	517	2.3E+03	N
2,2'-oxybis(1-Chloropropane)	108-60-1	ug/kg	14	18	1.45	23.8	9.1E+03	N
2,4,5-Trichlorophenol	95-95-4	ug/kg	14	18	3.67	60.1	7.8E+05	N
2,4,6-Trichlorophenol[8]	88-06-2	ug/kg	14	18	2.88	47.2	7.8E+03	N
2,4-Dichlorophenol	120-83-2	ug/kg	14	18	3.87	63.4	2.3E+04	N
2,4-Dimethylphenol	105-67-9	ug/kg	14	18	8.73	143	1.6E+05	N
2,4-Dinitrophenol	51-28-5	ug/kg	14	18	3.52	57.6	1.6E+04	N
2,4-Dinitrotoluene	121-14-2	ug/kg	11	18	3.47	56.7	1.6E+04	N
2,6-Dinitrotoluene	606-20-2	ug/kg	14	18	30.5	499	7.8E+03	N
2-Chloronaphthalene	91-58-7	ug/kg	14	18	2.53	41.4	6.3E+05	N
2-Chlorophenol	95-57-8	ug/kg	14	18	2.21	36.2	3.9E+04	N
2-Methylnaphthalene	91-57-6	ug/kg	14	18	3.01	49.3	3.1E+04	N
2-Methylphenol	95-48-7	ug/kg	14	18	5.32	87.1	3.9E+05	N
2-Nitroaniline	88-74-4	ug/kg	14	18	5.06	82.8	--	NS
2-Nitrophenol	88-75-5	ug/kg	14	18	1.87	30.6	--	NS
3,3'-Dichlorobenzidine	91-94-1	ug/kg	14	18	73.4	1,200	1.4E+03	N
3-Nitroaniline	99-09-2	ug/kg	14	18	36.6	599	--	NS
4,6-Dinitro-2-methylphenol	534-52-1	ug/kg	14	18	4.96	81.2	--	NS
4-Bromophenyl-PhenylEther	101-55-3	ug/kg	14	18	3.72	60.8	--	NS
4-Chloro-3-methylphenol[9]	59-50-7	ug/kg	4	18	6.77	93.8	3.9E+05	N
4-Chloroaniline	106-47-8	ug/kg	14	18	1.39	22.7	3.1E+04	N
4-Chlorophenyl-PhenylEther	7005-72-3	ug/kg	14	18	3.6	58.9	--	NS
4-Methylphenol	106-44-5	ug/kg	14	18	7.01	115	--	NS
4-Nitroaniline	100-01-6	ug/kg	14	18	7.98	131	--	NS
4-Nitrophenol	100-02-7	ug/kg	14	18	3.11	50.9	--	NS
Acenaphthene	83-32-9	ug/kg	14	18	1.89	31	--	NS
Acenaphthylene[10]	208-96-8	ug/kg	14	18	1.65	27	--	NS
Acetophenone	98-86-2	ug/kg	14	18	2.09	34.2	--	NS
Anthracene	120-12-7	ug/kg	14	18	1.25	83.2	2.3E+06	N
Atrazine	1912-24-9	ug/kg	14	18	7.57	124	2.9E+03	N
Benzaldehyde	100-52-7	ug/kg	14	18	4.46	72.9	7.8E+05	N
Benzo(a)anthracene	56-55-3	ug/kg	14	18	1.43	239	2.2E+02	**Y**
Benzo(a)pyrene	50-32-8	ug/kg	14	18	1.79	508	2.2E+01	**Y**
Benzo(b)fluoranthene	205-99-2	ug/kg	14	18	2.33	869	2.2E+02	**Y**
Benzo(g,h,i)perylene[10]	191-24-2	ug/kg	14	18	9.59	776	2.3E+05	N
Benzo(k)fluoranthene	207-08-9	ug/kg	14	18	1.79	1,190	2.2E+03	N
Bis(2-chloroethoxy)methane	111-91-1	ug/kg	14	18	3.45	56.5	--	NS
Bis(2-chloroethyl)Ether	111-44-4	ug/kg	14	18	1.9	31.1	5.8E+02	N
Butylbenzylphthalate	85-68-7	ug/kg	11	18	4.93	80.6	1.6E+06	N
Caprolactam	105-60-2	ug/kg	11	18	7.02	115	3.9E+06	N
Carbazole	86-74-8	ug/kg	14	18	6.71	110	3.2E+04	N
Chrysene	218-01-9	ug/kg	14	18	2.15	184	2.2E+04	N
Di-n-octylphthalate	117-84-0	ug/kg	14	18	3.41	55.8	--	NS
Dibenz(a,h)anthracene	53-70-3	ug/kg	14	18	2.51	525	2.2E+01	**Y**
Dibenzofuran	132-64-9	ug/kg	14	18	3.48	56.9	7.8E+03	N
Diethylphthalate	84-66-2	ug/kg	2	18	26.6	34.2	6.3E+06	N
Dimethylphthalate	131-11-3	ug/kg	14	18	3.64	59.6	--	NS
Fluoranthene	206-44-0	ug/kg	9	18	2.59	2.82	3.1E+05	N
Fluorene	86-73-7	ug/kg	14	18	1.85	30.2	3.1E+05	N
Hexachlorobenzene	118-74-1	ug/kg	14	18	2.76	45.2	4.0E+02	N

Table E.3-2.3
Non-detected Chemicals MDL Screening for SWMU 38 - Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adjusted R-RBC	Maximum MDL Exceeds SL
Hexachlorobutadiene[11]	87-68-3	ug/kg	14	18	4.26	69.7	7.8E+03	N
Hexachlorocyclopentadiene	77-47-4	ug/kg	14	18	2.18	35.6	4.7E+04	N
Hexachloroethane[12]	67-72-1	ug/kg	14	18	2.57	42	7.8E+03	N
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	14	18	1.25	349	2.2E+02	**Y**
Isophorone	78-59-1	ug/kg	14	18	1.9	31.1	6.7E+05	N
N-Nitrosodi-n-propylamine	621-64-7	ug/kg	14	18	3.62	59.2	9.1E+01	N
N-Nitrosodiphenylamine	86-30-6	ug/kg	9	18	5.23	5.7	1.3E+05	N
Naphthalene	91-20-3	ug/kg	14	18	3.03	49.5	1.6E+05	N
Nitrobenzene	98-95-3	ug/kg	14	18	3.52	57.6	3.9E+03	N
Pentachlorophenol	87-86-5	ug/kg	14	18	4.83	79	5.3E+03	N
Phenanthrene[10]	85-01-8	ug/kg	10	18	2.53	3.22	2.3E+05	N
Phenol	108-95-2	ug/kg	14	18	4.36	71.3	2.3E+06	N
Pyrene	129-00-0	ug/kg	9	18	1.63	1.78	2.3E+05	N
PAHs								
Acenaphthene	83-32-9	ug/kg	14	18	10.3	16.9	4.7E+05	N
Acenaphthylene[10]	208-96-8	ug/kg	14	18	12.8	20.9	2.3E+05	N
Anthracene	120-12-7	ug/kg	12	18	0.77	1.25	2.3E+06	N
Benzo(a)anthracene	56-55-3	ug/kg	13	18	0.88	1.43	2.2E+02	N
Benzo(a)pyrene	50-32-8	ug/kg	14	18	1.1	1.8	2.2E+01	N
Benzo(b)fluoranthene	205-99-2	ug/kg	12	18	1.43	2.33	2.2E+02	N
Benzo(g,h,i)perylene[10]	191-24-2	ug/kg	14	18	13.8	22.5	2.3E+05	N
Benzo(k)fluoranthene	207-08-9	ug/kg	13	18	1.1	1.79	2.2E+03	N
Chrysene	218-01-9	ug/kg	12	18	1.32	2.15	2.2E+04	N
Dibenz(a,h)anthracene	53-70-3	ug/kg	14	18	1.54	2.52	2.2E+01	N
Fluoranthene	206-44-0	ug/kg	10	18	1.87	3.04	3.1E+05	N
Fluorene	86-73-7	ug/kg	12	18	1.43	2.33	3.1E+05	N
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	14	18	0.77	1.26	2.2E+02	N
Naphthalene	91-20-3	ug/kg	14	18	8.69	14.2	1.6E+05	N
Phenanthrene[10]	85-01-8	ug/kg	11	18	0.66	1.07	2.3E+05	N
Pyrene	129-00-0	ug/kg	10	18	0.99	1.61	2.3E+05	N
Explosives								
1,3,5-Trinitrobenzene	99-35-4	mg/kg	30	34	0.074	0.14	2.3E+02	N
1,3-Dinitrobenzene	99-65-0	mg/kg	30	34	0.076	0.159	7.8E-01	N
2,4,6-Trinitrotoluene[13]	118-96-7	mg/kg	30	34	0.15	0.167	3.9E+00	N
2,4-Dinitrotoluene	121-14-2	mg/kg	29	34	0.1	0.142	1.6E+01	N
2,6-Dinitrotoluene	606-20-2	mg/kg	30	34	0.2	0.25	7.8E+00	N
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	30	34	0.151	0.22	1.6E+01	N
2-Nitrotoluene	88-72-2	mg/kg	30	34	0.17	0.266	7.8E+01	N
3-Nitrotoluene	99-08-1	mg/kg	30	34	0.184	0.21	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	mg/kg	30	34	0.162	0.3	1.6E+01	N
4-Nitrotoluene[14]	99-99-0	mg/kg	30	34	0.2	0.251	3.1E+01	N
HMX	2691-41-0	mg/kg	30	34	0.066	0.229	3.9E+02	N
Nitrobenzene	98-95-3	mg/kg	30	34	0.03	0.102	3.9E+00	N
RDX	121-82-4	mg/kg	30	34	0.048	0.131	5.8E+00	N
Tetryl	479-45-8	mg/kg	30	34	0.065	0.169	3.1E+01	N
Nitroglycerin/PETN								
Nitroglycerin	55-63-0	mg/kg	30	34	0.171	0.39	7.8E-01	N
PETN	78-11-5	mg/kg	30	34	0.23	0.332	--	NS
Cyanide								
Cyanide	57-12-5	mg/kg	5	18	0.0356	0.0356	1.6E+02	N

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
ug/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
PETN = Pentaerythritol Tetranitrate
MDL = Method Detection Limit
RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens
R-RBC = Residential RBC
SL = Screening Level

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

[1] = Mercuric chloride soil RBC value used
[2] = Chlordane RBC value was used
[3] = Alpha-BHC RBC value was used
[4] = Endosulfan RBC value was used
[5] = Endrin RBC value was used
[6] = Noncarcinogenic RBC value for Aroclor 1254 was used
[7] = 1,3-Dichloropropene RBC value was used
[8] = Noncarcinogenic RBC value for 2,4,6-Trichlorophenol was used
[9] = 3-Methylphenol RBC value was used
[10] = Pyrene RBC value was used
[11] = Noncarcinogenic RBC value for Hexachlorobutadiene was used
[12] = Noncarcinogenic RBC value for Hexachloroethane was used
[13] = Noncarcinogenic RBC value for 2,4,6-Trinitrotoluene was used
[14] = Noncarcinogenic RBC value for 4-Nitrotoluene was used

Table E.3-2.4
Groundwater COPC Selection - SWMU 38
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration	Maximum Concentration	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening	C/N	Adjusted Tap Water RBC[A]	MCL	COPC Flag (Y/N)	Rationale for Selection or Deletion
Perchlorate													
Perchlorate	14797-73-0	0.315	1.2	ug/L	38MW1	3/3	0.08 - 0.08	1.2	N	2.555	--	N	BSL
TAL Metals													
Aluminum, Total	7429-90-5	93	1,900	ug/L	38MW3	3/3	44 - 44	1,900	N	3,650	--	N	BSL
Arsenic, Total	7440-38-2	0.99	0.99	ug/L	38MW3	1/3	0.74 - 0.74	0.99	C	0.0446	10	Y	**ARBC**
Barium, Dissolved	7440-39-3	35	77	ug/L	38MW3	3/3	0.52 - 0.52	77	N	730	2,000	N	BSL
Barium, Total	7440-39-3	37	100	ug/L	38MW3	3/3	0.52 - 0.52	100	N	730	2,000	N	BSL
Cadmium, Total	7440-43-9	0.12	0.12	ug/L	38MW3	1/3	0.062 - 0.062	0.12	N	1.825	5	N	BSL
Calcium, Dissolved	7440-70-2	89,000	150,000	ug/L	38MW1	3/3	40 - 40	150,000	--	1,095,000	--	N	BSL
Calcium, Total	7440-70-2	91,000	150,000	ug/L	38MW1	3/3	40 - 40	150,000	--	1,095,000	--	N	BSL
Chromium, Dissolved [1]	7440-47-3	1.4	1.6	ug/L	38MW1	3/3	0.31 - 0.31	1.6	C	10.95	100	N	BSL
Chromium, Total [1]	7440-47-3	1.9	9.2	ug/L	38MW3	3/3	0.31 - 0.31	9.2	C	10.95	100	N	BSL
Cobalt, Dissolved	7440-48-4	0.9	2.2	ug/L	38MW1	3/3	0.096 - 0.096	2.2	--	--	--	Y	NSV
Cobalt, Total	7440-48-4	1.2	4.6	ug/L	38MW3	3/3	0.096 - 0.096	4.6	--	--	--	Y	NSV
Copper, Dissolved	7440-50-8	0.99	1.1	ug/L	38MW1	3/3	0.33 - 0.33	1.1	N	146	1,300	N	BSL
Copper, Total	7440-50-8	1	4.4	ug/L	38MW3	3/3	0.33 - 0.33	4.4	N	146	1,300	N	BSL
Iron, Dissolved	7439-89-6	9.7	11	ug/L	38MW1	2/3	5.7 - 5.7	11	N	2,555	--	N	BSL
Iron, Total	7439-89-6	340	5,500	ug/L	38MW3	3/3	5.7 - 5.7	5,500	N	2,555	--	Y	**ARBC**
Lead, Total [2]	7439-92-1	1.9	1.9	ug/L	38MW3	1/3	0.33 - 0.33	1.9	--	15	--	N	BSL
Magnesium, Dissolved	7439-95-4	22,000	51,000	ug/L	38MW1	3/3	38 - 38	51,000	--	156,400	--	N	BSL
Magnesium, Total	7439-95-4	23,000	48,000	ug/L	38MW1	3/3	38 - 38	48,000	--	156,400	--	N	BSL
Manganese, Dissolved	7439-96-5	4.7	2,400	ug/L	38MW3	3/3	0.43 - 4.3	2,400	N	73	--	Y	**ARBC**
Manganese, Total	7439-96-5	26	2,600	ug/L	38MW3	3/3	0.43 - 4.3	2,600	N	73	--	Y	**ARBC**
Nickel, Dissolved	7440-02-0	1	4.7	ug/L	38MW3	3/3	0.28 - 0.28	4.7	N	73	--	N	BSL
Nickel, Total	7440-02-0	1.2	11	ug/L	38MW3	3/3	0.28 - 0.28	11	N	73	--	N	BSL
Potassium, Dissolved	7440-09-7	630	1,200	ug/L	38MW3	3/3	54 - 54	1,200	--	2,607,000	--	N	BSL
Potassium, Total	7440-09-7	740	1,900	ug/L	38MW3	3/3	54 - 54	1,900	--	2,607,000	--	N	BSL
Sodium, Dissolved	7440-23-5	8,800	16,000	ug/L	38MW1	3/3	84 - 84	16,000	--	625,700	--	N	BSL
Sodium, Total	7440-23-5	8,900	16,000	ug/L	38MW1	3/3	84 - 84	16,000	--	625,700	--	N	BSL
Vanadium, Total	7440-62-2	0.86	5.8	ug/L	38MW3	3/3	0.83 - 0.83	5.8	N	3.65	--	Y	**ARBC**
Zinc, Dissolved	7440-66-6	6.9	15	ug/L	38MW3	3/3	0.84 - 0.84	15	N	1,095	--	N	BSL
Zinc, Total	7440-66-6	6.6	18	ug/L	38MW3	3/3	0.84 - 0.84	18	N	1,095	--	N	BSL
Pesticides													
beta-BHC	319-85-7	0.016	0.016	ug/L	38MW3	1/3	0.0032 - 0.0032	0.016	C	0.0372	--	N	BSL
Endosulfan II [3]	33213-65-9	0.0047	0.0047	ug/L	38MW2 DUP AVG	1/3	0.0018 - 0.0018	0.0047	N	21.9	--	N	BSL
TCL VOCs													
Chloroform	67-66-3	1.7	1.7	ug/L	38MW1	1/3	0.061 - 0.061	1.7	C	0.155	80	Y	**ARBC**
Chloromethane	74-87-3	0.34	0.34	ug/L	38MW3	1/3	0.06 - 0.06	0.34	N	18.98	--	N	BSL
Toluene	108-88-3	0.16	0.23	ug/L	38MW3	3/3	0.072 - 0.072	0.23	N	227.1	1,000	N	BSL
TCL SVOCs													
Diethylphthalate	84-66-2	0.057	0.057	ug/L	38MW3	1/1	0.034 - 0.034	0.057	N	2,920	--	N	BSL
Isophorone	78-59-1	0.12	0.12	ug/L	38MW3	1/1	0.031 - 0.031	0.12	C	70.5	--	N	BSL

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
DUP AVG = averaged result for duplicate samples

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
C = Carcinogenic per EPA RBC Table (October 2007)
N = Noncarcinogenic per EPA RBC Table (October 2007)
MCL = Maximum Contaminant Level
RDA = Recommended Daily Allowance

ARBC = Above Tap Water RBC
BSL = Below Tap Water RBC/MCL
[A] = RDAs used as screening values for nutrients
[1] = Chromium VI RBC used for screening
[2] = USEPA Action Level used for screening
[3] = Endosulfan RBC used for screening

Table E.3-2.5
SWMU 38 Groundwater Non-detects Screening
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adj. Tap Water RBC	Maximum MDL Exceeds SL
TAL Metals								
Aluminum, Dissolved	7429-90-5	ug/L	3	3	44	44	3,650	N
Antimony, Dissolved	7440-36-0	ug/L	3	3	0.44	0.44	1.46	N
Antimony, Total	7440-36-0	ug/L	3	3	0.44	0.44	1.46	N
Arsenic, Dissolved	7440-38-2	ug/L	3	3	0.74	0.74	0.0446	**Y**
Arsenic, Total	7440-38-2	ug/L	2	3	0.74	0.74	0.0446	**Y**
Beryllium, Dissolved	7440-41-7	ug/L	3	3	0.31	0.31	7.3	N
Beryllium, Total	7440-41-7	ug/L	3	3	0.31	0.31	7.3	N
Cadmium, Dissolved	7440-43-9	ug/L	3	3	0.062	0.062	1.825	N
Cadmium, Total	7440-43-9	ug/L	2	3	0.062	0.062	1.825	N
Iron, Dissolved	7439-89-6	ug/L	1	3	5.7	5.7	2,555	N
Lead, Dissolved [1]	7439-92-1	ug/L	3	3	0.33	0.33	15	N
Lead, Total [1]	7439-92-1	ug/L	2	3	0.33	0.33	15	N
Mercury, Dissolved [2]	7439-97-6	ug/L	3	3	0.046	0.046	0.37	N
Mercury, Total [2]	7439-97-6	ug/L	3	3	0.046	0.046	0.37	N
Selenium, Dissolved	7782-49-2	ug/L	3	3	0.92	0.92	18.25	N
Selenium, Total	7782-49-2	ug/L	3	3	0.92	0.92	18.25	N
Silver, Dissolved	7440-22-4	ug/L	3	3	0.12	0.12	18.25	N
Silver, Total	7440-22-4	ug/L	3	3	0.12	0.12	18.25	N
Thallium, Dissolved	7440-28-0	ug/L	3	3	0.17	0.17	0.256	N
Thallium, Total	7440-28-0	ug/L	3	3	0.17	0.17	0.256	N
Vanadium, Dissolved	7440-62-2	ug/L	3	3	0.83	0.83	3.65	N
Pesticides/PCBs								
4,4'-DDD	72-54-8	ug/L	3	3	0.0019	0.0019	0.279	N
4,4'-DDE	72-55-9	ug/L	3	3	0.0027	0.0027	0.197	N
4,4'-DDT	50-29-3	ug/L	3	3	0.002	0.002	0.197	N
Aldrin	309-00-2	ug/L	3	3	0.0079	0.0079	0.0039	**Y**
alpha-BHC	319-84-6	ug/L	3	3	0.0019	0.0019	0.0106	N
alpha-Chlordane [3]	5103-71-9	ug/L	3	3	0.0021	0.0021	0.191	N
beta-BHC	319-85-7	ug/L	2	3	0.0032	0.0032	0.0372	N
delta-BHC [4]	319-86-8	ug/L	3	3	0.0023	0.0023	0.0106	N
Dieldrin	60-57-1	ug/L	3	3	0.002	0.002	0.00419	N
Endosulfan I	959-98-8	ug/L	3	3	0.0023	0.0023	21.9	N
Endosulfan II [5]	33213-65-9	ug/L	2	3	0.0018	0.0018	21.9	N
Endosulfan Sulfate [5]	1031-07-8	ug/L	3	3	0.0033	0.0033	21.9	N
Endrin	72-20-8	ug/L	3	3	0.002	0.002	1.095	N
Endrin Aldehyde [6]	7421-93-4	ug/L	3	3	0.0029	0.0029	1.095	N
Endrin Ketone [6]	53494-70-5	ug/L	3	3	0.0033	0.0033	1.095	N
gamma-BHC (Lindane)	58-89-9	ug/L	3	3	0.0018	0.0018	0.052	N
gamma-Chlordane [3]	5103-74-2	ug/L	3	3	0.0021	0.0021	0.191	N
Heptachlor	76-44-8	ug/L	3	3	0.003	0.003	0.0149	N
Heptachlor Epoxide	1024-57-3	ug/L	3	3	0.0021	0.0021	0.0074	N
Methoxychlor	72-43-5	ug/L	3	3	0.0052	0.0052	18.25	N
Toxaphene	8001-35-2	ug/L	3	3	0.1	0.1	0.0609	**Y**
Aroclor 1016 [7]	12674-11-2	ug/L	3	3	0.05	0.05	0.255	N
Aroclor 1221	11104-28-2	ug/L	3	3	0.068	0.068	0.0335	**Y**
Aroclor 1232	11141-16-5	ug/L	3	3	0.031	0.031	0.0335	N
Aroclor 1242	53469-21-9	ug/L	3	3	0.035	0.035	0.0335	**Y**
Aroclor 1248	12672-29-6	ug/L	3	3	0.04	0.04	0.0335	**Y**
Aroclor 1254	11097-69-1	ug/L	3	3	0.034	0.034	0.0335	**Y**
Aroclor 1260	11096-82-5	ug/L	3	3	0.034	0.034	0.0335	**Y**
Aroclor 1262	37324-23-5	ug/L	3	3	0.022	0.022	--	NS
Aroclor 1268	11100-14-4	ug/L	3	3	0.049	0.049	--	NS
TCL VOCs								
1,1,1-Trichloroethane	71-55-6	ug/L	3	3	0.11	0.11	913.3	N
1,1,2,2-Tetrachloroethane	79-34-5	ug/L	3	3	0.1	0.1	0.0527	**Y**
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/L	3	3	0.14	0.14	5,938	N
1,1,2-Trichloroethane	79-00-5	ug/L	3	3	0.21	0.21	0.188	**Y**
1,1-Dichloroethane	75-34-3	ug/L	3	3	0.076	0.076	89.65	N
1,1-Dichloroethene	75-35-4	ug/L	3	3	0.14	0.14	35.32	N
1,2,3-Trichlorobenzene	87-61-6	ug/L	3	3	0.13	0.13	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/L	3	3	0.16	0.16	6.083	N
1,2-Dibromo-3-chloropropane	96-12-8	ug/L	3	3	0.29	0.29	0.0002	**Y**
1,2-Dibromoethane	106-93-4	ug/L	3	3	0.22	0.22	0.00527	**Y**
1,2-Dichlorobenzene	95-50-1	ug/L	3	3	0.065	0.065	26.82	N
1,2-Dichloroethane	107-06-2	ug/L	3	3	0.15	0.15	0.116	**Y**
1,2-Dichloropropane	78-87-5	ug/L	3	3	0.1	0.1	0.257	N
1,3-Dichlorobenzene	541-73-1	ug/L	3	3	0.12	0.12	1.825	N
1,4-Dichlorobenzene	106-46-7	ug/L	3	3	0.13	0.13	0.281	N
2-Butanone (MEK)	78-93-3	ug/L	3	3	0.33	0.33	696.8	N
2-Hexanone	591-78-6	ug/L	3	3	0.42	0.42	--	NS
4-Methyl-2-pentanone (MIBK)	108-10-1	ug/L	3	3	0.38	0.38	627.8	N
Acetone	67-64-1	ug/L	3	3	1.2	1.2	547.5	N
Benzene	71-43-2	ug/L	3	3	0.12	0.12	0.336	N

Table E.3-2.5
SWMU 38 Groundwater Non-detects Screening
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adj. Tap Water RBC	Maximum MDL Exceeds SL
Bromochloromethane	74-97-5	ug/L	3	3	0.2	0.2	--	NS
Bromodichloromethane	75-27-4	ug/L	3	3	0.19	0.19	0.17	**Y**
Bromoform	75-25-2	ug/L	3	3	0.23	0.23	8.478	N
Bromomethane	74-83-9	ug/L	3	3	0.19	0.19	0.852	N
Carbon Disulfide	75-15-0	ug/L	3	3	0.28	0.28	104.3	N
Carbon Tetrachloride	56-23-5	ug/L	3	3	0.15	0.15	0.162	N
Chlorobenzene	108-90-7	ug/L	3	3	0.12	0.12	8.965	N
Chloroethane	75-00-3	ug/L	3	3	0.2	0.2	3.638	N
Chloroform	67-66-3	ug/L	2	3	0.061	0.061	0.155	N
Chloromethane	74-87-3	ug/L	2	3	0.06	0.06	18.98	N
cis-1,2-Dichloroethene	156-59-2	ug/L	3	3	0.17	0.17	6.083	N
cis-1,3-Dichloropropene	10061-01-5	ug/L	3	3	0.14	0.14	0.436	N
Cyclohexane	110-82-7	ug/L	3	3	0.14	0.14	1,241	N
Dibromochloromethane	124-48-1	ug/L	3	3	0.14	0.14	0.126	**Y**
Dichlorodifluoromethane	75-71-8	ug/L	3	3	0.17	0.17	34.76	N
Ethylbenzene	100-41-4	ug/L	3	3	0.13	0.13	134	N
Isopropylbenzene	98-82-8	ug/L	3	3	0.12	0.12	65.82	N
Methyl Acetate	79-20-9	ug/L	3	3	0.16	0.16	608.3	N
Methyl tert-Butyl Ether	1634-04-4	ug/L	3	3	0.096	0.096	2.637	N
Methylcyclohexane	108-87-2	ug/L	3	3	0.15	0.15	627.8	N
Methylene Chloride	75-09-2	ug/L	3	3	0.051	0.051	4.102	N
Styrene	100-42-5	ug/L	3	3	0.11	0.11	162.3	N
Tetrachloroethene	127-18-4	ug/L	3	3	0.15	0.15	0.104	**Y**
trans-1,2-Dichloroethene	156-60-5	ug/L	3	3	0.16	0.16	10.61	N
trans-1,3-Dichloropropene	10061-02-6	ug/L	3	3	0.16	0.16	0.436	N
Trichloroethene	79-01-6	ug/L	3	3	0.17	0.17	0.026	**Y**
Trichlorofluoromethane	75-69-4	ug/L	3	3	0.18	0.18	128.8	N
Vinyl Chloride	75-01-4	ug/L	3	3	0.17	0.17	0.015	**Y**
Xylenes	1330-20-7	ug/L	3	3	0.36	0.36	21.26	N
TCL SVOCs								
1,1'-Biphenyl	92-52-4	ug/L	1	1	0.015	0.015	30.42	N
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/L	1	1	0.024	0.024	1.095	N
2,3,4,6-Tetrachlorophenol	58-90-2	ug/L	1	1	0.16	0.16	109.5	N
2,4,5-Trichlorophenol	95-95-4	ug/L	1	1	0.11	0.11	365	N
2,4,6-Trichlorophenol[8]	88-06-2	ug/L	1	1	0.027	0.027	3.6	N
2,4-Dichlorophenol	120-83-2	ug/L	1	1	0.015	0.015	10.95	N
2,4-Dimethylphenol	105-67-9	ug/L	1	1	0.33	0.33	73	N
2,4-Dinitrophenol	51-28-5	ug/L	1	1	1.5	1.5	7.3	N
2,4-Dinitrotoluene	121-14-2	ug/L	1	1	0.21	0.21	7.3	N
2,6-Dinitrotoluene	606-20-2	ug/L	1	1	0.05	0.05	3.65	N
2-Chloronaphthalene	91-58-7	ug/L	1	1	0.012	0.012	48.67	N
2-Chlorophenol	95-57-8	ug/L	1	1	0.016	0.016	3.042	N
2-Methylnaphthalene	91-57-6	ug/L	1	1	0.015	0.015	2.433	N
2-Methylphenol	95-48-7	ug/L	1	1	0.14	0.14	182.5	N
2-Nitroaniline	88-74-4	ug/L	1	1	0.12	0.12	--	NS
2-Nitrophenol	88-75-5	ug/L	1	1	0.026	0.026	--	NS
3,3'-Dichlorobenzidine	91-94-1	ug/L	1	1	0.21	0.21	0.149	**Y**
3-Nitroaniline	99-09-2	ug/L	1	1	0.13	0.13	--	NS
4,6-Dinitro-2-methylphenol	534-52-1	ug/L	1	1	0.12	0.12	--	NS
4-Bromophenyl Phenyl Ether	101-55-3	ug/L	1	1	0.026	0.026	--	NS
4-Chloro-3-methylphenol[9]	59-50-7	ug/L	1	1	0.021	0.021	182.5	N
4-Chloroaniline	106-47-8	ug/L	1	1	0.021	0.021	14.6	N
4-Chlorophenyl Phenyl Ether	7005-72-3	ug/L	1	1	0.016	0.016	--	NS
4-Methylphenol	106-44-5	ug/L	1	1	0.16	0.16	18.25	N
4-Nitroaniline	100-01-6	ug/L	1	1	0.14	0.14	--	NS
4-Nitrophenol	100-02-7	ug/L	1	1	1.3	1.3	--	NS
Acenaphthene	83-32-9	ug/L	1	1	0.013	0.013	36.5	N
Acenaphthylene[10]	208-96-8	ug/L	1	1	0.012	0.012	18.25	N
Acetophenone	98-86-2	ug/L	1	1	0.043	0.043	60.83	N
Anthracene	120-12-7	ug/L	1	1	0.014	0.014	182.5	N
Atrazine	1912-24-9	ug/L	1	1	0.026	0.026	0.304	N
Benzaldehyde	100-52-7	ug/L	1	1	0.051	0.051	365	N
Benzo(a)anthracene	56-55-3	ug/L	1	1	0.037	0.037	0.03	**Y**
Benzo(a)pyrene	50-32-8	ug/L	1	1	0.023	0.023	0.003	**Y**
Benzo(b)fluoranthene	205-99-2	ug/L	1	1	0.04	0.04	0.03	**Y**
Benzo(g,h,i)perylene[10]	191-24-2	ug/L	1	1	0.022	0.022	18.25	N
Benzo(k)fluoranthene	207-08-9	ug/L	1	1	0.036	0.036	0.3	N
Bis(2-chloroethoxy)methane	111-91-1	ug/L	1	1	0.016	0.016	--	NS
Bis(2-chloroethyl) Ether	111-44-4	ug/L	1	1	0.016	0.016	0.0096	**Y**
Bis(2-chloroisopropyl) Ether	108-60-1	ug/L	1	1	0.047	0.047	0.26	N
Bis(2-ethylhexyl) Phthalate	117-81-7	ug/L	1	1	0.41	0.41	4.784	N
Butyl Benzyl Phthalate	85-68-7	ug/L	1	1	0.029	0.029	730	N
Caprolactam	105-60-2	ug/L	1	1	0.14	0.14	1,825	N
Carbazole	86-74-8	ug/L	1	1	0.018	0.018	3.349	N
Chrysene	218-01-9	ug/L	1	1	0.02	0.02	3	N

Table E.3-2.5
SWMU 38 Groundwater Non-detects Screening
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Adj. Tap Water RBC	Maximum MDL Exceeds SL
Dibenz(a,h)anthracene	53-70-3	ug/L	1	1	0.026	0.026	0.003	**Y**
Dibenzofuran	132-64-9	ug/L	1	1	0.016	0.016	3.65	N
Dimethylphthalate	131-11-3	ug/L	1	1	0.016	0.016	--	NS
Di-n-butylphthalate	4-74-2	ug/L	1	1	0.38	0.38	--	NS
Di-n-octylphthalate	117-84-0	ug/L	1	1	0.34	0.34	--	NS
Fluoranthene	206-44-0	ug/L	1	1	0.016	0.016	146	N
Fluorene	86-73-7	ug/L	1	1	0.011	0.011	24.33	N
Hexachlorobenzene	118-74-1	ug/L	1	1	0.019	0.019	0.042	N
Hexachlorobutadiene	87-68-3	ug/L	1	1	0.018	0.018	0.859	N
Hexachlorocyclopentadiene	77-47-4	ug/L	1	1	0.13	0.13	21.9	N
Hexachloroethane	67-72-1	ug/L	1	1	0.038	0.038	3.65	N
Indeno(1,2,3-cd)pyrene	193-39-5	ug/L	1	1	0.014	0.014	0.03	N
Naphthalene	91-20-3	ug/L	1	1	0.023	0.023	0.651	N
Nitrobenzene	98-95-3	ug/L	1	1	0.026	0.026	0.353	N
N-Nitrosodi-n-propylamine	621-64-7	ug/L	1	1	0.03	0.03	0.0096	**Y**
N-Nitroso-diphenylamine	86-30-6	ug/L	1	1	0.019	0.019	13.67	N
Pentachlorophenol	87-86-5	ug/L	1	1	0.19	0.19	0.558	N
Phenanthrene[10]	85-01-8	ug/L	1	1	0.015	0.015	18.25	N
Phenol	108-95-2	ug/L	1	1	0.028	0.028	1,095	N
Pyrene	129-00-0	ug/L	1	1	0.047	0.047	18.25	N
Explosives								
1,3,5-Trinitrobenzene	99-35-4	ug/L	3	3	0.045	0.045	109.5	N
1,3-Dinitrobenzene	99-65-0	ug/L	3	3	0.071	0.071	0.365	N
2,4-Dinitrotoluene	121-14-2	ug/L	3	3	0.092	0.092	7.3	N
2,6-Dinitrotoluene	606-20-2	ug/L	3	3	0.16	0.16	3.65	N
2,4,6-Trinitrotoluene[11]	118-96-7	ug/L	3	3	0.1	0.1	1.83	N
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	3	3	0.24	0.24	7.3	N
2-Nitrotoluene	88-72-2	ug/L	3	3	0.28	0.28	6.083	N
3-Nitrotoluene	99-08-1	ug/L	3	3	0.17	0.17	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	ug/L	3	3	0.22	0.22	7.3	N
4-Nitrotoluene	99-99-0	ug/L	3	3	0.49	0.49	4.186	N
HMX	2691-41-0	ug/L	3	3	0.2	0.2	182.5	N
Nitrobenzene	98-95-3	ug/L	3	3	0.15	0.15	0.353	N
RDX	121-82-4	ug/L	3	3	0.092	0.092	0.609	N
Tetryl	479-45-8	ug/L	3	3	0.15	0.15	14.6	N
Nitroglycerin/PETN								
Nitroglycerin	55-63-0	ug/L	3	3	0.58	0.58	0.365	**Y**
PETN	78-11-5	ug/L	3	3	0.61	0.61	--	NS

Notes:

CAS = Chemical Abstracts Service
ug/L = Microgram per liter
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PETN = Pentaerythritol Tetranitrate
MDL = Method Detection Limit

RBC = USEPA Region III Risk-Based Concentration (RBC) values from the October 11, 2007, RBC Table and October 11, 2007, Alternate RBC Table
Adjusted RBCs = a Hazard Quotient (HQ) of 0.1 applied to non-carcinogens

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

[1] = Lead Action Level used for screening
[2] = Tap Water RBC for methylmercury used for screening
[3] = Alpha-BHC RBC value was used
[4] = Chlordane RBC value was used
[5] = Endosulfan RBC value was used
[6] = Endrin RBC value was used
[7] = Noncarcinogenic Tap Water RBC value for Aroclor 1016 used for screening
[8] = Noncarcinogenic Tap Water RBC value for 2,4,6-Trichlorophenol used for screening
[9] = 3-Methylphenol RBC value used for screening
[10] = Pyrene RBC value used for screening
[11] = Noncarcinogenic Tap Water RBC values for 2,4,6-Trinitrotoluene used for screening

Table E.3-3.1
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Exposure to Contaminants in SWMU 38/AOC Q Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Soil	Aluminum	mg/kg	16,217	19,542	26,400	19,542	mg/kg	95% Student's t UCL	ProUCL 4.0
	Arsenic	mg/kg	2.029	2.961	5.1	2.961	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Chromium	mg/kg	36.12	58.76	82	58.76	mg/kg	95% H-UCL	ProUCL 4.0
	Cobalt	mg/kg	8.535	9.44	12	9.44	mg/kg	95% Student's t UCL	ProUCL 4.0
	Iron	mg/kg	21,873	24,942	30,700	24,942	mg/kg	95% Student's t UCL	ProUCL 4.0
	Manganese	mg/kg	450	490.2	600	490.2	mg/kg	95% Student's t UCL	ProUCL 4.0
	Vanadium	mg/kg	29.27	34.56	43	34.56	mg/kg	95% Student's t UCL	ProUCL 4.0
	Aroclor 1254	mg/kg	0.195	0.454	0.57	0.454	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.0

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
* Due to the low frequency of detection, a mean and UCL were not calculated.

Table E.3-3.2
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Exposure to Contaminants in SWMU 38/AOC Q Total Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Medium: Total Soil
Exposure Medium: Total Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Total Soil	Aluminum	mg/kg	16,878	18,553	26,400	18,553	mg/kg	95% Student's t UCL	ProUCL 4.0
	Arsenic	mg/kg	1.728	2.581	5.1	2.581	mg/kg	95% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Chromium	mg/kg	28.64	34.52	82	34.52	mg/kg	95% Student's t UCL	ProUCL 4.0
	Cobalt	mg/kg	9.519	10.16	13	10.16	mg/kg	95% Student's t UCL	ProUCL 4.0
	Iron	mg/kg	24,162	26,000	32,200	26,000	mg/kg	95% Student's t UCL	ProUCL 4.0
	Manganese	mg/kg	446	468.9	600	468.9	mg/kg	95% Student's t UCL	ProUCL 4.0
	Vanadium	mg/kg	34.12	37.37	50	37.37	mg/kg	95% Student's t UCL	ProUCL 4.0
	Aroclor 1254	mg/kg	0.195	0.176	0.57	0.176	mg/kg	95% KM (t) UCL	ProUCL 4.0

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
* Due to the low frequency of detection, a mean and UCL were not calculated.

Table E.3-4.1a
Values used for Daily Intake Equations for Current/Future Scenario - Surface Soil - Exposure Medium Soil - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Maintenance Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = $\frac{CS \times IRS \times EF \times ED \times FI \times CF1}{BW \times AT}$
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 2004	
				EF	Exposure Frequency	50	days/year	(1)	
				FI	Fraction Ingested	1	(unitless)	(2)	
				IRS	Ingestion Rate of Soil	100	mg/day	USEPA, 1991	
Dermal Absorption *	Maintenance Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.1	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 2004	
				EF	Exposure Frequency	50	days/year	(1)	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	

Notes:

(1) Best professional judgement. Based on site maintenance conducted 1 day/week with 2 weeks/year vacation.

(2) Fraction ingested assumed 100%.

*See Table E.1-4.3 for chemical specific dermal absorption fractions

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

cm^2 = square centimeter

USEPA = U.S. Environmental Protection Agency

EPC = Exposure Point Concentration

Table E.3-4.1b
Values used for Daily Intake Equations for Current/Future Scenario - Surface Soil - Exposure Medium Air - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Medium:	Surface Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Maintenance Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	50	days/year	(1)	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.5	m^3/hr	USEPA, 1989	
				PEF	Particulate Emission Factor	1.32E+09	m^3/kg	(2)	

Notes:

(1) Best professional judgement. Based on site maintenance conducted 1 day/week with 2 weeks/year vacation.

(2) PEFs provided on Table E.1-4.4

Note: VOCs not identified as COPC in soil; therefore, vapor inhalation pathway not assessed.

USEPA, 1989. Risk Assessment Guidance for Superfund Volume I - Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

m^3/hour = cubic meters per hour

USEPA = U.S. Environmental Protection Agency

Table E.3-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Construction Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	330	mg/day	USEPA, 2002	
	Commercial Worker	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	50	mg/day	USEPA, 2002	
	Resident	Adult	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	100	mg/day	USEPA, 1991	
		Child	Soil	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	CDI (mg/kg-day) = CS x IRS x EF x ED x FI x CF1 / BW X AT
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	(1)	
				IRS	Ingestion Rate of Soil	200	mg/day	USEPA, 1991	

Table E.3-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption*	Construction Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.3	mg/(cm^2-event)	USEPA, 2002	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 2002	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				EV	Event Frequency	1	events/day	USEPA, 2002	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	
	Commercial Worker	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.1	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	3,300	cm^2	USEPA, 2004	
	Resident	Adult	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.07	mg/(cm^2-event)	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	5,700	cm^2	USEPA, 2004	

Table E.3-4.1c
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Soil - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption Cont.*	Resident Cont.	Child	Soil	ABS_d	Dermal Absorption Fraction	Chemical Specific	(unitless)	USEPA, 2004	
				AF	Soil-to-Skin Adherence Factor	0.2	$mg/(cm^2\text{-event})$	USEPA, 2004	
				AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	CDI (mg/kg-day) = $\frac{CS \times EF \times ED \times CF1 \times AF \times ABS_d \times SA \times EV}{BW \times AT}$
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2002	
				SA	Skin Surface Area Available for Contact	2,800	cm^2	USEPA, 2004	

Notes:

(1) Fraction ingested assumed 100%.

*See Table E.1-4.3 for chemical specific dermal absorption fractions

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005.

kg/mg = Kilogram Per Millogram

mg/kg = Milligram Per Kilogram

hr/day = hour per day

cm^2 = square centimeter

USEPA = U.S. Environmental Protection Agency

EPC = Exposure Point Concentration

Table E.3-4.1d
Values used for Daily Intake Equations for Future Scenarios - Total Soil - Exposure Pathway Air - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Total Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Construction Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	1	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	2.5	m^3/hr	USEPA, 1991	
				PEF	Particulate Emission Factor	1.17E+06	m^3/kg	(1)	
	Commercial Worker	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	25	years	USEPA, 2002	
				EF	Exposure Frequency	250	days/year	USEPA, 2002	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.0	m^3/hr	USEPA, 1989	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(1)	
	Resident	Adult	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	2	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.63	m^3/hr	(2)	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(1)	
		Child	Fugitive Dust	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	EPC	CDI (mg/kg-day) = $\frac{CS \times IR \times EF \times ED \times ET \times 1/PEF}{BW \times AT}$
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	6	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.5	m^3/hr	(3)	
				PEF	Particulate Emission Factor	6.61E+08	m^3/kg	(1)	

Notes:

(1) PEFs provided on Table E.1-4.4

(2) The inhalation rate is calculated using a daily long term rate of 15 m^3/day (USEPA, 1991) divided by 24 hours to derive hourly inhalation rate of 0.63 m^3/hour.

(3) The inhalation rate is calculated using a daily long term rate of 12 m^3/day (USEPA, 2003) divided by 24 hours to derive hourly inhalation rate of 0.5 m^3/hour.

Note: VOCs not identified as COPC in soil; therefore, vapor inhalation pathway not assessed.

USEPA, 1989. Risk Assessment Guidance for Superfund Volume I - Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 1997. Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa through Fc.

kg/mg = Kilogram Per Millogram
mg/kg = Milligram Per Kilogram
hr/day = hour per day
m^3/hour = cubic meters per hour
USEPA = U.S. Environmental Protection Agency

Table E.3-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Ingestion	Commercial Worker	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	1	L/day	USEPA, 1991	
	Resident	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	2	L/day	USEPA, 1991	
		Child	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	CDI (mg/kg-day) = $\frac{CW \times IRW \times EF \times ED \times CF1}{BW \times AT}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				IR-W	Ingestion Rate of Tap Water	1	L/day	USEPA, 1991	
Dermal Absorption*	Commercial Worker	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	70	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	*Organics:*
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	if $t_{event} \le t^*$, $DA_{event} = 2 \times CF1 \times CF2 \times FA \times Kp \times CW \times [(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	if $t_{event} > t^*$, $DA_{event} = CF1 \times CF2 \times FA \times Kp \times CW \times [(t_{event}/(1+B)) + 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	800	cm^2	(1)	*Inorganics:*
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	$DA_{event} = CF1 \times CF2 \times Kp \times CW \times t_{event}$
				t_{event}	Event Duration	1	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	

Table E.3-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Dermal Absorption Continued*	Resident	Adult	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	70	kg	USEPA, 1991	*Organics:*
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	if $t_{event} \le t^*$, DA_{event} = 2 x CF1 x CF2 x FA x Kp x CW x $[(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	24	years	USEPA, 1991	if $t_{event} > t^*$, DA_{event} = CF1 x CF2 x FA x Kp x CW x $[(t_{event}/(1+B))+ 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	*Inorganics:*
				SA	Skin Surface Area Available for Contact	18,000	cm^2	USEPA, 2004	DA_{event} = CF1 x CF2 x Kp x CW x t_{event}
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	
				t_{event}	Event Duration	0.58	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	
		Child	Tap Water	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				B	Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis	Chemical Specific	dimensionless	USEPA, 2004	Dermal Absorbed Dose (mg/kg-day) = $\frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$
									where
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-03	mg/µg	unit conversion	*Organics:*
				CF2	Conversion Factor 2	1.00E-03	L/cm^3	unit conversion	if $t_{event} \le t^*$, DA_{event} = 2 x CF1 x CF2 x FA x Kp x CW x $[(6 \times \tau_{event} \times t_{event})/\pi]^{1/2}$
				CW	Chemical Concentration in Water	Chemical Specific	µg/L	EPC	
				DA_{event}	Absorbed Dose per Event	Chemical Specific	mg/cm^2-event	USEPA, 2004	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	if $t_{event} > t^*$, DA_{event} = CF1 x CF2 x FA x Kp x CW x $[(t_{event}/(1+B))+ 2 \times \tau_{event}(1+3B+3B^2)/(1+B)^2]$
				EV	Event Frequency	1	events/day	USEPA, 2004	
				FA	Fraction Absorbed Water	Chemical Specific	dimensionless	USEPA, 2004	
				Kp	Skin Permeability Constant	Chemical Specific	cm/hr	USEPA, 2004	
				SA	Skin Surface Area Available for Contact	6,600	cm^2	USEPA, 2004	*Inorganics:*
				t*	Time to Reach Steady State	Chemical Specific	hr	USEPA, 2004	DA_{event} = CF1 x CF2 x Kp x CW x t_{event}
				t_{event}	Event Duration	1	hr/event	USEPA, 2004	
				τ_{event}	Lag Time per Event	Chemical Specific	hr/event	USEPA, 2004	

Table E.3-4.2a
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Groundwater - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

(1) Best Professional Judgement. Based on the mean surface area for hands for men and women.

*See Table E.1-4.6 for chemical specific parameters used to calculate absorbed dose per event

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 2004. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final.

kg = Kilogram

ug/L = Microgram Per Liter

mg/kg = milligram per kilogram

cm^2 = square centimeter

cm^3 = Cubic Centimeter

L/day = liter/day

USEPA = U.S. Environmental Protection Agency

VDEQ = Virginia Department of Environmental Quality

EPC = Exposure Point Concentration

Table E.3-4.2b
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Air - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation	Construction Worker	Adult	Trench Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USUSEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	365	days	USUSEPA, 1991	
				BW	Body Weight	70	kg	USUSEPA, 1991	
				CA	Chemical Concentration in Outdoor Air	calculated	mg/m^3	(1)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	1	years	USUSEPA, 1991	
				EF	Exposure Frequency	125	days/year	VDEQ, 2006	
				ET	Exposure Time	8	hr/day	USUSEPA, 1991	
				IR	Inhalation Rate	2.5	m^3/hr	USUSEPA, 2002	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
	Commercial Worker	Adult	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	9,125	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	25	years	USEPA, 1991	
				EF	Exposure Frequency	250	days/year	USEPA, 1991	
				ET	Exposure Time	8	hr/day	USEPA, 1991	
				IR	Inhalation Rate	1.0	m^3/hr	USEPA, 1997	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
	Resident	Adult	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	16.4	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.83	m^3/hr	(4)	
				FI	Fraction of Exposure, Air	1	unitless	(2)	
			Vapors while showering with groundwater	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	10,950	days	USEPA, 1991	
				BW	Body Weight	70	kg	USEPA, 1991	
				CA	Chemical Concentration in Shower Air	calculated	mg/m^3	(5)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	24	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	0.261	hr/day	(6)	
				IR	Inhalation Rate	0.83	m^3/hr	USEPA, 1997	
				FI	Fraction of Exposure, Air	1	unitless	(2)	

Table E.3-4.2b
Values used for Daily Intake Equations for Future Scenarios - Groundwater - Exposure Pathway Air - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/Model Name
Inhalation Cont.	Resident Cont.	Child	Indoor Vapors	AT-C	Averaging Time (Cancer)	25,550	days	USEPA, 1991	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CA	Chemical Concentration in Indoor Air	calculated	mg/m^3	(3)	CDI (mg/kg-day) = $\frac{CA \times IR \times EF \times ED \times ET \times FI}{BW \times AT}$
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				ET	Exposure Time	18	hr/day	USEPA, 1997	
				IR	Inhalation Rate	0.5	m^3/hr	(7)	
				FI	Fraction of Exposure, Air	1	unitless	(2)	

Notes:

(1) See Table E.1-4.8 for trench air calculations.

(2) Best Professional Judgement. Based on 100% inhalation fraction.

(3) Chemical Concentration in Air for Indoor Vapors calculated using Johnson and Ettinger Model (See Table E.1-4.6).

(4) The inhalation rate is calculated using a daily long term rate of 20 m^3/day (USEPA, 1991) divided by 24 hours to derive hourly inhalation rate of 0.83 m^3/hour.

(5) Chemical Concentration in Air for Vapors while showering with groundwater calculated using Foster and Chrostowski Inhalation Model (See Table E.1-4.7).

(6) ET calculated using ET=(Ds+((exp(-Ra*t))/Ra - ((exp(Ra(Ds-t))/Ra)))*1hr/60min

Ds (shower time) =	30	min
t (total time in shower room) =	60	min
Ra (air exchange rate) =	0.01667	per min
ET=	0.261	hour/day

(7) The inhalation rate is calculated using a daily long term rate of 12 m^3/day (USEPA, 2003) divided by 24 hours to derive hourly inhalation rate of 0.5 m^3/hour.

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

USEPA, 1997. Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.

USEPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

VDEQ, 2006. Voluntary Remediation Program Risk Assessment Guidance. www.deq.virginia.gov/vrprisk/raguide.html.

kg = Kilogram
ug/L = Microgram Per Liter
mg/kg = milligram per kilogram
cm^3 = Cubic Centimeter
L/day = liter/day
USEPA = U.S. Environmental Protection Agency
VDEQ = Virginia Department of Environmental Quality

Table E.3-4.3.RME
Dermal Absorption Fractions and Volatilization Factors for Soil - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	ABSd * (m^3/kg)	$VF_{C/I\ Worker}$/ $VF_{Maint.\ Worker}$ (m^3/kg)	$VF_{Const.\ Worker}$ (m^3/kg)	$VF_{Adult\ Resident}$ (m^3/kg)	$VF_{Child\ Resident}$ (m^3/kg)
Aluminum	7429-90-5	1.00E-02	--	--	--	--
Arsenic	7440-38-2	3.00E-02	--	--	--	--
Chromium	7440-47-3	1.00E-02	--	--	--	--
Cobalt	7440-48-4	1.00E-02	--	--	--	--
Iron	7439-89-6	1.00E-02	--	--	--	--
Manganese	7439-96-5	1.00E-02	--	--	--	--
Vanadium	7440-62-2	1.00E-02	--	--	--	--
Aroclor 1254	11097-69-1	1.40E-01	--	--	--	--

Notes:

CAS = Chemical Abstract Service

ABS_d = Dermal Absorption Fraction

VF = Volatilization Factor

D_a = Apparent Diffusivity

m^3/kg = cubic meters per kilogram

cm2/s = centimeter squared per second

*ABS_d values are taken from Exhibit 3-4, Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation and Manual, Part E; Supplemental Guidance for Dermal Risk Assessment, July 2004, and Region III Technical Guidance, Assessing Dermal Exposure in Soil, December 1995.

Volatiles were not identified as COPCs in soil; therefore, VFs not calculated

Table E.3-4.4.RME
PEF Calculations - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Commercial/Industrial Worker

Equation 4-5 from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA, 2002.

$$PEF = Q / C_{wind} \cdot \frac{3{,}600 s/h}{0.036 \cdot (1-V) \cdot (U_m / U_t)\text{^}3 \cdot F(x)}$$

Parameter	Value	
PEF	9.27E+08	
Q/C_{wind}	63.94	calculated below
V	0.5	default
U_m	4.69	default
U_t	11.32	default
F(x)	0.194	default

PEF = particulate emission factor (m^3/kg)
s/h = seconds per hour
Q/Cwind = Inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source (g/m^3-s per kg/m^3)
V = fraction of vegatative cover (unitless)
U_m = mean annual windspeed (m/s)
U_t = equivalent threshold value of windspeed at 7m (m/s)
F(x) = function dependent on U_m/U_t derived using Cowherd et al. (1985)
Site Area = 0.3 acres

Q/C_{wind} calculated in accordance with Exhibit D-2 from USEPA, 2002 using A, B, and C values for Huntington, WV:
$Q/C_{wind} = A*e\text{^}((\ln A_{site} - B)^2/C))$

Q/C_{wind}=	63.94	
A =	9.9253	unitless
B =	18.6636	unitless
C =	211.8862	unitless
A_{site}=	0.3	acres

Table E.3-4.4.RME
PEF Calculations - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Construction Worker

Equation 5-5 from Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA, 2002.

$$PEF_{sc} = Q / C_{sr} \cdot \frac{1}{F_D} \cdot \left[\frac{T \cdot A_R}{556 \cdot (W/3)^{0.4} \cdot \frac{(365\ d/yr - p)}{365\ d/yr} \cdot \sum VKT} \right]$$

Parameter	Value	
PEF_{sc}	1.61E+06	
Q/C_{sr}	25.32	calculated
F_D	0.185	default
T (sec)	7,488,000	assumed-see below
A_R (m^2)	212	calculated
W (tons)	8	assumed-see below
p (days/yr)	140	determined-see below
sumVKT (km)	267	assumed-see below

PEF_{sr} = subchronic road particulate emission factor (m^3/kg)
Q/C_{sr} = Inverse of the ratio of the 1-h geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/m2-s per kg/m3)
F_D = dispersion correction factor (unitless)
T = total time over which construction occurs-total time period assumed to be 6 months (52wks x 5days per week x 8 hours per day x 3,600 s per hour)
A_R = surface area of contaminated road segment (m^2)
L_R = length of road segment (assumed to equal to (0.3 acres*43,560 ft^2/acre)$^{1/2}$)
W_R = width of road segment (assumed to be 20 ft)
$A_R = L_R \times W_R \times 0.092903 m^2/ft^2$

A_R= 212 m^2

W = mean vehicle weight assumed to be 8 tons ([(20 cars * 2 tons/car)+(10 trucks*20 tons/truck)]/30 vehicles)
p = number of days with at least 0.01 inches of precipitation (from Exhibit 5-2 140 days/year)
sumVKT = sum of fleet vehicle kilometers traveled during the exposure duration (km)
(30 of vehicles x 0.034 km/day x 52wks x 5 days/wk)

Q/C_{sr} calculated in accordance with Equation 5-6:
using A, B, and C default values:
$Q/C_{sr} = A*e^{((\ln A_s - B)^2/C)}$

Q/C_{sr}=	25.32	g/m^2-s per kg/m^3
A =	12.9351	unitless
B =	5.7383	unitless
C =	71.7711	unitless
A_s =	0.3	acres

Table E.3-4.5
Parameter Values Used for Groundwater - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	FA	Kp (cm/hr)	tau $_{event}$ (hr)	B	t* (hr)
Cobalt	7440-48-4	--	4.0E-04	--	--	--
Manganese	7439-96-5	--	1.0E-03	--	--	--
Chloroform	67-66-3	1.0	6.8E-03	5.0E-01	2.9E-02	1.2E+00

Notes:

Organic parameter values are taken from Organic values from Organic Chemicals in Water Spreadsheet (http://www.epa.gov/oswer/riskassessment/ragse/index.htm)

Inorganic parameters were taken from Exhibit 3-1, Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual, Part E; Supplemental Guidance for Dermal Risk Assessment. July 2004.

TABLE E.3-4.6
Groundwater Inhalation Indoor Air Concentration Summary - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	C_a mg/m^3
Chloroform	67-66-3	1.70E+00	6.61E-06

Notes:

Indoor Air Concentrations Modeled Using Johnson and Ettinger Model.

Non-default Model Inputs: Depth below grade to bottom of enclosed floor space (15 cm)
Depth below grade to water table (822 cm)
Soil Type (SC)

TABLE E.3-4.7
Groundwater Inhalation Shower Stall Air Concentration Calculations - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	MW g/mole	H atm-m^3/mole	k_l cm/hour	k_g cm/hour	K_L cm/hour	K_{aL} cm/hour	C_{wd} ug/L	S ug/m^3-min	C_a mg/m^3
Chloroform	67-66-3	1.70E+00	119.4	3.7E-03	12.14	1164.91	1.14E+01	1.52E+01	6.75E-01	2.25E+00	1.35E-01

Equations:

k_l (liquid-film transfer coefficient) = $20*(44/MW)^{0.5}$

k_g (gas-film transfer coefficient) = $3000*(18/MW)^{0.5}$

K_L (overall mass transfer coefficient) = $(1/k_l+(R*t/H*k_g))^{-1}$

K_{aL} (overall mass transfer coefficient adjusted to shower water temperature) = $K_L*((T*u_s/T_s*u_l)^{-0.5}$

C_{wd} (VOC concentration leaving shower droplet) = $C_w*(1-\exp(-K_{aL}*t_s/60*d)$

S (VOC generation rate) = C_{wd}*FR/SV

C_a (VOC concentration in shower air) =(S/R_a)*(1mg/1000ug)

Constants:

R (gas constant)	8.20E-05	atm-m^3/mole-K
T (room temperature)	298	K
T_s (water temp)	318	K
u_s (water viscosity at T_s)	0.596	centapoise
u_l (water viscosity at T)	1.002	centapoise
t_s (shower droplet drop time)	2	sec
d (droplet diameter)	1	mm
FR (shower flow rate)	20	L/min
SV (shower room air volume)	6	m^3
R_a (air exchange rate)	0.01667	permin

TABLE E.3-4.8
Groundwater Inhalation Construction Worker Trench Gas Concentration Calculations - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Analyte	CAS	C_W ug/L	H_i atm-m^3/mole	D_{air} cm^2/sec	VF L/m^3	C_a mg/m^3
Chloroform	67-66-3	1.70E+00	3.67E-03	1.04E-01	8.61E-03	1.46E-05

Notes:

Exposure-point Concentrations calculated using VDEQ VRP Model for construction/utility workers in a trench: deep Goundwater greater than 15 feet

Equations:

$VF = (H_i * D_{air} * AC_{vad}^{3.33} * A * F * CF1 * CF2 * CF3)/(R * T * L_d * ACH * V * Por_{vad}^2)$

$C_a = C_W * VF * CF4$

Constants:

H_i (Henry's Law Constant)	chem spec	atm-m^3/mol
D_{air} (diffusion coefficient in air)	chem spec	cm^2/s
AC_{vad} (volumetric air content in vadose zone soil)	0.25	cm^3/cm^3
L (length of trench)	2.44	m
W (width of trench)	0.91	m
A (area of trench - L*W)	2.23	m^2
F (fraction of floor through which contaminant can enter)	1	untiless
R (gas constant)	8.2E-05	atm-m^3/mole-K
T (average system absolute temp)	298	K
L_d (dist. b/w trench bottom and groundwater)	365	cm
d (depth of trench)	4.57	m
V (volume of trench)	10.19	m^3
ACH (air changes per hour)	2	per hour
Por_{vad} (total soil porosity in vadose zone)	0.44	cm^3/cm^3
CF1	0.001	L/cm^3
CF2	10,000	cm^2/m^2
CF3	3600	sec/hour
CF4	0.001	mg/ug

Table E.3-5.1
Non-Cancer Toxicity Data - Oral/Dermal - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
			Value	Units		Value	Units			Source(s)	Date(s)
Aluminum	7429-90-5	Chronic	1.00E+00	mg/kg-day	1	1.00E+00	mg/kg-day	developmental CNS	100	PPRTV	07/26/2001
Arsenic	7440-38-2	Chronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	skin/ vascular	3	IRIS	06/17/2008
Arsenic	7440-38-2	Subchronic	3.00E-04	mg/kg-day	1	3.00E-04	mg/kg-day	skin	3	HEAST	07/31/1997
Chromium(2)	7440-47-3	Chronic	3.00E-03	mg/kg-day	0.025	7.50E-05	mg/kg-day	GI tract/fetus/bone marrow/liver	900	IRIS	06/17/2008
Chromium(2)	7440-47-3	Subchronic	2.00E-02	mg/kg-day	0.025	5.00E-04	mg/kg-day	GI tract/fetus/bone marrow/liver	100	HEAST	07/31/1997
Cobalt	7440-48-4	Chronic	2.00E-02	mg/kg-day	1	2.00E-02	mg/kg-day	blood	10	PPRTV	01/15/2002
Iron	7439-89-6	Chronic	7.00E-01	mg/kg-day	1	7.00E-01	mg/kg-day	blood/ liver/ GI tract	1	PPTRV	01/05/1999
Manganese	7439-96-5	Chronic	2.00E-02	mg/kg-day	0.04	8.00E-04	mg/kg-day	CNS	1	IRIS	06/17/2008
Vanadium	7440-62-2	Chronic	1.00E-03	mg/kg-day	0.026	2.60E-05	mg/kg-day	kidney	NA	NCEA, Region III	10/25/2005
Vanadium	7440-62-2	Subchronic	7.00E-03	mg/kg-day	0.026	1.80E-04	mg/kg-day	kidney/ blood	100	HEAST	07/31/1997
Aroclor 1254	11097-69-1	Chronic	2.00E-05	mg/kg-day	1	2.00E-05	mg/kg-day	eyes	300	IRIS	06/17/2008
Aroclor 1254	11097-69-1	Subchronic	5.00E-05	mg/kg-day	1	5.00E-05	mg/kg-day	immune system	100	HEAST	07/31/1997
Chloroform	67-66-3	Chronic	1.00E-02	mg/kg-day	1	1.00E-02	mg/kg-day	liver	100	IRIS	06/17/2008
Chloroform	67-66-3	Subchronic	1.00E-02	mg/kg-day	1	1.00E-02	mg/kg-day	liver	1000	HEAST	07/31/1997

Notes:

CAS = Chemical Abstract Service
RfD = Reference Dose
mg/(kg-d) = milligrams per kilogram day
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available
(1) Oral absorption efficiency for dermal from Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. EPA/540/R/99/005. 2004.
(2) Chromium VI toxicity value used

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III, and HEAST.
For IRIS values, the date of the IRIS search is provided.
For HEAST values, the date of HEAST is provided.
For Region III values, the date of the Region III RBC Table is provided.
For PPRTV/NCEA, date of paper is provided.

Table E.3-5.2
Non-Cancer Toxicity Data - Inhalation - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Chronic/ Subchronic	Inhalation RfC		Extrapolated RfD		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
			Value	Units	Value	Units			Source(s)	Date(s)
Aluminum	7429-90-5	Chronic	1.00E-03	mg/m3	1.00E-03	mg/kg-day	CNS	300	PPRTV, Region III	10/11/2007
Arsenic	7440-38-2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium(1)	7440-47-3	Chronic	1.00E-04	mg/m3	2.90E-05	mg/kg-day	respiratory	300	IRIS	06/17/2008
Cobalt	7440-48-4	Chronic	2.00E-05	mg/m3	5.70E-06	mg/kg-day	respiratory	100	PPRTV	01/15/2002
Iron	7439-89-6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	7439-96-5	Chronic	5.00E-05	mg/m3	1.43E-05	mg/kg-day	CNS	1000	IRIS	06/17/2008
Vanadium	7440-62-2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	67-66-3	Chronic	4.90E-02	mg/m3	1.40E-02	mg/kg-day	respiratory	NA	NCEA, Region III	10/11/2007

Notes:

RfC = Reference Concentration
RfD = Reference Dose
mg/m^3 = milligrams per cubic meter
mg/(kg-d) = milligrams per kilogram day
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available

(1) Toxicity data for chromium VI particulates
Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III, VDEQ, and HEAST.
For IRIS values, the date of the IRIS search is provided.
For PPRTV values, the date of the paper is provided.
For Region III values, the date of the Region III RBC Table is provided.
RfDi (mg/kg-day) = RfC (mg/m3) x 20 m3/day x 1/70 kg

Table E.3-6.1
Cancer Toxicity Data - Oral/Dermal - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
		Value	Units		Value	Units		Source(s)	Date(s)
Aluminum	7429-90-5	NA	NA	1	NA	NA	NA	NA	NA
Antimony	7440-36-0	NA	NA	0.15	NA	NA	NA	NA	NA
Arsenic	7440-38-2	1.50E+00	1/(mg/kg-day)	1	1.50E+00	1/(mg/kg-day)	A	IRIS	06/17/2008
Cadmium	7440-43-9	NA	NA	0.025	NA	NA	NA	NA	NA
Chromium[(2)]	7440-47-3	NA	NA	0.025	NA	NA	Cannot Be Determined	NA	NA
Cobalt	7440-48-4	NA	NA	1	NA	NA	NA	NA	NA
Iron	7439-89-6	NA	NA	1	NA	NA	NA	NA	NA
Manganese	7439-96-5	NA	NA	0.04	NA	NA	D	NA	NA
Thallium	7440-28-0	NA	NA	1	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NA	NA	0.026	NA	NA	NA	NA	NA
Zinc	7440-66-6	NA	NA	1	NA	NA	D	NA	NA
Aroclor 1254	11097-69-1	2.00E+00	1/(mg/kg-day)	1	2.00E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
Chloroform	67-66-3	NA	NA	1	NA	NA	B2	NA	NA

Notes:

CSF = Cancer Slope Factor
mg/(kg-d) = Milligrams Per Kilogram Day
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NA = Not Available
1986 Cancer Guideline Description:
A = Human carcinogen
B1 = Probable human carcinogen - indicates that limited human data are available.
B2 = Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C = Possible human carcinogen
D = Not classifiable as a human carcinogen

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III and VDEQ.
For IRIS values, the date of the IRIS search is provided.

(1) Oral absorption efficiency for dermal from Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Part E - Supplemental Guidance for Dermal Risk Assessment. Final. . EPA/540/R/99/005. 2004
(2) Chromium VI toxicity data used.

Table E.3-6.2
Cancer Toxicity Data - Inhalation - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical of Potential Concern	CAS	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description	CSF	
		Value	Units	Value	Units		Source(s)	Date(s)
Aluminum	7429-90-5	NA	NA	NA	NA	NA	NA	NA
Antimony	7440-36-0	NA	NA	NA	NA	NA	NA	NA
Arsenic	7440-38-2	4.30E+00	1/(mg/m3)	1.50E+01	1/(mg/kg-day)	A	IRIS	06/17/2008
Cadmium	7440-43-9	1.80E+00	1/(mg/m3)	6.30E+00	1/(mg/kg-day)	B1	IRIS	06/17/2008
Chromium(1)	7440-47-3	1.20E+01	1/(mg/m3)	4.10E+01	1/(mg/kg-day)	A	IRIS	06/17/2008
Cobalt	7440-48-4	2.80E+00	1/(mg/m3)	9.80E+00	1/(mg/kg-day)	B1	PPRTV	01/15/2002
Iron	7439-89-6	NA	NA	NA	NA	NA	NA	NA
Manganese	7439-96-5	NA	NA	NA	NA	D	NA	NA
Thallium	7440-28-0	NA	NA	NA	NA	NA	NA	NA
Vanadium	7440-62-2	NA	NA	NA	NA	NA	NA	NA
Zinc	7440-66-6	NA	NA	NA	NA	D	NA	NA
Aroclor 1254	11097-69-1	5.71E-01	1/(mg/m3)	2.00E+00	1/(mg/kg-day)	B2	IRIS	06/17/2008
Chloroform	67-66-3	2.31E-02	1/(mg/m3)	8.10E-02	1/(mg/kg-day)	B2	IRIS	06/17/2008

Notes:

CSF = Cancer Slope Factor
mg/(kg-d) = Milligrams Per Kilogram Day
USEPA = U.S. Environmental Protection Agency
Region III = U.S. Environmental Protection Agency, Region III
NCEA = National Center for Environmental Assessment
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
PPRTV = Provisional Peer Reviewed Toxicity Values
NA = Not Available
(1) = Chromium VI toxicity data used
CSF = Unit Risk ($1/mg/m^3$) x 70 kg x 1 day/20 m^3

1986 Cancer Guideline Description:
A = Human carcinogen
B1 = Probable human carcinogen - indicates that limited human data are available.
B2 = Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C = Possible human carcinogen
D = Not classifiable as a human carcinogen

Source Date:
The hierarchy of toxicity values used is:
IRIS, PPRTVs (if available), Region III and VDEQ.
For IRIS values, the date of the IRIS search is provided.
For NCEA, Region III values, the date of the Region III RBC Table is provided.
For PPRTV values, the date of the paper is provided.

TABLE E.3-7.1.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Maintenance Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Soil	Soil	Ingestion	Aluminum	19,542	mg/kg	1.37E-03	mg/kg-day	--	--	--	3.82E-03	mg/kg-day	1.00E+00	mg/kg-day	4.E-03
				Arsenic	2.961	mg/kg	2.07E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	3.1.E-07	5.79E-07	mg/kg-day	3.00E-04	mg/kg-day	2.E-03
				Chromium	58.76	mg/kg	4.11E-06	mg/kg-day	--	--	--	1.15E-05	mg/kg-day	3.00E-03	mg/kg-day	4.E-03
				Cobalt	9.44	mg/kg	6.60E-07	mg/kg-day	--	--	--	1.85E-06	mg/kg-day	2.00E-02	mg/kg-day	9.E-05
				Iron	24,942	mg/kg	1.74E-03	mg/kg-day	--	--	--	4.88E-03	mg/kg-day	7.00E-01	mg/kg-day	7.E-03
				Manganese	490.2	mg/kg	3.43E-05	mg/kg-day	--	--	--	9.59E-05	mg/kg-day	2.00E-02	mg/kg-day	5.E-03
				Vanadium	34.56	mg/kg	2.42E-06	mg/kg-day	--	--	--	6.76E-06	mg/kg-day	1.00E-03	mg/kg-day	7.E-03
				Aroclor 1254	0.454	mg/kg	3.17E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	6.3.E-08	8.88E-08	mg/kg-day	2.00E-05	mg/kg-day	4.E-03
			Exp. Route Total								4.E-07					3.E-02
			Dermal Absorption	Aluminum	19,542	mg/kg	4.51E-05	mg/kg-day	--	--	--	1.26E-04	mg/kg-day	1.00E+00	mg/kg-day	1.E-04
				Arsenic	2.961	mg/kg	2.05E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	3.E-08	5.74E-08	mg/kg-day	3.00E-04	mg/kg-day	2.E-04
				Chromium	58.76	mg/kg	1.36E-07	mg/kg-day	--	--	--	3.79E-07	mg/kg-day	7.50E-05	mg/kg-day	5.E-03
				Cobalt	9.44	mg/kg	2.18E-08	mg/kg-day	--	--	--	6.10E-08	mg/kg-day	2.00E-02	mg/kg-day	3.E-06
				Iron	24,942	mg/kg	5.75E-05	mg/kg-day	--	--	--	1.61E-04	mg/kg-day	7.00E-01	mg/kg-day	2.E-04
				Manganese	490.2	mg/kg	1.13E-06	mg/kg-day	--	--	--	3.17E-06	mg/kg-day	8.00E-04	mg/kg-day	4.E-03
				Vanadium	34.56	mg/kg	7.97E-08	mg/kg-day	--	--	--	2.23E-07	mg/kg-day	2.60E-05	mg/kg-day	9.E-03
				Aroclor 1254	0.454	mg/kg	1.47E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	3.E-08	4.10E-08	mg/kg-day	2.00E-05	mg/kg-day	2.E-03
			Exp. Route Total								6.E-08					2.E-02
		Exposure Point Total									4.E-07					5.E-02
	Exposure Medium Total										4.3.E-07					5.E-02
	Air	Fugitive Dust	Inhalation	Aluminum	19,542	mg/kg	1.77E-07	mg/kg-day	--	--	--	4.95E-07	mg/kg-day	1.00E-03	mg/kg-day	5.E-04
				Arsenic	2.961	mg/kg	2.68E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	4.E-10	7.50E-11	mg/kg-day	--	--	--
				Chromium	58.76	mg/kg	5.32E-10	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	2.E-08	1.49E-09	mg/kg-day	2.90E-05	mg/kg-day	5.E-05
				Cobalt	9.44	mg/kg	8.54E-11	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	8.E-10	2.39E-10	mg/kg-day	5.70E-06	mg/kg-day	4.E-05
				Iron	24,942	mg/kg	2.26E-07	mg/kg-day	--	--	--	6.32E-07	mg/kg-day	--	--	--
				Manganese	490.2	mg/kg	4.44E-09	mg/kg-day	--	--	--	1.24E-08	mg/kg-day	1.43E-05	mg/kg-day	9.E-04
				Vanadium	34.56	mg/kg	3.13E-10	mg/kg-day	--	--	--	8.76E-10	mg/kg-day	--	--	--
				Aroclor 1254	0.454	mg/kg	4.11E-12	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	8.E-12	1.15E-11	mg/kg-day	--	--	--
			Exp. Route Total								2.E-08					1.E-03
		Exposure Point Total									2.E-08					1.E-03
	Exposure Medium Total										2.E-08					1.E-03
Soil Total											5.E-07					5.E-02
											Total of Receptor Risks Across All Media					5.E-02

TABLE E.3-7.2.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Maintenance Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	18,553	mg/kg	1.30E-03	mg/kg-day	--	--	--	3.63E-03	mg/kg-day	1.00E+00	mg/kg-day	4.E-03
				Arsenic	2.581	mg/kg	1.80E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.7.E-07	5.05E-07	mg/kg-day	3.00E-04	mg/kg-day	2.E-03
				Chromium	34.52	mg/kg	2.41E-06	mg/kg-day	--	--	--	6.76E-06	mg/kg-day	3.00E-03	mg/kg-day	2.E-03
				Cobalt	10.16	mg/kg	7.10E-07	mg/kg-day	--	--	--	1.99E-06	mg/kg-day	2.00E-02	mg/kg-day	1.E-04
				Iron	26,000	mg/kg	1.82E-03	mg/kg-day	--	--	--	5.09E-03	mg/kg-day	7.00E-01	mg/kg-day	7.E-03
				Manganese	468.9	mg/kg	3.28E-05	mg/kg-day	--	--	--	9.18E-05	mg/kg-day	2.00E-02	mg/kg-day	5.E-03
				Vanadium	37.37	mg/kg	2.61E-06	mg/kg-day	--	--	--	7.31E-06	mg/kg-day	1.00E-03	mg/kg-day	7.E-03
				Aroclor 1254	0.176	mg/kg	1.23E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.5.E-08	3.44E-08	mg/kg-day	2.00E-05	mg/kg-day	2.E-03
			Exp. Route Total								3.E-07					3.E-02
			Dermal Absorption	Aluminum	18,553	mg/kg	4.28E-05	mg/kg-day	--	--	--	1.20E-04	mg/kg-day	1.00E+00	mg/kg-day	1.E-04
				Arsenic	2.581	mg/kg	1.79E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	3.E-08	5.00E-08	mg/kg-day	3.00E-04	mg/kg-day	2.E-04
				Chromium	34.52	mg/kg	7.96E-08	mg/kg-day	--	--	--	2.23E-07	mg/kg-day	7.50E-05	mg/kg-day	3.E-03
				Cobalt	10.16	mg/kg	2.34E-08	mg/kg-day	--	--	--	6.56E-08	mg/kg-day	2.00E-02	mg/kg-day	3.E-06
				Iron	26,000	mg/kg	6.00E-05	mg/kg-day	--	--	--	1.68E-04	mg/kg-day	7.00E-01	mg/kg-day	2.E-04
				Manganese	468.9	mg/kg	1.08E-06	mg/kg-day	--	--	--	3.03E-06	mg/kg-day	8.00E-04	mg/kg-day	4.E-03
				Vanadium	37.37	mg/kg	8.62E-08	mg/kg-day	--	--	--	2.41E-07	mg/kg-day	2.60E-05	mg/kg-day	9.E-03
				Aroclor 1254	0.176	mg/kg	5.68E-09	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	1.E-08	1.59E-08	mg/kg-day	2.00E-05	mg/kg-day	8.E-04
			Exp. Route Total								4.E-08					2.E-02
		Exposure Point Total									3.E-07					5.E-02
	Exposure Medium Total										3.3.E-07					5.E-02
	Air	Fugitive Dust	Inhalation	Aluminum	18,553	mg/kg	1.68E-07	mg/kg-day	--	--	--	4.70E-07	mg/kg-day	1.00E-03	mg/kg-day	5.E-04
				Arsenic	2.581	mg/kg	2.34E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	4.E-10	6.54E-11	mg/kg-day	--	--	--
				Chromium	34.52	mg/kg	3.12E-10	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	1.E-08	8.75E-10	mg/kg-day	2.90E-05	mg/kg-day	3.E-05
				Cobalt	10.16	mg/kg	9.19E-11	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	9.E-10	2.57E-10	mg/kg-day	5.70E-06	mg/kg-day	5.E-05
				Iron	26,000	mg/kg	2.35E-07	mg/kg-day	--	--	--	6.59E-07	mg/kg-day	--	--	--
				Manganese	468.9	mg/kg	4.24E-09	mg/kg-day	--	--	--	1.19E-08	mg/kg-day	1.43E-05	mg/kg-day	8.E-04
				Vanadium	37.37	mg/kg	3.38E-10	mg/kg-day	--	--	--	9.47E-10	mg/kg-day	--	--	--
				Aroclor 1254	0.176	mg/kg	1.59E-12	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	3.E-12	4.46E-12	mg/kg-day	--	--	--
			Exp. Route Total								1.E-08					1.E-03
		Exposure Point Total									1.E-08					1.E-03
	Exposure Medium Total										1.E-08					1.E-03
Soil Total											3.E-07					5.E-02
											Total of Receptor Risks Across All Media	3.E-07		Total of Receptor Hazards Across All Media		5.E-02

TABLE E.3-7.3.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Commercial Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	18,553	mg/kg	3.24E-03	mg/kg-day	--	--	--	9.08E-03	mg/kg-day	1.00E+00	mg/kg-day	9.E-03
				Arsenic	2.581	mg/kg	4.51E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	7.E-07	1.26E-06	mg/kg-day	3.00E-04	mg/kg-day	4.E-03
				Chromium	34.52	mg/kg	6.03E-06	mg/kg-day	--	--	--	1.69E-05	mg/kg-day	3.00E-03	mg/kg-day	6.E-03
				Cobalt	10.16	mg/kg	1.78E-06	mg/kg-day	--	--	--	4.97E-06	mg/kg-day	2.00E-02	mg/kg-day	2.E-04
				Iron	26,000	mg/kg	4.54E-03	mg/kg-day	--	--	--	1.27E-02	mg/kg-day	7.00E-01	mg/kg-day	2.E-02
				Manganese	468.9	mg/kg	8.19E-05	mg/kg-day	--	--	--	2.29E-04	mg/kg-day	2.00E-02	mg/kg-day	1.E-02
				Vanadium	37.37	mg/kg	6.53E-06	mg/kg-day	--	--	--	1.83E-05	mg/kg-day	1.00E-03	mg/kg-day	2.E-02
				Aroclor 1254	0.176	mg/kg	3.08E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	6.E-08	8.61E-08	mg/kg-day	2.00E-05	mg/kg-day	4.E-03
			Exp. Route Total								7.4.E-07					7.E-02
			Dermal Absorption	Aluminum	18,553	mg/kg	2.14E-04	mg/kg-day	--	--	--	5.99E-04	mg/kg-day	1.00E+00	mg/kg-day	6.E-04
				Arsenic	2.581	mg/kg	8.93E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	1.E-07	2.50E-07	mg/kg-day	3.00E-04	mg/kg-day	8.E-04
				Chromium	34.52	mg/kg	3.98E-07	mg/kg-day	--	--	--	1.11E-06	mg/kg-day	7.50E-05	mg/kg-day	1.E-02
				Cobalt	10.16	mg/kg	1.17E-07	mg/kg-day	--	--	--	3.28E-07	mg/kg-day	2.00E-02	mg/kg-day	2.E-05
				Iron	26,000	mg/kg	3.00E-04	mg/kg-day	--	--	--	8.40E-04	mg/kg-day	7.00E-01	mg/kg-day	1.E-03
				Manganese	468.9	mg/kg	5.41E-06	mg/kg-day	--	--	--	1.51E-05	mg/kg-day	8.00E-04	mg/kg-day	2.E-02
				Vanadium	37.37	mg/kg	4.31E-07	mg/kg-day	--	--	--	1.21E-06	mg/kg-day	2.60E-05	mg/kg-day	5.E-02
				Aroclor 1254	0.176	mg/kg	2.84E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	6.E-08	7.96E-08	mg/kg-day	2.00E-05	mg/kg-day	4.E-03
			Exp. Route Total								2.E-07					9.E-02
		Exposure Point Total									9.E-07					2.E-01
	Exposure Medium Total										9.E-07					2.E-01

TABLE E.3-7.3.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Commercial Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Commercial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Fugitive Dust	Inhalation	Aluminum	18,553	mg/kg	5.60E-07	mg/kg-day	--	--	--	1.57E-06	mg/kg-day	1.00E-03	mg/kg-day	2.E-03
				Arsenic	2.581	mg/kg	7.78E-11	mg/kg-day	1.50E+01	mg/kg-day^{-1}	1.E-09	2.18E-10	mg/kg-day	--	--	--
				Chromium	34.52	mg/kg	1.04E-09	mg/kg-day	4.10E+01	mg/kg-day^{-1}	4.E-08	2.92E-09	mg/kg-day	2.90E-05	mg/kg-day	1.E-04
				Cobalt	10.16	mg/kg	3.06E-10	mg/kg-day	9.80E+00	mg/kg-day^{-1}	3.E-09	8.58E-10	mg/kg-day	5.70E-06	mg/kg-day	2.E-04
				Iron	26,000	mg/kg	7.84E-07	mg/kg-day	--	--	--	2.20E-06	mg/kg-day	--	--	--
				Manganese	468.9	mg/kg	1.41E-08	mg/kg-day	--	--	--	3.96E-08	mg/kg-day	1.43E-05	mg/kg-day	3.E-03
				Vanadium	37.37	mg/kg	1.13E-09	mg/kg-day	--	--	--	3.16E-09	mg/kg-day	--	--	--
				Aroclor 1254	0.176	mg/kg	5.31E-12	mg/kg-day	2.00E+00	mg/kg-day^{-1}	1.E-11	1.49E-11	mg/kg-day	--	--	--
			Exp. Route Total								5.E-08					5.E-03
		Exposure Point Total									5.E-08					5.E-03
	Exposure Medium Total										5.E-08					5.E-03
Soil Total											1.E-06					2.E-01
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	2.2	ug/L	7.69E-06	mg/kg-day	--	--	--	2.15E-05	mg/kg-day	2.00E-02	mg/kg-day	1.E-03
				Manganese	1,050	ug/L	3.67E-03	mg/kg-day	--	--	--	1.03E-02	mg/kg-day	2.00E-02	mg/kg-day	5.E-01
				Chloroform	1.7	ug/L	5.94E-06	mg/kg-day	--	--	--	1.66E-05	mg/kg-day	1.00E-02	mg/kg-day	2.E-03
			Exp. Route Total								--					5.E-01
			Dermal Absorption	Cobalt	2.2	ug/L	2.46E-09	mg/kg-day	--	--	--	6.89E-09	mg/kg-day	2.00E-02	mg/kg-day	3.E-07
				Manganese	1,050	ug/L	2.94E-06	mg/kg-day	--	--	--	8.22E-06	mg/kg-day	8.00E-04	mg/kg-day	1.E-02
				Chloroform	1.7	ug/L	9.06E-09	mg/kg-day	--	--	--	2.54E-08	mg/kg-day	1.00E-02	mg/kg-day	3.E-06
			Exp. Route Total								--					1.E-02
		Exposure Point Total									--					5.E-01
	Exposure Medium Total										--					5.E-01
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	6.61E-06	mg/m^3	1.85E-07	mg/kg-day	8.10E-02	mg/kg-day^{-1}	1.E-08	5.17E-07	mg/kg-day	1.40E-02	mg/kg-day	4.E-05
			Exp. Route Total								1.E-08					4.E-05
		Exposure Point Total									1.E-08					4.E-05
	Exposure Medium Total										1.E-08					4.E-05
Groundwater Total											1.E-08					5.E-01
											Total of Receptor Risks Across All Media					7.E-01
											1.E-06	Total of Receptor Hazards Across All Media				

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.3-4.6)

TABLE E.3-7.4.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Construction Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	18,553	mg/kg	8.56E-04	mg/kg-day	--	--	--	5.99E-02	mg/kg-day	1.00E+00	mg/kg-day	6.E-02
				Arsenic	2.581	mg/kg	1.19E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.E-07	8.33E-06	mg/kg-day	3.00E-04	mg/kg-day	3.E-02
				Chromium	34.52	mg/kg	1.59E-06	mg/kg-day	--	--	--	1.11E-04	mg/kg-day	2.00E-02	mg/kg-day	6.E-03
				Cobalt	10.16	mg/kg	4.69E-07	mg/kg-day	--	--	--	3.28E-05	mg/kg-day	2.00E-02	mg/kg-day	2.E-03
				Iron	26,000	mg/kg	1.20E-03	mg/kg-day	--	--	--	8.40E-02	mg/kg-day	3.00E-01	mg/kg-day	3.E-01
				Manganese	468.9	mg/kg	2.16E-05	mg/kg-day	--	--	--	1.51E-03	mg/kg-day	2.00E-02	mg/kg-day	8.E-02
				Vanadium	37.37	mg/kg	1.72E-06	mg/kg-day	--	--	--	1.21E-04	mg/kg-day	7.00E-03	mg/kg-day	2.E-02
				Aroclor 1254	0.176	mg/kg	8.12E-09	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-08	5.68E-07	mg/kg-day	5.00E-05	mg/kg-day	1.E-02
			Exp. Route Total								2.E-07					5.E-01
			Dermal Absorption	Aluminum	18,553	mg/kg	2.57E-05	mg/kg-day	--	--	--	1.80E-03	mg/kg-day	1.00E+00	mg/kg-day	2.E-03
				Arsenic	2.581	mg/kg	1.07E-08	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.E-08	7.50E-07	mg/kg-day	3.00E-04	mg/kg-day	3.E-03
				Chromium	34.52	mg/kg	4.78E-08	mg/kg-day	--	--	--	3.34E-06	mg/kg-day	5.00E-04	mg/kg-day	7.E-03
				Cobalt	10.16	mg/kg	1.41E-08	mg/kg-day	--	--	--	9.84E-07	mg/kg-day	2.00E-02	mg/kg-day	5.E-05
				Iron	26,000	mg/kg	3.60E-05	mg/kg-day	--	--	--	2.52E-03	mg/kg-day	3.00E-01	mg/kg-day	8.E-03
				Manganese	468.9	mg/kg	6.49E-07	mg/kg-day	--	--	--	4.54E-05	mg/kg-day	8.00E-04	mg/kg-day	6.E-02
				Vanadium	37.37	mg/kg	5.17E-08	mg/kg-day	--	--	--	3.62E-06	mg/kg-day	1.80E-04	mg/kg-day	2.E-02
				Aroclor 1254	0.176	mg/kg	3.41E-09	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	7.E-09	2.39E-07	mg/kg-day	5.00E-05	mg/kg-day	5.E-03
			Exp. Route Total								2.E-08					1.E-01
		Exposure Point Total									2.E-07					6.E-01
	Exposure Medium Total										2.E-07					6.E-01

TABLE E.3-7.4.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Construction Worker
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Fugitive Dust	Inhalation	Aluminum	18,553	mg/kg	3.23E-05	mg/kg-day	--	--	--	2.26E-03	mg/kg-day	1.00E-03	mg/kg-day	2.E+00
				Arsenic	2.581	mg/kg	4.49E-09	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	7.E-08	3.14E-07	mg/kg-day	--	--	--
				Chromium	34.52	mg/kg	6.01E-08	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	2.E-06	4.20E-06	mg/kg-day	2.90E-05	mg/kg-day	1.E-01
				Cobalt	10.16	mg/kg	1.77E-08	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	2.E-07	1.24E-06	mg/kg-day	5.70E-06	mg/kg-day	2.E-01
				Iron	26,000	mg/kg	4.52E-05	mg/kg-day	--	--	--	3.17E-03	mg/kg-day	--	--	--
				Manganese	468.9	mg/kg	8.16E-07	mg/kg-day	--	--	--	5.71E-05	mg/kg-day	1.43E-05	mg/kg-day	4.E+00
				Vanadium	37.37	mg/kg	6.50E-08	mg/kg-day	--	--	--	4.55E-06	mg/kg-day	--	--	--
				Aroclor 1254	0.176	mg/kg	3.06E-10	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	6.E-10	2.14E-08	mg/kg-day	--	--	--
			Exp. Route Total								3.E-06					7.E+00
		Exposure Point Total									3.E-06					7.E+00
	Exposure Medium Total										3.E-06					7.E+00
Soil Total											3.E-06					7.E+00
Groundwater	Air	Upward Migration of Vapors from Groundwater Trench Vapors (1)	Inhalation	Chloroform	1.46E-05	mg/m^3	2.05E-08	mg/kg-day	8.10E-02	mg/kg-day $^{-1}$	2.E-09	1.43E-06	mg/kg-day	5.70E-06	mg/kg-day	3.E-01
			Exp. Route Total								2.E-09					3.E-01
		Exposure Point Total									2.E-09					3.E-01
	Exposure Medium Total										2.E-09					3.E-01
Groundwater Total											2.E-09					3.E-01
											Total of Receptor Risks Across All Media					7.E+00
											3.E-06	Total of Receptor Hazards Across All Media				

(1) See Table E.3-4.8 for trench vapor calculations

TABLE E.3-7.5.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Soil	Soil	Ingestion	Aluminum	19,542	mg/kg	9.18E-03	mg/kg-day	--	--	--	2.68E-02	mg/kg-day	1.00E+00	mg/kg-day	3.E-02
				Arsenic	2.961	mg/kg	1.39E-06	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.E-06	4.06E-06	mg/kg-day	3.00E-04	mg/kg-day	1.E-02
				Chromium	58.76	mg/kg	2.76E-05	mg/kg-day	--	--	--	8.05E-05	mg/kg-day	3.00E-03	mg/kg-day	3.E-02
				Cobalt	9.44	mg/kg	4.43E-06	mg/kg-day	--	--	--	1.29E-05	mg/kg-day	2.00E-02	mg/kg-day	6.E-04
				Iron	24,942	mg/kg	1.17E-02	mg/kg-day	--	--	--	3.42E-02	mg/kg-day	7.00E-01	mg/kg-day	5.E-02
				Manganese	490.2	mg/kg	2.30E-04	mg/kg-day	--	--	--	6.72E-04	mg/kg-day	2.00E-02	mg/kg-day	3.E-02
				Vanadium	34.56	mg/kg	1.62E-05	mg/kg-day	--	--	--	4.73E-05	mg/kg-day	1.00E-03	mg/kg-day	5.E-02
				Aroclor 1254	0.454	mg/kg	2.13E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	4.E-07	6.22E-07	mg/kg-day	2.00E-05	mg/kg-day	3.E-02
			Exp. Route Total								3.E-06					2.E-01
			Dermal Absorption	Aluminum	19,542	mg/kg	3.66E-04	mg/kg-day	--	--	--	1.07E-03	mg/kg-day	1.00E+00	mg/kg-day	1.E-03
				Arsenic	2.961	mg/kg	1.66E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.E-07	4.86E-07	mg/kg-day	3.00E-04	mg/kg-day	2.E-03
				Chromium	58.76	mg/kg	1.10E-06	mg/kg-day	--	--	--	3.21E-06	mg/kg-day	7.50E-05	mg/kg-day	4.E-02
				Cobalt	9.44	mg/kg	1.77E-07	mg/kg-day	--	--	--	5.16E-07	mg/kg-day	2.00E-02	mg/kg-day	3.E-05
				Iron	24,942	mg/kg	4.67E-04	mg/kg-day	--	--	--	1.36E-03	mg/kg-day	7.00E-01	mg/kg-day	2.E-03
				Manganese	490.2	mg/kg	9.19E-06	mg/kg-day	--	--	--	2.68E-05	mg/kg-day	8.00E-04	mg/kg-day	3.E-02
				Vanadium	34.56	mg/kg	6.48E-07	mg/kg-day	--	--	--	1.89E-06	mg/kg-day	2.60E-05	mg/kg-day	7.E-02
				Aroclor 1254	0.454	mg/kg	1.19E-07	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-07	3.47E-07	mg/kg-day	2.00E-05	mg/kg-day	2.E-02
			Exp. Route Total								5.E-07					2.E-01
		Exposure Point Total									3.E-06					4.E-01
	Exposure Medium Total										3.E-06					4.E-01
	Air	Fugitive Dust	Inhalation	Aluminum	19,542	mg/kg	1.64E-07	mg/kg-day	--	--	--	4.79E-07	mg/kg-day	1.00E-03	mg/kg-day	5.E-04
				Arsenic	2.961	mg/kg	2.49E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	4.E-10	7.26E-11	mg/kg-day	--	--	--
				Chromium	58.76	mg/kg	4.94E-10	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	2.E-08	1.44E-09	mg/kg-day	2.90E-05	mg/kg-day	5.E-05
				Cobalt	9.44	mg/kg	7.94E-11	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	8.E-10	2.32E-10	mg/kg-day	5.70E-06	mg/kg-day	4.E-05
				Iron	24,942	mg/kg	2.10E-07	mg/kg-day	--	--	--	6.12E-07	mg/kg-day	--	--	--
				Manganese	490.2	mg/kg	4.12E-09	mg/kg-day	--	--	--	1.20E-08	mg/kg-day	1.43E-05	mg/kg-day	8.E-04
				Vanadium	34.56	mg/kg	2.91E-10	mg/kg-day	--	--	--	8.48E-10	mg/kg-day	--	--	--
				Aroclor 1254	0.454	mg/kg	3.82E-12	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	8.E-12	1.11E-11	mg/kg-day	--	--	--
			Exp. Route Total								2.E-08					1.E-03
		Exposure Point Total									2.E-08					1.E-03
	Exposure Medium Total										2.E-08					1.E-03
Soil Total											3.E-06					4.E-01
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	2.2	ug/L	2.07E-05	mg/kg-day	--	--	--	6.03E-05	mg/kg-day	2.00E-02	mg/kg-day	3.E-03
				Manganese	1,050	ug/L	9.86E-03	mg/kg-day	--	--	--	2.88E-02	mg/kg-day	2.00E-02	mg/kg-day	1.E+00
				Chloroform	1.7	ug/L	1.60E-05	mg/kg-day	--	--	--	4.66E-05	mg/kg-day	1.00E-02	mg/kg-day	5.E-03
			Exp. Route Total								--					1.4.E+00
			Dermal Absorption	Cobalt	2.2	ug/L	4.31E-08	mg/kg-day	--	--	--	1.26E-07	mg/kg-day	2.00E-02	mg/kg-day	6.E-06
				Manganese	1,050	ug/L	5.15E-05	mg/kg-day	--	--	--	1.50E-04	mg/kg-day	8.00E-04	mg/kg-day	2.E-01
				Chloroform	1.7	ug/L	1.81E-07	mg/kg-day	--	--	--	5.27E-07	mg/kg-day	1.00E-02	mg/kg-day	5.E-05
			Exp. Route Total								--					2.E-01
		Exposure Point Total									--					1.6.E+00
	Exposure Medium Total										--					1.6.E+00

TABLE E.3-7.5.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groudwater Cont.	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	6.61E-06	mg/m^3	4.23E-07	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	3.E-08	1.23E-06	mg/kg-day	1.40E-02	mg/kg-day	9.E-05
			Exp. Route Total								3.E-08					9.E-05
		Exposure Point Total									3.E-08					9.E-05
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	1.35E-01	mg/m^3	1.38E-04	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	1.E-05	3.21E-04	mg/kg-day	1.40E-02	mg/kg-day	2.E-02
			Exp. Route Total								1.E-05					2.E-02
		Exposure Point Total									1.E-05					2.E-02
	Exposure Medium Total										1.E-05					2.E-02
Groundwater Total											1.E-05					1.7.E+00
										Total of Receptor Risks Across All Media	1.E-05			Total of Receptor Hazards Across All Media		2.E+00

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.3-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.3-4.7)

TABLE E.3-7.6.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	18,553	mg/kg	8.71E-03	mg/kg-day	--	--	--	2.54E-02	mg/kg-day	1.00E+00	mg/kg-day	3.E-02
				Arsenic	2.581	mg/kg	1.21E-06	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.E-06	3.54E-06	mg/kg-day	3.00E-04	mg/kg-day	1.E-02
				Chromium	34.52	mg/kg	1.62E-05	mg/kg-day	--	--	--	4.73E-05	mg/kg-day	3.00E-03	mg/kg-day	2.E-02
				Cobalt	10.16	mg/kg	4.77E-06	mg/kg-day	--	--	--	1.39E-05	mg/kg-day	2.00E-02	mg/kg-day	7.E-04
				Iron	26,000	mg/kg	1.22E-02	mg/kg-day	--	--	--	3.56E-02	mg/kg-day	7.00E-01	mg/kg-day	5.E-02
				Manganese	468.9	mg/kg	2.20E-04	mg/kg-day	--	--	--	6.42E-04	mg/kg-day	2.00E-02	mg/kg-day	3.E-02
				Vanadium	37.37	mg/kg	1.76E-05	mg/kg-day	--	--	--	5.12E-05	mg/kg-day	1.00E-03	mg/kg-day	5.E-02
				Aroclor 1254	0.176	mg/kg	8.27E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	2.E-07	2.41E-07	mg/kg-day	2.00E-05	mg/kg-day	1.E-02
			Exp. Route Total								2.E-06					2.E-01
			Dermal Absorption	Aluminum	18,553	mg/kg	3.48E-04	mg/kg-day	--	--	--	1.01E-03	mg/kg-day	1.00E+00	mg/kg-day	1.E-03
				Arsenic	2.581	mg/kg	1.45E-07	mg/kg-day	1.50E+00	mg/kg-day $^{-1}$	2.E-07	4.23E-07	mg/kg-day	3.00E-04	mg/kg-day	1.E-03
				Chromium	34.52	mg/kg	6.47E-07	mg/kg-day	--	--	--	1.89E-06	mg/kg-day	7.50E-05	mg/kg-day	3.E-02
				Cobalt	10.16	mg/kg	1.90E-07	mg/kg-day	--	--	--	5.55E-07	mg/kg-day	2.00E-02	mg/kg-day	3.E-05
				Iron	26,000	mg/kg	4.87E-04	mg/kg-day	--	--	--	1.42E-03	mg/kg-day	7.00E-01	mg/kg-day	2.E-03
				Manganese	468.9	mg/kg	8.79E-06	mg/kg-day	--	--	--	2.56E-05	mg/kg-day	8.00E-04	mg/kg-day	3.E-02
				Vanadium	37.37	mg/kg	7.00E-07	mg/kg-day	--	--	--	2.04E-06	mg/kg-day	2.60E-05	mg/kg-day	8.E-02
				Aroclor 1254	0.176	mg/kg	4.62E-08	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	9.E-08	1.35E-07	mg/kg-day	2.00E-05	mg/kg-day	7.E-03
			Exp. Route Total								3.E-07					1.E-01
		Exposure Point Total									2.E-06					3.E-01
	Exposure Medium Total										2.E-06					3.E-01
	Air	Fugitive Dust	Inhalation	Aluminum	18,553	mg/kg	1.56E-07	mg/kg-day	--	--	--	4.55E-07	mg/kg-day	1.00E-03	mg/kg-day	5.E-04
				Arsenic	2.581	mg/kg	2.17E-11	mg/kg-day	1.50E+01	mg/kg-day $^{-1}$	3.E-10	6.33E-11	mg/kg-day	--	--	--
				Chromium	34.52	mg/kg	2.90E-10	mg/kg-day	4.10E+01	mg/kg-day $^{-1}$	1.E-08	8.47E-10	mg/kg-day	2.90E-05	mg/kg-day	3.E-05
				Cobalt	10.16	mg/kg	8.55E-11	mg/kg-day	9.80E+00	mg/kg-day $^{-1}$	8.E-10	2.49E-10	mg/kg-day	5.70E-06	mg/kg-day	4.E-05
				Iron	26,000	mg/kg	2.19E-07	mg/kg-day	--	--	--	6.38E-07	mg/kg-day	--	--	--
				Manganese	468.9	mg/kg	3.94E-09	mg/kg-day	--	--	--	1.15E-08	mg/kg-day	1.43E-05	mg/kg-day	8.E-04
				Vanadium	37.37	mg/kg	3.14E-10	mg/kg-day	--	--	--	9.17E-10	mg/kg-day	--	--	--
				Aroclor 1254	0.176	mg/kg	1.48E-12	mg/kg-day	2.00E+00	mg/kg-day $^{-1}$	3.E-12	4.32E-12	mg/kg-day	--	--	--
			Exp. Route Total								1.E-08					1.E-03
		Exposure Point Total									1.E-08					1.E-03
	Exposure Medium Total										1.E-08					1.E-03
Soil Total											2.E-06					3.E-01
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	2.2	ug/L	2.07E-05	mg/kg-day	--	--	--	6.03E-05	mg/kg-day	2.00E-02	mg/kg-day	3.E-03
				Manganese	1,050	ug/L	9.86E-03	mg/kg-day	--	--	--	2.88E-02	mg/kg-day	2.00E-02	mg/kg-day	1.E+00
				Chloroform	1.7	ug/L	1.60E-05	mg/kg-day	--	--	--	4.66E-05	mg/kg-day	1.00E-02	mg/kg-day	5.E-03
			Exp. Route Total								--					1.4.E+00
			Dermal Absorption	Cobalt	2.2	ug/L	4.31E-08	mg/kg-day	--	--	--	1.26E-07	mg/kg-day	2.00E-02	mg/kg-day	6.E-06
				Manganese	1,050	ug/L	5.15E-05	mg/kg-day	--	--	--	1.50E-04	mg/kg-day	8.00E-04	mg/kg-day	2.E-01
				Chloroform	1.7	ug/L	1.81E-07	mg/kg-day	--	--	--	5.27E-07	mg/kg-day	1.00E-02	mg/kg-day	5.E-05
			Exp. Route Total								--					2.E-01
		Exposure Point Total									--					1.6.E+00
	Exposure Medium Total										--					1.6.E+00

TABLE E.3-7.6.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Adult Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	6.61E-06	mg/m^3	4.23E-07	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	3.E-08	1.23E-06	mg/kg-day	1.40E-02	mg/kg-day	9.E-05
			Exp. Route Total								3.E-08					9.E-05
		Exposure Point Total									3.E-08					9.E-05
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	1.35E-01	mg/m^3	1.38E-04	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	1.E-05	3.21E-04	mg/kg-day	1.40E-02	mg/kg-day	2.E-02
			Exp. Route Total								1.E-05					2.E-02
		Exposure Point Total									1.E-05					2.E-02
	Exposure Medium Total										1.E-05					2.E-02
Groundwater Total											1.E-05					1.7.E+00
											Total of Receptor Risks Across All Media	1.E-05	Total of Receptor Hazards Across All Media			2.E+00

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.3-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.3-4.7)

TABLE E.3-7.7.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil	Soil	Soil	Ingestion	Aluminum	19,542	mg/kg	2.14E-02	mg/kg-day	--	--	--	2.50E-01	mg/kg-day	1.00E+00	mg/kg-day	2.E-01
				Arsenic	2.961	mg/kg	3.24E-06	mg/kg-day	1.50E+00	mg/kg-day^{-1}	5.E-06	3.79E-05	mg/kg-day	3.00E-04	mg/kg-day	1.E-01
				Chromium	58.76	mg/kg	6.44E-05	mg/kg-day	--	--	--	7.51E-04	mg/kg-day	3.00E-03	mg/kg-day	3.E-01
				Cobalt	9.44	mg/kg	1.03E-05	mg/kg-day	--	--	--	1.21E-04	mg/kg-day	2.00E-02	mg/kg-day	6.E-03
				Iron	24,942	mg/kg	2.73E-02	mg/kg-day	--	--	--	3.19E-01	mg/kg-day	7.00E-01	mg/kg-day	5.E-01
				Manganese	490.2	mg/kg	5.37E-04	mg/kg-day	--	--	--	6.27E-03	mg/kg-day	2.00E-02	mg/kg-day	3.E-01
				Vanadium	34.56	mg/kg	3.79E-05	mg/kg-day	--	--	--	4.42E-04	mg/kg-day	1.00E-03	mg/kg-day	4.E-01
				Aroclor 1254	0.454	mg/kg	4.98E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	1.E-06	5.80E-06	mg/kg-day	2.00E-05	mg/kg-day	3.E-01
			Exp. Route Total								6.E-06					2.E+00
			Dermal Absorption	Aluminum	19,542	mg/kg	6.00E-04	mg/kg-day	--	--	--	7.00E-03	mg/kg-day	1.00E+00	mg/kg-day	7.E-03
				Arsenic	2.961	mg/kg	2.73E-07	mg/kg-day	1.50E+00	mg/kg-day^{-1}	4.E-07	3.18E-06	mg/kg-day	3.00E-04	mg/kg-day	1.E-02
				Chromium	58.76	mg/kg	1.80E-06	mg/kg-day	--	--	--	2.10E-05	mg/kg-day	7.50E-05	mg/kg-day	3.E-01
				Cobalt	9.44	mg/kg	2.90E-07	mg/kg-day	--	--	--	3.38E-06	mg/kg-day	2.00E-02	mg/kg-day	2.E-04
				Iron	24,942	mg/kg	7.65E-04	mg/kg-day	--	--	--	8.93E-03	mg/kg-day	7.00E-01	mg/kg-day	1.E-02
				Manganese	490.2	mg/kg	1.50E-05	mg/kg-day	--	--	--	1.75E-04	mg/kg-day	8.00E-04	mg/kg-day	2.E-01
				Vanadium	34.56	mg/kg	1.06E-06	mg/kg-day	--	--	--	1.24E-05	mg/kg-day	2.60E-05	mg/kg-day	5.E-01
				Aroclor 1254	0.454	mg/kg	1.95E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	4.E-07	2.28E-06	mg/kg-day	2.00E-05	mg/kg-day	1.E-01
			Exp. Route Total								8.E-07					1.E+00
		Exposure Point Total									7.E-06					3.E+00
	Exposure Medium Total										7.E-06					3.E+00
	Air	Fugitive Dust	Inhalation	Aluminum	19,542	mg/kg	3.47E-07	mg/kg-day	--	--	--	4.04E-06	mg/kg-day	1.00E-03	mg/kg-day	4.E-03
				Arsenic	2.961	mg/kg	5.25E-11	mg/kg-day	1.50E+01	mg/kg-day^{-1}	8.E-10	6.13E-10	mg/kg-day	--	--	--
				Chromium	58.76	mg/kg	1.04E-09	mg/kg-day	4.10E+01	mg/kg-day^{-1}	4.E-08	1.22E-08	mg/kg-day	2.90E-05	mg/kg-day	4.E-04
				Cobalt	9.44	mg/kg	1.67E-10	mg/kg-day	9.80E+00	mg/kg-day^{-1}	2.E-09	1.95E-09	mg/kg-day	5.70E-06	mg/kg-day	3.E-04
				Iron	24,942	mg/kg	4.42E-07	mg/kg-day	--	--	--	5.16E-06	mg/kg-day	--	--	--
				Manganese	490.2	mg/kg	8.69E-09	mg/kg-day	--	--	--	1.01E-07	mg/kg-day	1.43E-05	mg/kg-day	7.E-03
				Vanadium	34.56	mg/kg	6.13E-10	mg/kg-day	--	--	--	7.15E-09	mg/kg-day	--	--	--
				Aroclor 1254	0.454	mg/kg	8.05E-12	mg/kg-day	2.00E+00	mg/kg-day^{-1}	2.E-11	9.39E-11	mg/kg-day	--	--	--
			Exp. Route Total								5.E-08					1.E-02
		Exposure Point Total									5.E-08					1.E-02
	Exposure Medium Total										5.E-08					1.E-02
Soil Total											7.E-06					3.E+00

TABLE E.3-7.7.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	2.2	ug/L	1.21E-05	mg/kg-day	--	--	--	1.41E-04	mg/kg-day	2.00E-02	mg/kg-day	7.E-03
				Manganese	1,050	ug/L	5.75E-03	mg/kg-day	--	--	--	6.71E-02	mg/kg-day	2.00E-02	mg/kg-day	3.E+00
				Chloroform	1.7	ug/L	9.32E-06	mg/kg-day	--	--	--	1.09E-04	mg/kg-day	1.00E-02	mg/kg-day	1.E-02
			Exp. Route Total								--					3.E+00
			Dermal Absorption	Cobalt	2.2	ug/L	3.18E-08	mg/kg-day	--	--	--	3.71E-07	mg/kg-day	2.00E-02	mg/kg-day	2.E-05
				Manganese	1,050	ug/L	3.80E-05	mg/kg-day	--	--	--	4.43E-04	mg/kg-day	8.00E-04	mg/kg-day	6.E-01
				Chloroform	1.7	ug/L	1.17E-07	mg/kg-day	--	--	--	1.37E-06	mg/kg-day	1.00E-02	mg/kg-day	1.E-04
			Exp. Route Total								--					6.E-01
		Exposure Point Total									--					4.E+00
	Exposure Medium Total										--					4.E+00
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	6.61E-06	mg/m^3	3.26E-07	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	3.E-08	3.80E-06	mg/kg-day	1.40E-02	mg/kg-day	3.E-04
			Exp. Route Total								3.E-08					3.E-04
		Exposure Point Total									3.E-08					3.E-04
	Exposure Medium Total										3.E-08					3.E-04
Groundwater Total											3.E-08					4.E+00
											Total of Receptor Risks Across All Media					7.E-06
												Total of Receptor Hazards Across All Media				7.E+00

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.3-4.6)

TABLE E.3-7.8.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Total Soil	Soil	Soil	Ingestion	Aluminum	18,553	mg/kg	2.03E-02	mg/kg-day	--	--	--	2.37E-01	mg/kg-day	1.00E+00	mg/kg-day	2.E-01
				Arsenic	2.581	mg/kg	2.83E-06	mg/kg-day	1.50E+00	mg/kg-day^{-1}	4.E-06	3.30E-05	mg/kg-day	3.00E-04	mg/kg-day	1.E-01
				Chromium	34.52	mg/kg	3.78E-05	mg/kg-day	--	--	--	4.41E-04	mg/kg-day	3.00E-03	mg/kg-day	1.E-01
				Cobalt	10.16	mg/kg	1.11E-05	mg/kg-day	--	--	--	1.30E-04	mg/kg-day	2.00E-02	mg/kg-day	6.E-03
				Iron	26,000	mg/kg	2.85E-02	mg/kg-day	--	--	--	3.32E-01	mg/kg-day	7.00E-01	mg/kg-day	5.E-01
				Manganese	468.9	mg/kg	5.14E-04	mg/kg-day	--	--	--	6.00E-03	mg/kg-day	2.00E-02	mg/kg-day	3.E-01
				Vanadium	37.37	mg/kg	4.10E-05	mg/kg-day	--	--	--	4.78E-04	mg/kg-day	1.00E-03	mg/kg-day	5.E-01
				Aroclor 1254	0.176	mg/kg	1.93E-07	mg/kg-day	2.00E+00	mg/kg-day^{-1}	4.E-07	2.25E-06	mg/kg-day	2.00E-05	mg/kg-day	1.E-01
			Exp. Route Total								5.E-06					2.E+00
			Dermal Absorption	Aluminum	18,553	mg/kg	5.69E-04	mg/kg-day	--	--	--	6.64E-03	mg/kg-day	1.00E+00	mg/kg-day	7.E-03
				Arsenic	2.581	mg/kg	2.38E-07	mg/kg-day	1.50E+00	mg/kg-day^{-1}	4.E-07	2.77E-06	mg/kg-day	3.00E-04	mg/kg-day	9.E-03
				Chromium	34.52	mg/kg	1.06E-06	mg/kg-day	--	--	--	1.24E-05	mg/kg-day	7.50E-05	mg/kg-day	2.E-01
				Cobalt	10.16	mg/kg	3.12E-07	mg/kg-day	--	--	--	3.64E-06	mg/kg-day	2.00E-02	mg/kg-day	2.E-04
				Iron	26,000	mg/kg	7.98E-04	mg/kg-day	--	--	--	9.31E-03	mg/kg-day	7.00E-01	mg/kg-day	1.E-02
				Manganese	468.9	mg/kg	1.44E-05	mg/kg-day	--	--	--	1.68E-04	mg/kg-day	8.00E-04	mg/kg-day	2.E-01
				Vanadium	37.37	mg/kg	1.15E-06	mg/kg-day	--	--	--	1.34E-05	mg/kg-day	2.60E-05	mg/kg-day	5.E-01
				Aroclor 1254	0.176	mg/kg	7.56E-08	mg/kg-day	2.00E+00	mg/kg-day^{-1}	2.E-07	8.82E-07	mg/kg-day	2.00E-05	mg/kg-day	4.E-02
			Exp. Route Total								5.E-07					1.E+00
		Exposure Point Total									5.E-06					3.E+00
	Exposure Medium Total										5.E-06					3.E+00
	Air	Fugitive Dust	Inhalation	Aluminum	18,553	mg/kg	3.29E-07	mg/kg-day	--	--	--	3.84E-06	mg/kg-day	1.00E-03	mg/kg-day	4.E-03
				Arsenic	2.581	mg/kg	4.58E-11	mg/kg-day	1.50E+01	mg/kg-day^{-1}	7.E-10	5.34E-10	mg/kg-day	--	--	--
				Chromium	34.52	mg/kg	6.12E-10	mg/kg-day	4.10E+01	mg/kg-day^{-1}	3.E-08	7.14E-09	mg/kg-day	2.90E-05	mg/kg-day	2.E-04
				Cobalt	10.16	mg/kg	1.80E-10	mg/kg-day	9.80E+00	mg/kg-day^{-1}	2.E-09	2.10E-09	mg/kg-day	5.70E-06	mg/kg-day	4.E-04
				Iron	26,000	mg/kg	4.61E-07	mg/kg-day	--	--	--	5.38E-06	mg/kg-day	--	--	--
				Manganese	468.9	mg/kg	8.32E-09	mg/kg-day	--	--	--	9.70E-08	mg/kg-day	1.43E-05	mg/kg-day	7.E-03
				Vanadium	37.37	mg/kg	6.63E-10	mg/kg-day	--	--	--	7.73E-09	mg/kg-day	--	--	--
				Aroclor 1254	0.176	mg/kg	3.12E-12	mg/kg-day	2.00E+00	mg/kg-day^{-1}	6.E-12	3.64E-11	mg/kg-day	--	--	--
			Exp. Route Total								3.E-08					1.E-02
		Exposure Point Total									3.E-08					1.E-02
	Exposure Medium Total										3.E-08					1.E-02
Soil Total											5.E-06					3.E+00

TABLE E.3-7.8.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Child Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	2.2	ug/L	1.21E-05	mg/kg-day	--	--	--	1.41E-04	mg/kg-day	2.00E-02	mg/kg-day	7.E-03
				Manganese	1,050	ug/L	5.75E-03	mg/kg-day	--	--	--	6.71E-02	mg/kg-day	2.00E-02	mg/kg-day	3.E+00
				Chloroform	1.7	ug/L	9.32E-06	mg/kg-day	--	--	--	1.09E-04	mg/kg-day	1.00E-02	mg/kg-day	1.E-02
			Exp. Route Total								--					3.E+00
			Dermal Absorption	Cobalt	2.2	ug/L	3.18E-08	mg/kg-day	--	--	--	3.71E-07	mg/kg-day	2.00E-02	mg/kg-day	2.E-05
				Manganese	1,050	ug/L	3.80E-05	mg/kg-day	--	--	--	4.43E-04	mg/kg-day	8.00E-04	mg/kg-day	6.E-01
				Chloroform	1.7	ug/L	1.17E-07	mg/kg-day	--	--	--	1.37E-06	mg/kg-day	1.00E-02	mg/kg-day	1.E-04
			Exp. Route Total								--					6.E-01
		Exposure Point Total									--					4.E+00
	Exposure Medium Total										--					4.E+00
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	6.61E-06	mg/m^3	3.26E-07	mg/kg-day	8.10E-02	$mg/kg\text{-}day^{-1}$	3.E-08	3.80E-06	mg/kg-day	1.40E-02	mg/kg-day	3.E-04
			Exp. Route Total								3.E-08					3.E-04
		Exposure Point Total									3.E-08					3.E-04
	Exposure Medium Total										3.E-08					3.E-04
Groundwater Total											3.E-08					4.E+00
											Total of Receptor Risks Across All Media					5.E-06
												Total of Receptor Hazards Across All Media				7.E+00

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.3-4.6)

TABLE E.3-7.9.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Future
Receptor Population	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Surface Soil	Soil	Soil	Ingestion	Aluminum	19,542	mg/kg	--
				Arsenic	2.961	mg/kg	7.E-06
				Chromium	58.76	mg/kg	--
				Cobalt	9.44	mg/kg	--
				Iron	24,942	mg/kg	--
				Manganese	490.2	mg/kg	--
				Vanadium	34.56	mg/kg	--
				Aroclor 1254	0.454	mg/kg	1.E-06
			Exp. Route Total				8.E-06
			Dermal Absorption	Aluminum	19,542	mg/kg	--
				Arsenic	2.961	mg/kg	7.E-07
				Chromium	58.76	mg/kg	--
				Cobalt	9.44	mg/kg	--
				Iron	24,942	mg/kg	--
				Manganese	490.2	mg/kg	--
				Vanadium	34.56	mg/kg	--
				Aroclor 1254	0.454	mg/kg	6.E-07
			Exp. Route Total				1.E-06
		Exposure Point Total					1.E-05
	Exposure Medium Total						1.E-05
	Air	Fugitive Dust	Inhalation	Aluminum	19,542	mg/kg	--
				Arsenic	2.961	mg/kg	1.E-09
				Chromium	58.76	mg/kg	6.E-08
				Cobalt	9.44	mg/kg	2.E-09
				Iron	24,942	mg/kg	--
				Manganese	490.2	mg/kg	--
				Vanadium	34.56	mg/kg	--
				Aroclor 1254	0.454	mg/kg	2.E-11
			Exp. Route Total				7.E-08
		Exposure Point Total					7.E-08
	Exposure Medium Total						7.E-08
Soil Total							1.E-05

TABLE E.3-7.9.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Future
Receptor Population	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	2.2	ug/L	--
				Manganese	1,050	ug/L	--
				Chloroform	1.7	ug/L	--
			Exp. Route Total				--
			Dermal Absorption	Cobalt	2.2	ug/L	--
				Manganese	1,050	ug/L	--
				Chloroform	1.7	ug/L	--
			Exp. Route Total				--
		Exposure Point Total					--
	Exposure Medium Total						--
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	6.61E-06	mg/m^3	6.E-08
			Exp. Route Total				6.E-08
		Exposure Point Total					6.E-08
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	0.14	mg/m^3	1.E-05
			Exp. Route Total				1.E-05
		Exposure Point Total					1.E-05
	Exposure Medium Total						1.E-05
Groundwater Total							1.E-05
							2.E-05

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.3-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.3-4.7)

TABLE E.3-7.10.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Future
Receptor Population	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Total Soil	Soil	Soil	Ingestion	Aluminum	18553	mg/kg	--
				Arsenic	2.581	mg/kg	6.E-06
				Chromium	34.52	mg/kg	--
				Cobalt	10.16	mg/kg	--
				Iron	26,000	mg/kg	--
				Manganese	468.9	mg/kg	--
				Vanadium	37.37	mg/kg	--
				Aroclor 1254	0.176	mg/kg	6.E-07
			Exp. Route Total				7.E-06
			Dermal Absorption	Aluminum	18553	mg/kg	--
				Arsenic	2.581	mg/kg	6.E-07
				Chromium	34.52	mg/kg	--
				Cobalt	10.16	mg/kg	--
				Iron	26,000	mg/kg	--
				Manganese	468.9	mg/kg	--
				Vanadium	37.37	mg/kg	--
				Aroclor 1254	0.176	mg/kg	2.E-07
			Exp. Route Total				8.E-07
		Exposure Point Total					7.E-06
	Exposure Medium Total						7.E-06
	Air	Fugitive Dust	Inhalation	Aluminum	18553	mg/kg	--
				Arsenic	2.581	mg/kg	1.E-09
				Chromium	34.52	mg/kg	4.E-08
				Cobalt	10.16	mg/kg	3.E-09
				Iron	26,000	mg/kg	--
				Manganese	468.9	mg/kg	--
				Vanadium	37.37	mg/kg	--
				Aroclor 1254	0.176	mg/kg	9.E-12
			Exp. Route Total				4.E-08
		Exposure Point Total					4.E-08
	Exposure Medium Total						4.E-08
Soil Total							7.E-06

TABLE E.3-7.10.RME
Calculation of Chemical Cancer Risks and Non-Cancer Hazards - SWMU 38/AOC Q
Reasonable Maximum Exposure - Lifetime Resident
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe	Future
Receptor Population	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Cancer Risk
Groundwater	Groundwater	Groundwater used for Tap Water	Ingestion	Cobalt	2.2	ug/L	--
				Manganese	1,050	ug/L	--
				Chloroform	1.7	ug/L	--
			Exp. Route Total				--
			Dermal Absorption	Cobalt	2.2	ug/L	--
				Manganese	1,050	ug/L	--
				Chloroform	1.7	ug/L	--
			Exp. Route Total				--
		Exposure Point Total					--
	Exposure Medium Total						--
	Air	Upward Migration of Vapors from Groundwater (Indoor) (1)	Inhalation	Chloroform	6.61E-06	mg/m^3	6.E-08
			Exp. Route Total				6.E-08
		Exposure Point Total					6.E-08
		Vapors While Showering with Groundwater (2)	Inhalation	Chloroform	0.14	mg/m^3	1.E-05
			Exp. Route Total				1.E-05
		Exposure Point Total					1.E-05
	Exposure Medium Total						1.E-05
Groundwater Total							1.E-05
							2.E-05

(1) Receptor assessed using the Johnson and Ettinger Model (see Table E.3-4.6)
(2) Receptor assessed using shower model from Foster and Chrostowski (1989) (See Table E.3-4.7)

TABLE E.3-9.1.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Maintenance Worker - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Receptor Population:	Maintenance Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	4.E-03	--	1.E-04	4.E-03
			Arsenic	3.1.E-07	--	3.E-08	3.E-07	Arsenic	skin/ vascular	2.E-03	--	2.E-04	2.E-03
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	4.E-03	--	5.E-03	9.E-03
			Cobalt	--	--	--	--	Cobalt	blood	9.E-05	--	3.E-06	1.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	7.E-03	--	2.E-04	7.E-03
			Manganese	--	--	--	--	Manganese	CNS	5.E-03	--	4.E-03	9.E-03
			Vanadium	--	--	--	--	Vanadium	kidney	7.E-03	--	9.E-03	2.E-02
			Aroclor 1254	6.3.E-08	--	3.E-08	9.E-08	Aroclor 1254	eyes	4.E-03	--	2.E-03	6.E-03
				4.E-07	--	6.E-08	4.3.E-07			3.E-02	--	2.E-02	5.E-02
		Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-04	--	5.E-04
			Arsenic	--	4.E-10	--	4.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	2.E-08	--	2.E-08	Chromium	respiratory	--	5.E-05	--	5.E-05
			Cobalt	--	8.E-10	--	8.E-10	Cobalt	respiratory	--	4.E-05	--	4.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	9.E-04	--	9.E-04
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	8.E-12	--	8.E-12	Aroclor 1254	NA	--	--	--	--
				--	2.E-08	--	2.E-08			--	1.E-03	--	1.E-03
						Total Risk Across Soil	5.E-07					Total Hazard Index Across Soil	5.E-02

Total Risk Across All Media and All Exposure Routes	5.E-07

Total Hazard Index Across All Media and All Exposure Routes	5.E-02

Total blood HI across all media =	7.E-03
Total CNS HI across all media =	1.E-02
Total skin HI across all media =	2.E-03
Total respiratory HI across all media =	9.E-05
Total GI tract HI across all media =	2.E-02
Total kidney HI across all media =	2.E-02
Total liver HI across all media =	2.E-02
Total vascular HI across all media =	2.E-03
Total eyes HI across all media =	6.E-03
Total bone marrow HI across all media =	9.E-03
Total fetus HI across all media =	9.E-03

TABLE E.3-9.2.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Maintenance Worker - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Current/Future
Receptor Population:	Maintenance Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	4.E-03	--	1.E-04	4.E-03
			Arsenic	2.7.E-07	--	3.E-08	3.E-07	Arsenic	skin/ vascular	2.E-03	--	2.E-04	2.E-03
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	2.E-03	--	3.E-03	5.E-03
			Cobalt	--	--	--	--	Cobalt	blood	1.E-04	--	3.E-06	1.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	7.E-03	--	2.E-04	8.E-03
			Manganese	--	--	--	--	Manganese	CNS	5.E-03	--	4.E-03	8.E-03
			Vanadium	--	--	--	--	Vanadium	kidney	7.E-03	--	9.E-03	2.E-02
			Aroclor 1254	2.5.E-08	--	1.E-08	4.E-08	Aroclor 1254	eyes	2.E-03	--	8.E-04	3.E-03
				3.E-07	--	4.E-08	3.3.E-07			3.E-02	--	2.E-02	5.E-02
		Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-04	--	5.E-04
			Arsenic	--	4.E-10	--	4.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	1.E-08	--	1.E-08	Chromium	respiratory	--	3.E-05	--	3.E-05
			Cobalt	--	9.E-10	--	9.E-10	Cobalt	respiratory	--	5.E-05	--	5.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	8.E-04	--	8.E-04
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	3.E-12	--	3.E-12	Aroclor 1254	NA	--	--	--	--
				--	1.E-08	--	1.E-08			--	1.E-03	--	1.E-03
						Total Risk Across Soil	3.E-07					Total Hazard Index Across Soil	5.E-02

Total Risk Across All Media and All Exposure Routes	3.E-07
Total Hazard Index Across All Media and All Exposure Routes	5.E-02

Total blood HI across all media =	8.E-03
Total CNS HI across all media =	1.E-02
Total skin HI across all media =	2.E-03
Total respiratory HI across all media =	8.E-05
Total GI tract HI across all media =	1.E-02
Total kidney HI across all media =	2.E-02
Total liver HI across all media =	1.E-02
Total vascular HI across all media =	2.E-03
Total eyes HI across all media =	3.E-03
Total bone marrow HI across all media =	5.E-03
Total fetus HI across all media =	5.E-03

TABLE E.3-9.3.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Commercial Worker - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Commercial Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	9.E-03	--	6.E-04	1.E-02
			Arsenic	7.E-07	--	1.E-07	8.E-07	Arsenic	skin/ vascular	4.E-03	--	8.E-04	5.E-03
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	6.E-03	--	1.E-02	2.E-02
			Cobalt	--	--	--	--	Cobalt	blood	2.E-04	--	2.E-05	3.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	2.E-02	--	1.E-03	2.E-02
			Manganese	--	--	--	--	Manganese	CNS	1.E-02	--	2.E-02	3.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	2.E-02	--	5.E-02	6.E-02
			Aroclor 1254	6.E-08	--	6.E-08	1.E-07	Aroclor 1254	eyes	4.E-03	--	4.E-03	8.E-03
			Total	7.4.E-07	--	2.E-07	9.E-07	Total		7.E-02	--	9.E-02	2.E-01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	2.E-03	--	2.E-03
			Arsenic	--	1.E-09	--	1.E-09	Arsenic	NA	--	--	--	--
			Chromium	--	4.E-08	--	4.E-08	Chromium	respiratory	--	1.E-04	--	1.E-04
			Cobalt	--	3.E-09	--	3.E-09	Cobalt	respiratory	--	2.E-04	--	2.E-04
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	3.E-03	--	3.E-03
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	1.E-11	--	1.E-11	Aroclor 1254	NA	--	--	--	--
			Total	--	5.E-08	--	5.E-08	Total		--	5.E-03	--	5.E-03
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	1.E-03	--	3.E-07	1.E-03
			Manganese	--	--	--	--	Manganese	CNS	5.E-01	--	1.E-02	5.E-01
			Chloroform	--	--	--	--	Chloroform	liver	2.E-03	--	3.E-06	2.E-03
			Total	--	--	--	--	Total		5.E-01	--	1.E-02	5.E-01
	Air	Air (Indoor Air)	Chloroform	--	1.E-08	--	1.E-08	Chloroform	respiratory	--	4.E-05	--	4.E-05
				--	1.E-08	--	1.E-08			--	4.E-05	--	4.E-05
						Total Risk Across Soil	1.E-06					Total Hazard Index Across Soil	2.E-01
						Total Risk Across Groundwater	1.E-08					Total Hazard Index Across Groundwater	5.E-01

Total Risk Across All Media and All Exposure Routes	1.E-06	Total Hazard Index Across All Media and All Exposure Routes	7.E-01

Total blood HI across all media =	2.E-02
Total CNS HI across all media =	6.E-01
Total skin HI across all media =	5.E-03
Total respiratory HI across all media =	3.E-04
Total GI tract HI across all media =	4.E-02
Total kidney HI across all media =	6.E-02
Total liver HI across all media =	4.E-02
Total vascular HI across all media =	5.E-03
Total eyes HI across all media =	8.E-03
Total bone marrow HI across all media =	2.E-02
Total fetus HI across all media =	2.E-02

TABLE E.3-9.4.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Construction Worker - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	6.E-02	--	2.E-03	6.E-02
			Arsenic	2.E-07	--	2.E-08	2.E-07	Arsenic	skin/ vascular	3.E-02	--	3.E-03	3.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	6.E-03	--	7.E-03	1.E-02
			Cobalt	--	--	--	--	Cobalt	blood	2.E-03	--	5.E-05	2.E-03
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	3.E-01	--	8.E-03	3.E-01
			Manganese	--	--	--	--	Manganese	CNS	8.E-02	--	6.E-02	1.E-01
			Vanadium	--	--	--	--	Vanadium	kidney	2.E-02	--	2.E-02	4.E-02
			Aroclor 1254	2.E-08	--	7.E-09	2.E-08	Aroclor 1254	eyes	1.E-02	--	5.E-03	2.E-02
			Total	2.E-07	--	2.E-08	2.E-07	Total		5.E-01	--	1.E-01	6.E-01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	2.E+00	--	2.E+00
			Arsenic	--	7.E-08	--	7.E-08	Arsenic	NA	--	--	--	--
			Chromium	--	2.E-06	--	2.E-06	Chromium	respiratory	--	1.E-01	--	1.E-01
			Cobalt	--	2.E-07	--	2.E-07	Cobalt	respiratory	--	2.E-01	--	2.E-01
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	4.E+00	--	4.E+00
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	6.E-10	--	6.E-10	Aroclor 1254	NA	--	--	--	--
			Total	--	3.E-06	--	3.E-06	Total		--	6.6.E+00	--	7.E+00
		Air (Trench Air)	Chloroform	--	2.E-09	--	2.E-09	Chloroform	respiratory	--	3.E-01	--	3.E-01
				--	2.E-09	--	2.E-09			--	3.E-01	--	3.E-01
						Total Risk Across Soil	3.E-06					Total Hazard Index Across Soil	7.E+00
						Total Risk Across Groundwater	2.E-09					Total Hazard Index Across Groundwater	3.E-01
						Total Risk Across All Media and All Exposure Routes	3.E-06					Total Hazard Index Across All Media and All Exposure Routes	7.E+00

Total blood HI across all media =	3.E-01
Total CNS HI across all media =	6.E+00
Total skin HI across all media =	3.E-02
Total respiratory HI across all media =	6.E-01
Total GI tract HI across all media =	3.E-01
Total kidney HI across all media =	4.E-02
Total liver HI across all media =	3.E-01
Total vascular HI across all media =	3.E-02
Total eyes HI across all media =	2.E-02
Total bone marrow HI across all media =	1.E-02
Total fetus HI across all media =	1.E-02

TABLE E.3-9.5.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Adult Resident - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	3.E-02	--	1.E-03	3.E-02
			Arsenic	2.E-06	--	2.E-07	2.E-06	Arsenic	skin/ vascular	1.E-02	--	2.E-03	2.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	3.E-02	--	4.E-02	7.E-02
			Cobalt	--	--	--	--	Cobalt	blood	6.E-04	--	3.E-05	7.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-02	--	2.E-03	5.E-02
			Manganese	--	--	--	--	Manganese	CNS	3.E-02	--	3.E-02	7.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	5.E-02	--	7.E-02	1.E-01
			Aroclor 1254	4.E-07	--	2.E-07	7.E-07	Aroclor 1254	eyes	3.E-02	--	2.E-02	5.E-02
			Total	3.E-06	--	5.E-07	3.E-06	Total		2.E-01	--	2.E-01	4.E-01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-04	--	5.E-04
			Arsenic	--	4.E-10	--	4.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	2.E-08	--	2.E-08	Chromium	respiratory	--	5.E-05	--	5.E-05
			Cobalt	--	8.E-10	--	8.E-10	Cobalt	respiratory	--	4.E-05	--	4.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	8.E-04	--	8.E-04
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	8.E-12	--	8.E-12	Aroclor 1254	NA	--	--	--	--
			Total	--	2.E-08	--	2.E-08	Total		--	1.E-03	--	1.E-03
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	3.E-03	--	6.E-06	3.E-03
			Manganese	--	--	--	--	Manganese	CNS	1.E+00	--	2.E-01	2.E+00
			Chloroform	--	--	--	--	Chloroform	liver	5.E-03	--	5.E-05	5.E-03
			Total	--	--	--	--	Total		1.4.E+00	--	2.E-01	2.E+00
	Air	Air (Indoor Air)	Chloroform	--	3.E-08	--	3.E-08	Chloroform	respiratory	--	9.E-05	--	9.E-05
				--	3.E-08	--	3.E-08			--	9.E-05	--	9.E-05
		Air (Shower Air)	Chloroform	--	1.E-05	--	1.E-05	Chloroform	respiratory	--	2.E-02	--	2.E-02
				--	1.E-05	--	1.E-05			--	2.E-02	--	2.E-02
						Total Risk Across Soil	3.E-06					Total Hazard Index Across Soil	4.E-01
						Total Risk Across Groundwater	1.E-05					Total Hazard Index Across Groundwater	2.E+00

Total Risk Across All Media and All Exposure Routes	1.E-05

Total Hazard Index Across All Media and All Exposure Routes	2.E+00

Total blood HI across all media =	5.E-02
Total CNS HI across all media =	2.E+00
Total skin HI across all media =	2.E-02
Total respiratory HI across all media =	2.E-02
Total GI tract HI across all media =	1.E-01
Total kidney HI across all media =	1.E-01
Total liver HI across all media =	1.E-01
Total vascular HI across all media =	2.E-02
Total eyes HI across all media =	5.E-02
Total bone marrow HI across all media =	7.E-02
Total fetus HI across all media =	7.E-02

TABLE E.3-9.6.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Adult Resident - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	3.E-02	--	1.E-03	3.E-02
			Arsenic	2.E-06	--	2.E-07	2.E-06	Arsenic	skin/ vascular	1.E-02	--	1.E-03	1.E-02
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	2.E-02	--	3.E-02	4.E-02
			Cobalt	--	--	--	--	Cobalt	blood	7.E-04	--	3.E-05	7.E-04
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-02	--	2.E-03	5.E-02
			Manganese	--	--	--	--	Manganese	CNS	3.E-02	--	3.E-02	6.E-02
			Vanadium	--	--	--	--	Vanadium	kidney	5.E-02	--	8.E-02	1.E-01
			Aroclor 1254	2.E-07	--	9.E-08	3.E-07	Aroclor 1254	eyes	1.E-02	--	7.E-03	2.E-02
			Total	2.E-06	--	3.E-07	2.E-06	Total		2.E-01	--	1.E-01	3.E-01
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	5.E-04	--	5.E-04
			Arsenic	--	3.E-10	--	3.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	1.E-08	--	1.E-08	Chromium	respiratory	--	3.E-05	--	3.E-05
			Cobalt	--	8.E-10	--	8.E-10	Cobalt	respiratory	--	4.E-05	--	4.E-05
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	8.E-04	--	8.E-04
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	3.E-12	--	3.E-12	Aroclor 1254	NA	--	--	--	--
			Total	--	1.E-08	--	1.E-08	Total		--	1.E-03	--	1.E-03
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	3.E-03	--	6.E-06	3.E-03
			Manganese	--	--	--	--	Manganese	CNS	1.E+00	--	2.E-01	2.E+00
			Chloroform	--	--	--	--	Chloroform	liver	5.E-03	--	5.E-05	5.E-03
			Total	--	--	--	--	Total		1.4.E+00	--	2.E-01	2.E+00
	Air	Air (Indoor Air)	Chloroform	--	3.E-08	--	3.E-08	Chloroform	respiratory	--	9.E-05	--	9.E-05
				--	3.E-08	--	3.E-08			--	9.E-05	--	9.E-05
		Air (Shower Air)	Chloroform	--	1.E-05	--	1.E-05	Chloroform	respiratory	--	2.E-02	--	2.E-02
				--	1.E-05	--	1.E-05			--	2.E-02	--	2.E-02
							Total Risk Across Soil						Total Hazard Index Across Soil
							2.E-06						3.E-01
							Total Risk Across Groundwater						Total Hazard Index Across Groundwater
							1.E-05						2.E+00

Total Risk Across All Media and All Exposure Routes	1.E-05

Total Hazard Index Across All Media and All Exposure Routes	2.E+00

Total blood HI across all media =	6.E-02
Total CNS HI across all media =	2.E+00
Total skin HI across all media =	1.E-02
Total respiratory HI across all media =	2.E-02
Total GI tract HI across all media =	9.E-02
Total kidney HI across all media =	1.E-01
Total liver HI across all media =	1.E-01
Total vascular HI across all media =	1.E-02
Total eyes HI across all media =	2.E-02
Total bone marrow HI across all media =	4.E-02
Total fetus HI across all media =	4.E-02

TABLE E.3-9.7.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Child Resident - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Sutrface Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	2.E-01	--	7.E-03	3.E-01
			Arsenic	5.E-06	--	4.E-07	5.E-06	Arsenic	skin/ vascular	1.E-01	--	1.E-02	1.E-01
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	3.E-01	--	3.E-01	5.E-01
			Cobalt	--	--	--	--	Cobalt	blood	6.E-03	--	2.E-04	6.E-03
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-01	--	1.E-02	5.E-01
			Manganese	--	--	--	--	Manganese	CNS	3.E-01	--	2.E-01	5.E-01
			Vanadium	--	--	--	--	Vanadium	kidney	4.E-01	--	5.E-01	9.E-01
			Aroclor 1254	1.E-06	--	4.E-07	1.E-06	Aroclor 1254	eyes	3.E-01	--	1.E-01	4.E-01
			Total	6.E-06	--	8.E-07	7.E-06	Total		2.E+00	--	1.E+00	3.E+00
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	4.E-03	--	4.E-03
			Arsenic	--	8.E-10	--	8.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	4.E-08	--	4.E-08	Chromium	respiratory	--	4.E-04	--	4.E-04
			Cobalt	--	2.E-09	--	2.E-09	Cobalt	respiratory	--	3.E-04	--	3.E-04
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	7.E-03	--	7.E-03
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	2.E-11	--	2.E-11	Aroclor 1254	NA	--	--	--	--
			Total	--	5.E-08	--	5.E-08	Total		--	1.E-02	--	1.E-02
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	7.E-03	--	2.E-05	7.E-03
			Manganese	--	--	--	--	Manganese	CNS	3.E+00	--	6.E-01	4.E+00
			Chloroform	--	--	--	--	Chloroform	liver	1.E-02	--	1.E-04	1.E-02
			Total	--	--	--	--	Total		3.E+00	--	6.E-01	4.E+00
	Air	Air (Indoor Air)	Chloroform	--	3.E-08	--	3.E-08	Chloroform	respiratory	--	3.E-04	--	3.E-04
				--	3.E-08	--	3.E-08			--	3.E-04	--	3.E-04
						Total Risk Across Soil	7.E-06					Total Hazard Index Across Soil	3.E+00
						Total Risk Across Groundwater	3.E-08					Total Hazard Index Across Groundwater	4.E+00
						Total Risk Across All Media and All Exposure Routes	7.E-06					Total Hazard Index Across All Media and All Exposure Routes	7.E+00

Total blood HI across all media =	5.E-01
Total CNS HI across all media =	5.E+00
Total skin HI across all media =	1.E-01
Total respiratory HI across all media =	1.E-03
Total GI tract HI across all media =	1.E+00
Total kidney HI across all media =	9.E-01
Total liver HI across all media =	1.E+00
Total vascular HI across all media =	1.E-01
Total eyes HI across all media =	4.E-01
Total bone marrow HI across all media =	5.E-01
Total fetus HI across all media =	5.E-01

TABLE E.3-9.8.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Child Resident - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--	Aluminum	developmental CNS	2.E-01	--	7.E-03	2.E-01
			Arsenic	4.E-06	--	4.E-07	5.E-06	Arsenic	skin/ vascular	1.E-01	--	9.E-03	1.E-01
			Chromium	--	--	--	--	Chromium	GI tract/fetus/bone marrow/liver	1.E-01	--	2.E-01	3.E-01
			Cobalt	--	--	--	--	Cobalt	blood	6.E-03	--	2.E-04	7.E-03
			Iron	--	--	--	--	Iron	blood/ liver/ GI tract	5.E-01	--	1.E-02	5.E-01
			Manganese	--	--	--	--	Manganese	CNS	3.E-01	--	2.E-01	5.E-01
			Vanadium	--	--	--	--	Vanadium	kidney	5.E-01	--	5.E-01	1.E+00
			Aroclor 1254	4.E-07	--	2.E-07	5.E-07	Aroclor 1254	eyes	1.E-01	--	4.E-02	2.E-01
			Total	5.E-06	--	5.E-07	5.E-06	Total		2.E+00	--	1.E+00	3.E+00
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--	Aluminum	CNS	--	4.E-03	--	4.E-03
			Arsenic	--	7.E-10	--	7.E-10	Arsenic	NA	--	--	--	--
			Chromium	--	3.E-08	--	3.E-08	Chromium	respiratory	--	2.E-04	--	2.E-04
			Cobalt	--	2.E-09	--	2.E-09	Cobalt	respiratory	--	4.E-04	--	4.E-04
			Iron	--	--	--	--	Iron	NA	--	--	--	--
			Manganese	--	--	--	--	Manganese	CNS	--	7.E-03	--	7.E-03
			Vanadium	--	--	--	--	Vanadium	NA	--	--	--	--
			Aroclor 1254	--	6.E-12	--	6.E-12	Aroclor 1254	NA	--	--	--	--
			Total	--	3.E-08	--	3.E-08	Total		--	1.E-02	--	1.E-02
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--	Cobalt	blood	7.E-03	--	2.E-05	7.E-03
			Manganese	--	--	--	--	Manganese	CNS	3.E+00	--	6.E-01	4.E+00
			Chloroform	--	--	--	--	Chloroform	liver	1.E-02	--	1.E-04	1.E-02
			Total	--	--	--	--	Total		3.E+00	--	6.E-01	4.E+00
	Air	Air (Indoor Air)	Chloroform	--	3.E-08	--	3.E-08	Chloroform	respiratory	--	3.E-04	--	3.E-04
				--	3.E-08	--	3.E-08			--	3.E-04	--	3.E-04

Total Risk Across Soil	5.E-06
Total Risk Across Groundwater	3.E-08
Total Risk Across All Media and All Exposure Routes	5.E-06

Total Hazard Index Across Soil	3.E+00
Total Hazard Index Across Groundwater	4.E+00
Total Hazard Index Across All Media and All Exposure Routes	7.E+00

Total blood HI across all media =	5.E-01
Total CNS HI across all media =	5.E+00
Total skin HI across all media =	1.E-01
Total respiratory HI across all media =	9.E-04
Total GI tract HI across all media =	8.E-01
Total kidney HI across all media =	1.E+00
Total liver HI across all media =	8.E-01
Total vascular HI across all media =	1.E-01
Total eyes HI across all media =	2.E-01
Total bone marrow HI across all media =	3.E-01
Total fetus HI across all media =	3.E-01

TABLE E.3-9.9.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Lifetime Resident - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	--	--	--	--
			Arsenic	7.E-06	--	7.E-07	8.E-06
			Chromium	--	--	--	--
			Cobalt	--	--	--	--
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	1.E-06	--	6.E-07	2.E-06
			Total	8.E-06	--	1.3.E-06	1.E-05
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--
			Arsenic	--	1.E-09	--	1.E-09
			Chromium	--	6.E-08	--	6.E-08
			Cobalt	--	2.E-09	--	2.E-09
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	--	2.E-11	--	2.E-11
			Total	--	7.E-08	--	7.E-08
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--
			Manganese	--	--	--	--
			Chloroform	--	--	--	--
			Total	--	--	--	--
	Air	Air (Indoor Air)	Chloroform	--	6.E-08	--	6.E-08
				--	6.E-08	--	6.E-08
		Air (Shower Air)	Chloroform	--	1.E-05	--	1.E-05
				--	1.E-05	--	1.E-05
						Total Risk Across Soil	1.E-05
						Total Risk Across Groundwater	1.E-05

Total Risk Across All Media and All Exposure Routes	2.E-05

TABLE E.3-9.10.RME
RME Summary of Cancer Risks and Non-Cancer Hazards for COPCs: Lifetime Resident - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Lifetime

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	--	--	--	--
			Arsenic	6.E-06	--	6.E-07	7.E-06
			Chromium	--	--	--	--
			Cobalt	--	--	--	--
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	6.E-07	--	2.E-07	8.E-07
			Total	7.E-06	--	8.2.E-07	7.E-06
	Air	Air (Fugitive Dust)	Aluminum	--	--	--	--
			Arsenic	--	1.E-09	--	1.E-09
			Chromium	--	4.E-08	--	4.E-08
			Cobalt	--	3.E-09	--	3.E-09
			Iron	--	--	--	--
			Manganese	--	--	--	--
			Vanadium	--	--	--	--
			Aroclor 1254	--	9.E-12	--	9.E-12
			Total	--	4.E-08	--	4.E-08
Groundwater	Groundwater	Groundwater used as tapwater	Cobalt	--	--	--	--
			Manganese	--	--	--	--
			Chloroform	--	--	--	--
			Total	--	--	--	--
	Air	Air (Indoor Air)	Chloroform	--	6.E-08	--	6.E-08
				--	6.E-08	--	6.E-08
		Air (Shower Air)	Chloroform	--	1.E-05	--	1.E-05
				--	1.E-05	--	1.E-05
						Total Risk Across Soil	7.E-06
						Total Risk Across Groundwater	1.E-05

Total Risk Across All Media and All Exposure Routes	2.E-05

TABLE E.3-10.1.RME
RME Risk Assessment Summary: Construction Worker - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Construction Worker
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	None Identified					None Identified					
			Total	--	--	--	--	Total		--	--	--	--
	Air	Air	None Identified					Aluminum	CNS	--	2.E+00	--	2.E+00
								Manganese	CNS	--	4.E+00	--	4.E+00
			Total	--	--	--	--	Total		--	6.E+00	--	6.E+00
Groundwater	Groundwater	Groundwater	None Identified					None Identified					
			Total	--	--	--	--	Total		--	--	--	--
						Total Risk Across Soil	--					Total Hazard Index Across Soil	6.E+00
						Total Risk Across Groundwater	--					Total Hazard Index Across Groundwater	--
						Total Risk Across All Media and All Exposure Routes	--					Total Hazard Index Across All Media and All Exposure Routes	6.E+00
												Total CNS HI across all media =	6.E+00

TABLE E.3-10.2.RME
RME Risk Assessment Summary: Adult Resident - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Soil	Soil	None Identified		--	--	--	--
			Total		--	--	--	--
	Air	Air	None Identified		--	--	--	--
			Total		--	--	--	--
Groundwater	Groundwater	Groundwater Used as Tapwater	Manganese	CNS	1.4.E+00	--	2.E-01	2.E+00
			Total		1.4.E+00	--	2.E-01	2.E+00
							Total Hazard Index Across Soil	--
							Total Hazard Index Across Groundwater	2.E+00

Total Hazard Index Across All Media and All Exposure Routes	2.E+00
Total CNS HI across all media =	2.E+00

TABLE E.3-10.3.RME
RME Risk Assessment Summary: Child Resident - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Soil	Soil	Aluminum	developmental CNS	2.E-01	--	7.E-03	3.E-01
			Manganese	CNS	3.E-01	--	2.E-01	5.E-01
			Total		6.E-01	--	2.E-01	8.E-01
	Air	Air	None Identified		--	--	--	--
			Total		--	--	--	--
Groundwater	Groundwater	Groundwater Used as Tapwater	Manganese	CNS	3.4.E+00	--	5.5.E-01	4.E+00
			Total		3.4.E+00	--	5.5.E-01	4.E+00
							Total Hazard Index Across Soil	8.E-01
							Total Hazard Index Across Groundwater	4.E+00

Total Hazard Index Across All Media and All Exposure Routes: 5.E+00

Total CNS HI across all media = 5.E+00

TABLE E.3-10.4.RME
RME Risk Assessment Summary: Child Resident - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Total Soil	Soil	Soil	Aluminum	developmental CNS	2.E-01	--	7.E-03	2.E-01
			Manganese	CNS	3.E-01	--	2.E-01	5.E-01
			Total		5.E-01	--	2.E-01	8.E-01
	Air	Air	None Identified		--	--	--	--
			Total		--	--	--	--
Groundwater	Groundwater	Groundwater Used as Tapwater	Manganese	CNS	3.4.E+00	--	5.5.E-01	4.E+00
			Total		3.4.E+00	--	5.5.E-01	4.E+00
							Total Hazard Index Across Soil	8.E-01
							Total Hazard Index Across Groundwater	4.E+00

Total Hazard Index Across All Media and All Exposure Routes: 5.E+00

Total CNS HI across all media = 5.E+00

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IRON MARGIN OF EXPOSURE EVALUATION

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Table 1
Iron "Margin of Exposure" Evaluation - SWMU 38 and AOC Q
SMWUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Total Soil - Child Resident				
Iron EPC (mg/kg)	Child Daily Intake Estimate* (mg/day)	RDA for Child 6 mths to 4 years Old	Child Daily Intake** (mg/kg-day)	Provisional RfD (mg/kg-day)
26,000	5.0	10 mg/day	0.33	0.7

* See Table 2 for equations used to calculated daily intake estimates.
** Default weight of 15 kg used for child

Table 2
Iron "Margin of Exposure" Evaluation - SWMU 38 and AOC Q
SMWUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation
Ingestion-Total Soil	Resident	Child	SWMU 38 / AOC Q	AT-NC	Averaging Time (Non-Cancer)	2,190	days	USEPA, 1991	
				BW	Body Weight	15	kg	USEPA, 1991	
				CF1	Conversion Factor 1	1.00E-06	kg/mg	unit conversion	Chronic Daily Intake (mg/day) = $\frac{CS*IRS*EF*ED*FI*CF1}{BW*AT}$
				CS	Chemical Concentration in Soil	Chemical Specific	mg/kg	MDC or EPC	
				ED	Exposure Duration	6	years	USEPA, 1991	
				EF	Exposure Frequency	350	days/year	USEPA, 1991	
				FI	Fraction Ingested	1	(unitless)	default	
				IRS	Ingestion Rate of Soil	200	mg/day	USEPA, 1991	

Notes:

MDC = Maximum Detected Concentration

EPC = Exposure Point Concentration

kg = kilogram

mg/kg = milligram per kilogram

mg/day = milligram per day

kg/mg = kilogram per milligram

USEPA, 1991. Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors". OSWER 9285.6-03.

APPENDIX E.4

JOHNSON AND ETTINGER MODEL – GROUNDWATER TO INDOOR AIR

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Table E.4-1a
Data Entry Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
67663	3.60E-01	Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	610	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC	OR		SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

Table E.4-1b
Chemical Properties Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.04E-01	1.00E-05	3.66E-03	25	6,988	334.32	536.40	3.98E+01	7.92E+03	2.3E-05	0.0E+00

END

Table E.4-1c
Intermediate Calculations Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
595	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	7,554	1.86E-03	8.02E-02	1.75E-04	2.69E-03	3.28E-05	5.29E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
595	15	2.89E+01	0.10	8.33E+01	2.69E-03	4.00E+02	#NUM!	5.19E-05	1.50E-03	2.3E-05	NA

Table E.4-1d
Results Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	NA	NA	7.92E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.4E-08	NA

MESSAGE SUMMARY BELOW:

END

Table E.4-2a
Data Entry Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
67663	2.80E-01	Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	853	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC	OR		SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

Table E.4-2b
Chemical Properties Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.04E-01	1.00E-05	3.66E-03	25	6,988	334.32	536.40	3.98E+01	7.92E+03	2.3E-05	0.0E+00

END

Table E.4-2c
Intermediate Calculations Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
838	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	7,554	1.86E-03	8.02E-02	1.75E-04	2.69E-03	3.28E-05	6.89E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
838	15	2.25E+01	0.10	8.33E+01	2.69E-03	4.00E+02	#NUM!	4.81E-05	1.08E-03	2.3E-05	NA

Table E.4-2d
Results Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	7.92E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.0E-08	NA

MESSAGE SUMMARY BELOW:

END

Table E.4-3a
Data Entry Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

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Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
67663	1.70E+00	Chloroform

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	822	SC	10	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SC			SC	1.63	0.385	0.197

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	30	30	350

Used to calculate risk-based groundwater concentration.

Table E.4-3b
Chemical Properties Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.04E-01	1.00E-05	3.66E-03	25	6,988	334.32	536.40	3.98E+01	7.92E+03	2.3E-05	0.0E+00

END

Table E.4-3c
Intermediate Calculations Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
807	0.188	0.299	1.74E-09	0.837	1.46E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	7,554	1.86E-03	8.02E-02	1.75E-04	2.69E-03	3.28E-05	6.70E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
807	15	1.36E+02	0.10	8.33E+01	2.69E-03	4.00E+02	#NUM!	4.85E-05	6.61E-03	2.3E-05	NA

Table E.4-3d
Results Sheet
Johnson and Ettinger Model
Groundwater to Indoor Air - Chloroform - SWMU 38/AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	7.92E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
6.3E-08	NA

MESSAGE SUMMARY BELOW:

END

APPENDIX F

ECOLOGICAL RISK ASSESSMENT

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APPENDIX F.1

SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT PROCESS

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APPENDIX F.1
SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT PROCESS
SWMUs 35, 37, 38, and AOC Q RFI REPORT

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LIST OF ABBREVIATIONS AND ACRONYMS

% ..... Percent
ADD..... Average Daily Dose
AF ..... Area Use Factor
BAF..... Bioaccumulation Factor
BTAG..... Biological Technical Assistance Group
BW ..... Body Weight
C_{TRV}..... NOAEL- or LOAEL-based TRV concentration
COPC ..... Chemical of Potential Concern
COPEC..... Chemical of Potential Ecological Concern
DF ..... Dietary Fraction
DW:WW ..... Dry weight to wet weight
ECO-SSL ..... Ecological Soil Screening Level
EF..... Extrapolation Factor
EPC ..... Exposure Point Concentration
HQ..... Hazard Quotient
IR ..... Ingestion Rate
kg ..... Kilogram
LD_{50}..... Lethal Dose to 50% of the test population
LOAEL ..... Lowest Observable Adverse Effects Level
MDC ..... Maximum Detected Concentration
mg ..... Milligram
mg/kg ..... Milligrams Per Kilogram
NOAEL..... No Observable Adverse Effects Level
ORNL..... Oak Ridge National Laboratory
SLERA..... Screening Level Ecological Risk Assessment
TOC ..... Total Organic Carbon
TRV ..... Toxicity Reference Value
UF ..... Uncertainty Factor
UF_{plant} ..... Plant Uptake Factor
USACHPPM..... U.S. Army Center for Health Promotion and Preventive Medicine
USEPA..... U.S. Environmental Protection Agency

1.0 INTRODUCTION

The purpose of this appendix is to present and describe development of exposure assessment models for the receptors presented in Section 7.0, the Screening Level Ecological Risk Assessment (SLERA) at SWMUs 35, 37, 38, and AOC Q. The following sections provide a summary of parameters used in the models and a detailed description of the direct contact and dose rate modeling approachs used in the SLERA. The complete SLERAs for SWMU 35, SWMU 37, and SWMU 38/AOC Q are presented in Appendices F.2, F.3, and F.4, respectively.

2.0 MODEL PARAMETERS

The direct contact and dose rate models include parameters relating to receptor-specific exposure, chemical of potential concern (COPC) toxicity, and bioaccumulation rates. The following sections describe the estimation of these parameters and major assumptions of parameterization.

2.1 TOXICITY REFERENCE VALUES

MDCs for detected chemicals in soil are used as the preliminary exposure estimate to evaluate a conservative risk scenario for the direct contact pathway to soil invertebrates. Other potentially complete exposure pathways to soil invertebrate and microbial communities include direct ingestion of soil and biota. Due to insufficient information to quantify these pathways, likely secondary to the direct contact/absorption pathway, their omission should not substantially alter the risk characterization.

To evaluate the preliminary exposure estimates, the Toxicity Reference Values (TRVs) that were protective of terrestrial plants and soil invertebrate/microbial communities, were selected from a review of toxicological benchmarks for soil. TRVs for direct contact of soil to invertebrates/microbes and soil to plants were determined from the following guidance:

- USEPA Ecological Soil Screening Level (ECO-SSL): soil invertebrate and plant;
- Oak Ridge National Laboratory (ORNL): plant, microbial community, earthworm values (Efroymson *et al*. 1997a, Efroymson *et al*. 1997b, Efroymson *et al*. 1997c); and
- USEPA Region III Biological Technical Assistance Group (BTAG) soil screening values (USEPA 1995), BTAG freshwater screening benchmarks (USEPA 2006a), and BTAG freshwater sediment screening levels (USEPA 2006b)

Selected screening levels and sources are reported on Tables F.2-5 (SWMU 35), F.3-5 (SWMU 37), and F.4-5 (SWMU 38/AOC Q) for terrestrial plants and Tables F.2-7 (SWMU 35), F.3-7 (SWMU 37), and F.4-7 (SWMU 38/AOC Q) for soil invertebrates and microbial communities.

2.2 RECEPTOR-SPECIFIC EXPOSURE PARAMETERS

Wildlife receptors selected to characterize exposure at SWMUs 35, 37, 38, and AOC Q include:

- Herbivorous mammals: Meadow Vole (*Microtus pennsylvanicus*);
- Invertivorous mammals: Short-tailed Shrew (*Blarina brevicauda*);
- Invertivorous birds: American Robin (*Turdus migratorius*);
- Carnivorous birds: Red-tailed Hawk (*Buteo jamaicensis*); and
- Carnivorous mammals: Red Fox (*Vulpes vulpes*).

Exposure parameters used to derive TRV-based substrate concentrations for each receptor include body weight (kg), food ingestion rate (kg dry weight/day), dietary fraction, incidental substrate ingestion rate (kg dry weight/day), and area use factor. Both preliminary and refinement level exposure parameters are presented in Tables F.2-9 (SWMU 35), F.3-9 (SWMU 37), and F.4-9 (SWMU 38/AOC Q).

2.3 LITERATURE-BASED NOAEL AND LOAEL VALUES

The dose-response relationships for chemicals of potential concern are expressed as NOAELs and LOAELs for wildlife receptors, which are defined as a daily ingested amount (mg/kg body weight-day) that is associated with a specified effect. This process involves the determination of a "test species dose" for a critical endpoint from a particular experimental combination of exposure concentration, exposure duration, test species, and chemical. Endpoints may be based on growth, reproductive, developmental, and survival effects. Such effects are important because they may affect the abundance or reproductive success of receptor populations. The test-species dose from the selected study is then modified using extrapolation and uncertainty factors (EFs and UFs).

For this evaluation, EFs and UFs are used to modify laboratory study results, based on the methodology of Sample et al. (1996). This process involves the determination of a "test species dose" for a critical endpoint from a particular experimental combination of exposure concentration, exposure duration, test species, and chemical. The test-species dose from the selected study is then modified to account for the various extrapolations and uncertainties inherent in applying results from a controlled setting to an ecologically relevant setting, as in:

$$\text{NOAEL or LOAEL} = \frac{\text{Test-Species Dose}}{\text{Duration UF} \times \text{Endpoint UF}} \times \text{Body-Weight EF}$$

EFs and UFs are based on: (1) the duration of exposure, (2) the endpoint measured, and (3) differences in body weights among test and receptor species (Calabrese and Baldwin 1993, Ford et al. 1992, Opresko et al. 1994, Sample et al. 1996, USEPA 1996, Wentsel et al. 1994). EFs and UFs derivation and use is described in the following subsections. The use of surrogate chemical data is also discussed. NOAEL and LOAELs for COPCs are summarized in Tables F.2-10 (SWMU 35), F.3-10 (SWMU 37), and F.4-10 (SWMU 38/AOC Q).

2.3.1 The Test-Species Dose

Critical toxicological values are identified from carefully qualified primary and secondary literature references. The selection of particular studies and endpoints used for the derivation of NOAELs and LOAELs is based on the evaluation of the applicable studies and the dose-response data contained therein. In cases where preferred toxicological endpoints are not available, other toxicity values are used, but additional uncertainty factors may be incorporated. All toxicological values chosen for NOAEL and LOAEL derivation are presented on a mg chemical per kg body weight per day (mg/kg BW-day) basis. These units allow comparisons among organisms of different body sizes (Sample et al. 1996).

2.3.2 Duration Uncertainty Factors

Exposure durations of interest include (1) chronic, (2) subchronic, and (3) acute. Chronic studies occur over the lifetime or a majority of the lifespan of the test organism, generally longer than one year for mammals and 10 weeks for birds. Additionally, studies in which the test organism is dosed during a critical life stage (e.g., gestation) are included with chronic duration studies. Subchronic studies include exposures of two weeks to one year in duration that do not occur during a critical life stage. Acute studies typically have exposures of less than two weeks. NOAELs and LOAELs are usually reported from chronic and subchronic studies, with acute studies often reporting LD_{50} levels (LD_{50}; doses corresponding to the overt expression of a serious adverse effect such as mortality in 50% of test animals). Test-species doses from chronic studies are used preferentially over data from acute and subchronic studies. In cases where chronic data are not available as test-species doses, studies involving less-than-chronic exposures are used to in NOAEL and LOAEL derivation with the addition of a duration uncertainty factor.

For this study, duration uncertainty factors are applied according to USACHPPM 2000:

- Subchronic NOAEL to Chronic NOAEL: 10

- Subchronic LOAEL to Chronic NOAEL: 20
- Subchronic LOAEL to Chronic LOAEL: 4
- Acute NOAEL to Chronic NOAEL: 30
- Acute LOAEL to Chronic NOAEL: 50
- Acute LOAEL to Chronic LOAEL: 10

2.3.3 Endpoint Uncertainty Factors

Additional UFs are used to account for uncertainties in extrapolation between effect- and no-effect levels. Specifically, a NOAEL test-species dose may be estimated from a LOAEL (or LD_{50}) value, or a LOAEL may be estimated from a LD_{50}.

Extrapolation from a LOAEL or LD_{50t} to a NOAEL: Consistent with USACHPPM 2000, a UF of 10 is used with chronic LOAEL values to estimate the chronic NOAEL, which is considered conservative (Sample et al. 1996, USEPA 1996). When a LOAEL value is not available, a LD_{50} is used, although chronic NOAELs may range from 1/10 to 1/10,000 of the corresponding acute LD_{50} value (Opresko et al. 1994). For this report, an uncertainty factor of 100 is used to estimate a NOAEL value from a LD_{50} value (USACHPPM 2000).

Extrapolation from an LD_{50} to a LOAEL: Consistent with USACHPPM 2000, an UF of 20 is used conservatively to estimate a LOAEL value from a LD_{50} value (USACHPPM 2000).

2.3.4 Body-Weight Extrapolation Factor

This extrapolation is accomplished using a body weight-scaling factor to account for differences in body size (Sample et al. 1996). Numerous studies have shown that many physiological functions such as metabolic rates and responses to chemicals are a function of body size for mammals. Smaller mammals have higher metabolic rates and are usually more resistant to chemicals because of more rapid rates of detoxification. It has been shown that the best measure of body size is one based on body surface-area, which can be expressed in terms of body weight raised to a fractional power (Opresko et al. 1994, Sample et al. 1996, USEPA 1980). Dosimetric differences between the mammalian test species and wildlife receptors are accounted for using:

$$\mathrm{NOAEL}_w = \mathrm{NOAEL}_t \times \left(\frac{\mathrm{BW}_t}{\mathrm{BW}_w} \right)^{0.25}$$

where:

$NOAEL_w$ = NOAEL for the mammalian wildlife receptor (mg/kg BW-day)

$NOAEL_t$ = NOAEL for the mammalian test species (mg/kg BW-day)

BW_t = Test species body weight (kg)

BW_w = Wildlife receptor body weight (kg)

Scaling factors may not be appropriate for avian interspecies extrapolations. Information has shown that adjustment factors based on body size for interspecies extrapolation among avian species range from 0.63 to 1.55 (Sample et al. 1996). Therefore, a body-weight extrapolation factor is not used to derive avian NOAELs and LOAELs.

Mammalian wildlife receptor body weights are presented on Tables F.2-9 (SWMU 35), F.3-9 (SWMU 37), and F.4-9 (SWMU 38/AOC Q) and laboratory test species body weights are presented on Tables F.2-10 (SWMU 35), F.3-10 (SWMU 37), and F.4-10 (SWMU 38/AOC Q).

2.4 BIOACCUMULATION FACTORS

Bioaccumulation factors (BAFs) provide quantitative indicators of the tendency for a chemical to partition into terrestrial organisms, relative to the concentrations present in terrestrial exposure media. Exposure-point concentrations of chemicals in terrestrial prey (soil invertebrates and small mammals) and terrestrial plants are estimated using BAFs derived from the literature. The derivation of BAFs is described for organic and inorganic chemicals in the following subsections.

2.4.1 Terrestrial Plants

Exposure-point concentrations of chemicals in terrestrial plants are estimated using soil-to-plant bioaccumulation factors (uptake factors for plants, UF_{plant}) derived from the literature. UF_{plant} values are used to estimate wet-weight chemical concentrations in terrestrial plants using the same equation for invertebrates and a dry weight to wet weight conversion factor assuming plants are 80% water (Salisbury and Ross 1992). Tables F.2-11 (SWMU 35), F.3-11 (SWMU 37), and F.4-11 (SWMU 38/AOC Q) present the uptake factors for plants.

Organic Chemicals: Organic chemicals may enter the plant by partitioning from contaminated soil to the roots and then translocating throughout the plant via the xylem tissue. Most bioaccumulative, lipophilic organic chemicals partition to the epidermis of the root or adhere to soil particles and are not drawn into the inner root or xylem (Paterson et al. 1990). Uptake factors for estimating concentrations of organic chemicals in plant tissues are derived from the following equation:

$$UF_{plant} = 10^{[1.588-(0.578\times \log K_{ow})]}$$

where:

UF_{plant} = Plant uptake factor (kg soil, dry weight / kg plant, dry weight)

$\log K_{ow}$ = Logarithm of the octanol:water partition coefficient

This relationship is based on a linear regression of bioaccumulation factors for 29 organic chemicals (Travis and Arms 1988). The correlation coefficient for the regression is 0.73, indicating that a majority of the variability in bioaccumulation is explained by the log K_{ow}. UF_{plant} values are derived for organic chemicals using this equation.

Inorganic Chemicals: Concentrations of inorganic chemicals in plant tissues are estimated based on generalized soil-to-plant transfer coefficients reported in a literature review. The soil-to-plant transfer factors for inorganic chemicals are equivalent to UF_{plant} values for organic chemicals and represent the ratio of the dry weight concentrations in plant tissue to the dry weight concentration of the element in root-zone soils. Bechtel-Jacobs 1998 C_p regression equation: $C_p = e^{(slope*\ln(Cs) - intercept)}$

2.4.2 Terrestrial Prey

Organic Chemicals: BAFs for estimating concentrations of organic chemicals in prey tissues are derived from linear regression equations presented in Travis and Arms (1998) and Beyer and Stafford (1993). The dry weight to wet weight (DW:WW) conversion factor is 0.2 for soil invertebrates (kg soil invertebrate dry weight per soil invertebrate wet weight; assumes invertebrates are 80% water), based on data reported in USEPA (1993). No DW:WW conversion factor was applied for small mammals. The BAF values used in to estimate concentrations of organic chemicals in soil invertebrates and small mammals are shown in Tables F.2-12 and F.2-13 (SWMU 35), Tables F.3-12 and F.3-13 (SWMU 37), and Tables F.4-12 and F.4-13 (SWMU 38/AOC Q).

Inorganic Chemicals: Inorganic bioaccumulation factors for terrestrial prey (Tables F.2-13, F.3-13, and F.4-13) are wet-weight-based and are used to predict concentrations in invertebrates and small mammals according to:

$$BAF_{si} = C_{si} / C_{soil}$$

where:

BAF_{si} = Soil invertebrate uptake factor for inorganic chemicals

C_{si} = Chemical concentration predicted in soil invertebrates (mg chemical / kg soil invertebrate, dry weight)

C_{soil} = Concentration of inorganic chemical in soil (mg chemical / kg soil, dry weight)

3.0 DIRECT CONTACT APPROACH

3.1 PRELIMINARY DIRECT CONTACT TOXICITY EVALUATION

Risk is assessed by comparing the preliminary exposure estimate (maximum detected concetrations [MDCs]) of each detected chemical to the established TRV (detailed in Section 2.1). The preliminary risk is characterized in terms of a hazard quotient (HQ), which is expressed as:

HQ = MDC/TRV

where:

HQ = Hazard Quotient for the contaminant (unitless)
MDC = Maximum Detected Concentration for contaminant (mg/kg)
TRV = Screening Level for contaminant (mg/kg)

3.2 REFINED DIRECT CONTACT TOXICITY EVALUATION

For the refined evaluation, risk is assessed by comparing the exposure point concentration (EPC) of each detected chemical to the TRV (Section 7.1.6 details EPC development). The refined risk HQ is expressed as:

HQ = EPC/TRV

where:

HQ = Hazard Quotient for the contaminant (unitless)
EPC = Calculated Exposure Point Concentration for contaminant (mg/kg)
TRV = Screening Level for contaminant (mg/kg)

An HQ of less than 1 indicates no or negligible risk. The potential for risk increases as the HQ increases above unity. However, this result should be considered in the context of other characteristics of the exposure area.

Results of the direct contact toxicity evaluation for SWMU 35 are presented in Tables F.2-6 (terrestrial plants) and F.2-8 (soil and microbial communities), SWMU 37 results are presented in Tables F.3-6 (terrestrial plants) and F.3-8 (soil and microbial communities), and SWMU 38/AOC Q results are presented in Tables F.4-6 (terrestrial plants) and F.4-8 (soil and microbial communities).

4.0 DOSE RATE MODELING APPROACH

A simplified food web model is utilized to calculate TRVs for each chemical and wildlife receptor. TRVs quantify COPC concentrations in exposure media that may result in no observable adverse effects or low observable adverse effects. The NOAEL corresponds to the greatest exposure associated with no observed adverse effects on growth, reproduction, or survival. The LOAEL corresponds to the smallest exposure associated with observed adverse effects on growth, reproduction or survival. TRVs developed by dose rate models are used to evaluate ecological effects associated with COPEC concentrations in exposure media.

4.1 PRELIMINARY DOSE RATE MODEL

Preliminary risk characterization for wildlife receptors uses the conservative preliminary exposure estimate and ecological effects evaluation to characterize risk to potential terrestrial receptors.

The simplified food web model considers the ingestion of prey, the incidental ingestion of media, and the primary routes of exposure to wildlife receptors. Chemical concentrations in prey are expressed as a function of chemical concentrations in exposure media using BAFs for terrestrial prey items. Other important parameters in the model include receptor body weight and an estimate of receptor use. As shown in the equation below, literature-derived NOAEL and LOAEL values are input into the model as the ADD variable to calculate the concentration in exposure media (C_{TRV}) that would result in a dose equivalent to a NOAEL or LOAEL.

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \ (BAF_{food} \cdot DF) + IR_s \ )AF}$$

where:

C_{TRV} = NOAEL or LOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg COPC/kg body weight-day)

BW = Minimum Body Weight of the receptor (kg)

IR_{food} = Maximum Ingestion Rate of food (kg food ingested per day, dry weight)

BAF_{food} = BAF of most contaminated dietary component used, specific to prey type and COPC (ratio of mg of COPC/kg fauna, wet weight to mg COPC/ kg substrate, dry weight)

DF = Dietary Fraction (most contaminated dietary component assumed to be 100% of diet)

IR_s = Maximum Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)

AF = 100% Area Use Factor

Preliminary receptor parameters for SWMU 35, SWMU 37, and SWMU 38/AOC Q are presented on Tables F.2-9, F.3-9, and F.4-9 respectively. The resulting risk is characterized in terms of an HQ and is presented for wildlife receptors in Appendix F.2 and summarized in Table F.2-24 for SWMU 35, in Appendix F.3 and summarized in Table F.3-24 for SWMU 37, in Appendix F.4 and summarized in Table F.4-24 for SWMU 38/AOC Q.

4.2 REFINED EXPOSURE ESTIMATE AND RISK CHARACTERIZATION

The refined exposure and risk characterization, Step 3a of the ecological risk assessment guidance (ERAGS), reviews and refines the conservative assumptions used in the risk calculation (USEPA 1997). In Step 3a, conservative assumptions used in the preliminary exposure and risk characterization are replaced with more environmentally realistic assumptions to evaluate risk posed by COPECs identified in the preliminary risk characterization. The addition of Step 3a focuses the outcome of the ecological screening, streamlines the review process and functions as the initial basis for ecological risk management decision-making at each site.

4.3 REFINED DOSE RATE MODEL

This step replaces the conservative assumptions used in the preliminary exposure estimate and ecological effects evaluation with more environmentally realistic assumptions including the use of average body weight, average food and substrate ingestion rates, and the use of realistic area use factor, resulting in a more realistic estimate of potential risk.

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + IR_s) AF_{refined}}$$

where:

C_{TRV} = NOAEL or LOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg COPC/kg body weight-day)

BW = Average Body Weight of the receptor (kg)

IR_{food} = Average Ingestion Rate of food (kg food ingested per day, dry weight)

BAF_{food} = BAF of dietary component used, specific to prey type and COPC (ratio of mg of COPC/kg fauna, wet weight to mg COPC/ kg substrate, dry weight)

DF = Dietary Fraction

IR_s = Average Incidental Ingestion Rate of soil (kg substrate ingested per day, dry weight)

$AF_{refined}$ = Refined Area Use Factor (detailed below)

In the refined model, a realistic area use factor ($AF_{refined}$) was used to calculate the ratio of the study area (2 acres) to the average home range of the receptor:

$AF_{refined}$ = Study Area/Home Range Area

Other receptor parameters in the refined model remain conservative. The conservative assumptions are summarized as follows:

- Receptors assimilate 100% of COPECs detected in the food and soil; and
- Receptors forage in the site area 100% of the time.

Refined receptor parameters for SWMU 35, SWMU 37, and SWMU 38/AOC Q are presented on Tables F.2-9, F.3-9, and F.4-9, respectively. The resulting risk is characterized in terms of an HQ and is presented for wildlife receptors in Appendix F.2 and summarized in Table F.2-24 for SWMU 35, in Appendix F.3 and summarized in Table F.3-24 for SWMU 37, and in Appendix F.4 and summarized in Table F.4-24 for SWMU 38/AOC Q.

4.4 EXAMPLE C_{TRV} EQUATION CALCULATION – PRELIMINARY AND REFINED

The following example C_{TRV} equation details the arsenic NOAEL-based screening level (SL) calculated for the short-tailed shrew at SWMU 35 (Tables F.2-16 and F.2-17) and resulting HQs:

Preliminary

- ADD = 0.15 mg/kg bw-day (NOAEL)
- BW = 0.0125 kg (minimum body weight)
- IR_{food} = 0.003 kg dw/day (maximum ingestion rate)
- BAF_{food} = 1.1 (for the most contaminated dietary component in this case plant)
- DF = 1 (100% most contaminated dietary component in this case 100% plants)
- IR_{soil} = 0.00039 kg dw/day (maximum soil ingestion rate)
- AF = 1 (default used)

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} (BAF_{food} \cdot DF) + IR_s) AF} = \frac{0.15 \cdot 0.0125}{(0.003 (1.1 \cdot 1) + 0.00039) \cdot 1} = \textbf{5.1E-01 mg/kg}$$

NOAEL HQ = MDC (mg/kg)/NOAEL-based SL (mg/kg) = $\frac{10}{5.1E-01}$ = **2.0E+01**

EPC NOAEL HQ = NOAEL HQ * (EPC (mg/kg) / MDC (mg/kg)) = 2.0E+01*($\frac{6.908}{10}$) = **1.4E+01**

Refined

- ADD = 0.15 mg/kg bw-day
- BW = 0.015 kg
- IR_{food} = 0.002 kg dw/day
- BAF_{plant} = 0.038
- BAF_{inv} = 0.137
- DF_{plant} = 0.14
- DF_{inv} = 0.86
- IR_{soil} = 0.00026 kg dw/day
- $AF_{refined}$ = 0.31

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF_{food}) + IR_s)AF}$$

$$= \frac{0.15 \cdot 0.015}{(0.002\,(0.038 \cdot 0.14 + 0.137 \cdot 0.86) + 0.00026) \cdot 0.31} = \textbf{1.4+01 mg/kg}$$

NOAEL HQ = EPC (mg/kg)/NOAEL-based SL (mg/kg) = $\frac{6.908}{1.4E+01}$ = **4.8E-01**

Tables F.2-24, F.3-24, and F.4-24 provide a summary of preliminary and refined HQs developed for terrestrial receptors at SWMU 35, SWMU 37, and SWMU 38/AOC Q, respectively.

5.0 SUMMARY

Receptor-specific exposure parameters are obtained from life history studies found in the literature. Important receptor-specific exposure parameters input into the model include: body weight, food ingestion rate, diet composition, incidental substrate ingestion rate, and area use factor.

The dose-response relationships for chemicals of potential interest are expressed as NOAELs and LOAELs for wildlife receptors, which are defined as a daily ingested amount (mg COPC/kg body weight-day) that is associated with a specified growth, reproductive, developmental, or survival effect. Extrapolation and uncertainty factors are applied to literature-based toxicological endpoints to account for differences in a controlled laboratory setting and an ecologically relevant setting. Extrapolation and uncertainty factors are based on: (1) the duration of exposure, (2) the endpoint measured, and (3) differences in body weights among test and receptor species.

Bioaccumulation accumulation factors provide quantitative indicators of the tendency for a chemical to partition into organisms, relative to the concentrations present in exposure media. Exposure-point concentrations of chemicals in terrestrial prey (soil invertebrates and small mammals) are estimated using several BAFs derived from the literature.

COPC concentrations in prey and media, receptor-specific exposure parameters, literature-based NOAEL and LOAEL values, and bioaccumulation factors are used in the model to calculate the concentration in exposure media (C_{TRV}) that would result in a dose equivalent to a NOAEL or LOAEL. The dose rate

modeling approach is used to evaluate the potential mobility of COPCs through varying trophic associations.

6.0 REFERENCES

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APPENDIX F.2

SWMU 35 SLERA

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Table F.2-1
SLERA Occurence/Distribution - SWMU 35 Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Units	Location of Maximum Concentration	Total Samples Analyzed	Detection Frequency	Concentration Used for Screening
TAL Metals								
Aluminum	7429-90-5	17,000	25,000	mg/kg	35SB7A	10	10/10	25,000
Antimony	7440-36-0	0.0365	1.1	mg/kg	35SB7A	10	9/10	1.1
Arsenic	7440-38-2	1.5	10	mg/kg	35SB10A	10	10/10	10
Barium	7440-39-3	82	180	mg/kg	35SB9A	10	10/10	180
Beryllium	7440-41-7	0.59	1.1	mg/kg	35SB6A	10	10/10	1.1
Cadmium	7440-43-9	1.2	2.2	mg/kg	35SB7A	10	10/10	2.2
Calcium	7440-70-2	5,300	87,000	mg/kg	35SB10A	10	10/10	87,000
Chromium	7440-47-3	23	160	mg/kg	35SB10A	10	10/10	160
Cobalt	7440-48-4	5.1	11.5	mg/kg	35SB5A DUP AVG	10	10/10	11.5
Copper	7440-50-8	12	200	mg/kg	35SB7A	10	10/10	200
Iron	7439-89-6	19,000	31,000	mg/kg	35SB2A	10	10/10	31,000
Lead	7439-92-1	25	750	mg/kg	35SB7A	10	10/10	750
Magnesium	7439-95-4	3,300	14,000	mg/kg	35SB10A	10	10/10	14,000
Manganese	7439-96-5	260	675	mg/kg	35SB4A DUP AVG	10	10/10	675
Mercury	7439-97-6	0.044	0.83	mg/kg	35SB7A	10	10/10	0.83
Nickel	7440-02-0	12	45	mg/kg	35SB6A	10	10/10	45
Potassium	7440-09-7	1,300	1,700	mg/kg	35SB3A	10	10/10	1,700
Selenium	7782-49-2	0.16	0.37	mg/kg	35SB2A	10	10/10	0.37
Silver	7440-22-4	0.067	25	mg/kg	35SB7A	10	10/10	25
Sodium	7440-23-5	31	85	mg/kg	35SB10A	10	10/10	85
Thallium	7440-28-0	0.059	0.235	mg/kg	35SB5A DUP AVG	10	10/10	0.235
Vanadium	7440-62-2	21	43.5	mg/kg	35SB4A DUP AVG	10	10/10	43.5
Zinc	7440-66-6	60	280	mg/kg	35SB9A	10	10/10	280
TCL Pesticides/PCBs								
4,4'-DDT	50-29-3	1.5E-03	1.5E-03	mg/kg	35SB1A	10	1/10	1.5E-03
Heptachlor epoxide	1024-57-3	6.5E-03	6.5E-03	mg/kg	35SB2A	10	1/10	6.5E-03
Aroclor 1254	11097-69-1	3.2E-02	1.7E+00	mg/kg	35SB6A	10	10/10	1.7E+00
Aroclor 1260	11096-82-5	8.0E-01	8.0E-01	mg/kg	35SB6A	10	1/10	8.0E-01
TCL VOCs								
2-Butanone	78-93-3	1.4E-02	1.7E-02	mg/kg	35SB1A	10	4/10	1.7E-02
Acetone	67-64-1	9.6E-02	2.4E-01	mg/kg	35SB10A	10	9/10	2.4E-01
Carbon disulfide	75-15-0	3.1E-03	6.2E-03	mg/kg	35SB5A DUP AVG	10	4/10	6.2E-03
Methyl acetate	79-20-9	3.1E-03	2.0E-01	mg/kg	35SB2A	10	9/10	2.0E-01
Methylene chloride	75-09-2	5.5E-03	5.5E-03	mg/kg	35SB1A	10	1/10	5.5E-03
Toluene	108-88-3	2.5E-02	5.5E-02	mg/kg	35SB5A DUP AVG	10	2/10	5.5E-02
TCL SVOCs								
Benzaldehyde	100-52-7	3.1E-01	4.6E+00	mg/kg	35SB6A	10	2/10	4.6E+00
Benzo(a)anthracene	56-55-3	3.9E-03	1.0E-01	mg/kg	35SB8A	10	7/10	1.0E-01
Benzo(a)pyrene	50-32-8	5.5E-03	1.8E-02	mg/kg	35SB3A	10	2/10	1.8E-02
Benzo(b)fluoranthene	205-99-2	9.3E-03	2.9E-02	mg/kg	35SB3A	10	2/10	2.9E-02
Benzo(k)fluoranthene	207-08-9	1.8E-02	1.8E-02	mg/kg	35SB3A	10	1/10	1.8E-02
Bis(2-ethylhexyl) Phthalate	117-81-7	1.6E-02	5.4E-01	mg/kg	35SB6A	10	5/10	5.4E-01
Carbazole	86-74-8	7.4E-03	7.4E-03	mg/kg	35SB3A	10	1/10	7.4E-03
Chrysene	218-01-9	7.0E-03	5.7E-02	mg/kg	35SB6A	10	4/10	5.7E-02
Di-n-butylphthalate	84-74-2	1.1E-02	4.9E+00	mg/kg	35SB5A DUP AVG	10	10/10	4.9E+00
Diethylphthalate	84-66-2	4.0E-03	3.0E-02	mg/kg	35SB2A	10	3/10	3.0E-02
Naphthalene	91-20-3	3.7E-03	3.7E-03	mg/kg	35SB3A	10	1/10	3.7E-03
N-Nitrosodiphenylamine	86-30-6	2.5E-01	2.5E-01	mg/kg	35SB6A	10	1/10	2.5E-01
Pyrene	129-00-0	1.9E-03	1.9E-01	mg/kg	35SB7A	10	8/10	1.9E-01
Explosives								
2,4,6-Trinitrotoluene	118-96-7	3.1E-01	3.1E-01	mg/kg	35SB6A	10	1/10	3.1E-01
2,4-Dinitrotoluene	121-14-2	5.2E-01	5.2E-01	mg/kg	35SB5A DUP AVG	10	1/10	5.2E-01
Dinitrotoluene Mix	--	5.2E-01	5.2E-01	mg/kg	35SB5A DUP AVG	10	1/10	5.2E-01
HMX	2691-41-0	5.9E-01	7.0E+00	mg/kg	35SB7A	10	6/10	7.0E+00
Nitroglycerin								
Nitroglycerin	55-63-0	1.1E+01	1.1E+01	mg/kg	35SB6A	10	1/10	1.1E+01

Notes:
CAS = Chemical Abstracts Service
COPEC = Chemical of Potential Ecological Concern
mg/kg = Milligram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound

Table F.2-2
Non-detected Chemicals MDL Screening for SWMU 35 - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
TAL Metals																		
Antimony	7440-36-0	mg/kg	1	10	0.042	0.042	5	F	N	78	A	N	--	--	NS	0.27	A	N
Pesticides/PCBs (ug/kg)																		
4,4'-DDD	72-54-8	ug/kg	10	10	1.2	2.2	100	G	N	100	C	N	--	--	NS	--	--	NS
4,4'-DDE	72-55-9	ug/kg	10	10	0.99	1.8	100	G	N	100	C	N	--	--	NS	--	--	NS
4,4'-DDT	50-29-3	ug/kg	9	10	1.1	2	100	G	N	100	C	N	93	A	N	21	A	N
Aldrin	309-00-2	ug/kg	10	10	0.6	1.1	100	G	N	100	C	N	--	--	NS	--	--	NS
alpha-BHC	319-84-6	ug/kg	10	10	0.39	0.69	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
alpha-Chlordane	5103-71-9	ug/kg	10	10	0.75	1.3	100	G	N	100	C	N	--	--	NS	--	--	NS
beta-BHC	319-85-7	ug/kg	10	10	0.74	1.3	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
delta-BHC	319-86-8	ug/kg	10	10	1	1.8	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
Dieldrin	60-57-1	ug/kg	10	10	0.51	0.91	100	G	N	100	C	N	22	A	N	4.9	A	N
Endosulfan I	959-98-8	ug/kg	10	10	0.99	1.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endosulfan II	33213-65-9	ug/kg	10	10	0.94	1.7	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endosulfan Sulfate	1031-07-8	ug/kg	10	10	1.1	2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endrin	72-20-8	ug/kg	10	10	0.59	1.1	100	G	N	100	C	N	--	--	NS	--	--	NS
Endrin Aldehyde	7421-93-4	ug/kg	10	10	1.1	2.1	100	G	N	100	C	N	--	--	NS	--	--	NS
Endrin Ketone	53494-70-5	ug/kg	10	10	1.1	2	100	G	N	100	C	N	--	--	NS	--	--	NS
gamma-BHC (Lindane)	58-89-9	ug/kg	10	10	0.71	1.3	100	G	N	100	C	N	--	--	NS	--	--	NS
gamma-Chlordane	5103-74-2	ug/kg	10	10	0.52	0.93	100	G	N	100	C	N	--	--	NS	--	--	NS
Heptachlor	76-44-8	ug/kg	10	10	1.3	2.4	100	G	N	100	C	N	--	--	NS	--	--	NS
Heptachlor Epoxide	1024-57-3	ug/kg	9	10	0.46	0.82	100	G	N	100	C	N	--	--	NS	--	--	NS
Methoxychlor	72-43-5	ug/kg	10	10	1.4	2.5	100	G	N	100	C	N	--	--	NS	--	--	NS
Toxaphene	8001-35-2	ug/kg	10	10	25	44	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Aroclor 1016	12674-11-2	ug/kg	10	10	4.6	14	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1221	11104-28-2	ug/kg	10	10	8.2	25	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1232	11141-16-5	ug/kg	10	10	9.3	29	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1242	53469-21-9	ug/kg	10	10	18	55	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1248	12672-29-6	ug/kg	10	10	5.8	18	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1254	11097-69-1	ug/kg	0	10	0	0	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1260	11096-82-5	ug/kg	9	10	18	31	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1262	37324-23-5	ug/kg	10	10	5.7	18	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1268	11100-14-4	ug/kg	10	10	4.9	15	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
TCL VOCs (ug/kg)																		
Acetone	67-64-1	ug/kg	1	10	110	110	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,1,1-Trichloroethane	71-55-6	ug/kg	10	10	0.23	11	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	10	10	0.22	9.9	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/kg	10	10	0.37	14	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,1,2-Trichloroethane	79-00-5	ug/kg	10	10	0.76	20	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1-Dichloroethane	75-34-3	ug/kg	10	10	0.21	7.5	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1-Dichloroethene	75-35-4	ug/kg	10	10	0.41	14	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,3-Trichlorobenzene	87-61-6	ug/kg	10	10	0.23	13	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/kg	10	10	0.27	16	100	G	N	100	C	N	--	--	NS	--	--	NS
1,2-Dibromo-3-chloropropane	96-12-8	ug/kg	10	10	0.9	29	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2-Dibromoethane	106-93-4	ug/kg	10	10	0.93	22	--	--	NS	5,000	C	N	--	--	NS	--	--	NS
1,2-Dichlorobenzene	95-50-1	ug/kg	10	10	0.27	6.5	100	G	N	100	C	N	--	--	NS	--	--	NS
1,2-Dichloroethane	107-06-2	ug/kg	10	10	0.33	15	870,000	G	N	--	--	NS	--	--	NS	--	--	NS
1,2-Dichloropropane	78-87-5	ug/kg	10	10	1	10	300	G	N	300	C	N	--	--	NS	--	--	NS
1,3-Dichlorobenzene	541-73-1	ug/kg	10	10	0.26	12	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,4-Dichlorobenzene	106-46-7	ug/kg	10	10	0.24	13	100	G	N	20,000	B	N	--	--	NS	--	--	NS
2-Butanone	78-93-3	ug/kg	6	10	20	33	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Hexanone	591-78-6	ug/kg	10	10	3.3	42	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Methyl-2-pentanone	108-10-1	ug/kg	10	10	2.1	38	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
Benzene	71-43-2	ug/kg	10	10	0.14	12	100	G	N	100	C	N	--	--	NS	--	--	NS
Bromochloromethane	74-97-5	ug/kg	10	10	0.14	19	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bromodichloromethane	75-27-4	ug/kg	10	10	0.27	19	450,000	G	N	--	--	NS	--	--	NS	--	--	NS
Bromoform	75-25-2	ug/kg	10	10	0.53	23	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bromomethane	74-83-9	ug/kg	10	10	1.3	19	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbon Disulfide	75-15-0	ug/kg	6	10	17	28	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbon Tetrachloride	56-23-5	ug/kg	10	10	0.32	15	300	G	N	300	C	N	--	--	NS	--	--	NS
Chlorobenzene	108-90-7	ug/kg	10	10	0.22	12	100	G	N	40,000	B	N	--	--	NS	--	--	NS
Chloroethane	75-00-3	ug/kg	10	10	0.39	20	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Chloroform	67-66-3	ug/kg	10	10	0.16	6.1	300	G	N	300	C	N	--	--	NS	--	--	NS

Table F.2-2
Non-detected Chemicals MDL Screening for SWMU 35 - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
Chloromethane	74-87-3	ug/kg	10	10	0.27	5.9	--	--	NS	--	--	NS	--	--	NS	--	--	NS
cis-1,2-Dichloroethene	156-59-2	ug/kg	10	10	0.18	16	300	G	N	300	C	N	--	--	NS	--	--	NS
cis-1,3-Dichloropropene	10061-01-5	ug/kg	10	10	0.28	14	300	G	N	300	C	N	--	--	NS	--	--	NS
Cyclohexane	110-82-7	ug/kg	10	10	0.76	14	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dibromochloromethane	124-48-1	ug/kg	10	10	0.39	14	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dichlorodifluoromethane	75-71-8	ug/kg	10	10	0.36	17	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Ethylbenzene	100-41-4	ug/kg	10	10	0.14	13	100	G	N	100	C	N	--	--	NS	--	--	NS
Isopropylbenzene	98-82-8	ug/kg	10	10	0.14	12	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methyl Acetate	79-20-9	ug/kg	1	10	1	1	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methyl tert-Butyl Ether	1634-04-4	ug/kg	10	10	0.26	9.5	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methylcyclohexane	108-87-2	ug/kg	10	10	0.88	15	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methylene Chloride	75-09-2	ug/kg	9	10	4.4	16	300	G	N	300	C	N	--	--	NS	--	--	NS
Styrene	100-42-5	ug/kg	10	10	0.24	11	300,000	F	N	100	C	N	--	--	NS	--	--	NS
Tetrachloroethene	127-18-4	ug/kg	10	10	0.49	15	300	G	N	300	C	N	--	--	NS	--	--	NS
Toluene	108-88-3	ug/kg	8	10	0.44	7.1	200,000	F	N	100	C	N	--	--	NS	--	--	NS
trans-1,2-Dichloroethene	156-60-5	ug/kg	10	10	0.25	16	300	G	N	300	C	N	--	--	NS	--	--	NS
trans-1,3-Dichloropropene	10061-02-6	ug/kg	10	10	0.92	15	300	G	N	300	C	N	--	--	NS	--	--	NS
Trichloroethene	79-01-6	ug/kg	10	10	0.62	17	300	G	N	300	C	N	--	--	NS	--	--	NS
Trichlorofluoromethane	75-69-4	ug/kg	10	10	0.24	18	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Vinyl Chloride	75-01-4	ug/kg	10	10	0.5	17	300	G	N	300	C	N	--	--	NS	--	--	NS
Xylenes	1330-20-7	ug/kg	10	10	0.65	35	100	G	N	--	--	NS	--	--	NS	--	--	NS
TCL SVOCs (ug/kg)																		
1,1'-Biphenyl	92-52-4	ug/kg	10	10	2.7	450	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/kg	10	10	4.7	790	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,3,4,6-Tetrachlorophenol	58-90-2	ug/kg	10	10	95	16,000	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4,5-Trichlorophenol	95-95-4	ug/kg	10	10	35	5,900	4,000	F	**Y**	9,000	B	N	--	--	NS	--	--	NS
2,4,6-Trichlorophenol	88-06-2	ug/kg	10	10	27	4,500	100	G	**Y**	10,000	B	N	--	--	NS	--	--	NS
2,4-Dichlorophenol	120-83-2	ug/kg	10	10	38	6,500	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
2,4-Dimethylphenol	105-67-9	ug/kg	10	10	33	5,600	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
2,4-Dinitrophenol	51-28-5	ug/kg	10	10	190	33,000	20,000	F	**Y**	100	C	**Y**	--	--	NS	--	--	NS
2,4-Dinitrotoluene	121-14-2	ug/kg	10	10	77	13,000	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,6-Dinitrotoluene	606-20-2	ug/kg	10	10	9.5	1,600	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Chloronaphthalene	91-58-7	ug/kg	10	10	2.5	430	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Chlorophenol	95-57-8	ug/kg	10	10	2.2	380	7,000	F	N	10,000	B	N	--	--	NS	--	--	NS
2-Methylnaphthalene	91-57-6	ug/kg	10	10	2.8	470	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Methylphenol	95-48-7	ug/kg	10	10	47	8,000	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
2-Nitroaniline	88-74-4	ug/kg	10	10	77	13,000	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Nitrophenol	88-75-5	ug/kg	10	10	71	12,000	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3,3'-Dichlorobenzidine	91-94-1	ug/kg	10	10	460	77,000	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3-Nitroaniline	99-09-2	ug/kg	10	10	64	11,000	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4,6-Dinitro-2-methylphenol	534-52-1	ug/kg	10	10	210	36,000	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Bromophenyl Phenyl Ether	101-55-3	ug/kg	10	10	7.3	1,200	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Chloro-3-methylphenol	59-50-7	ug/kg	10	10	10	1,800	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Chloroaniline	106-47-8	ug/kg	10	10	110	19,000	20,000	F	N	--	--	NS	--	--	NS	--	--	NS
4-Chlorophenyl Phenyl Ether	7005-72-3	ug/kg	10	10	2.6	440	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Methylphenol	106-44-5	ug/kg	10	10	53	9,000	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
4-Nitroaniline	100-01-6	ug/kg	10	10	130	23,000	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Nitrophenol	100-02-7	ug/kg	10	10	65	11,000	100	G	**Y**	7,000	B	**Y**	--	--	NS	--	--	NS
Acetophenone	98-86-2	ug/kg	10	10	39	6,600	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Atrazine	1912-24-9	ug/kg	10	10	8.7	1,500	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Benzaldehyde	100-52-7	ug/kg	8	10	160	26,000	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bis(2-chloroethoxy)methane	111-91-1	ug/kg	10	10	4.7	790	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bis(2-chloroethyl) Ether	111-44-4	ug/kg	10	10	5.3	890	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bis(2-ethylhexyl) Phthalate	117-81-7	ug/kg	5	10	7.6	1,300	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bis(2-chloroisopropyl) Ether	39638-32-9	ug/kg	10	10	1.8	310	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Butylbenzylphthalate	85-68-7	ug/kg	10	10	12	2,100	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Caprolactam	105-60-2	ug/kg	10	10	130	23,000	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbazole	86-74-8	ug/kg	9	10	2.9	490	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Di-n-octylphthalate	117-84-0	ug/kg	10	10	57	9,700	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dibenzofuran	132-64-9	ug/kg	10	10	1.5	260	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Diethylphthalate	84-66-2	ug/kg	7	10	2.2	370	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dimethylphthalate	131-11-3	ug/kg	10	10	2	330	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachlorobenzene	118-74-1	ug/kg	10	10	4.7	790	--	--	NS	--	--	NS	--	--	NS	--	--	NS

Table F.2-2
Non-detected Chemicals MDL Screening for SWMU 35 - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
Hexachlorobutadiene	87-68-3	ug/kg	10	10	4	680	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachlorocyclopentadiene	77-47-4	ug/kg	10	10	23	3,900	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachloroethane	67-72-1	ug/kg	10	10	4.7	790	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Isophorone	78-59-1	ug/kg	10	10	2.3	400	--	--	NS	--	--	NS	--	--	NS	--	--	NS
N-Nitrosodi-n-propylamine	621-64-7	ug/kg	10	10	4.2	700	--	--	NS	--	--	NS	--	--	NS	--	--	NS
N-Nitrosodiphenylamine	86-30-6	ug/kg	9	10	4.7	790	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Nitrobenzene	98-95-3	ug/kg	10	10	8.7	1,500	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Pentachlorophenol	87-86-5	ug/kg	10	10	22	3,600	5,000	A	N	31,000	A	N	2,100	A	**Y**	2,800	A	**Y**
Phenol	108-95-2	ug/kg	10	10	4.1	690	100	G	**Y**	30,000	B	N	--	--	NS	--	--	NS
PAHs (ug/kg)																		
Acenaphthene	83-32-9	ug/kg	10	10	2.3	400	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Acenaphthylene	208-96-8	ug/kg	10	10	3.5	590	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Anthracene	120-12-7	ug/kg	10	10	2.5	420	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Benzo(a)anthracene	56-55-3	ug/kg	3	10	240	530	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Benzo(a)pyrene	50-32-8	ug/kg	8	10	6	1,000	100	G	**Y**	--	--	NS	--	--	NS	--	--	NS
Benzo(b)fluoranthene	205-99-2	ug/kg	8	10	5	840	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Benzo(g,h,i)perylene	191-24-2	ug/kg	10	10	13	2,300	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Benzo(k)fluoranthene	207-08-9	ug/kg	9	10	4.2	710	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Chrysene	218-01-9	ug/kg	6	10	2.8	470	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Dibenz(a,h)anthracene	53-70-3	ug/kg	10	10	3.1	530	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Fluoranthene	206-44-0	ug/kg	10	10	22	3,700	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Fluorene	86-73-7	ug/kg	10	10	1.6	280	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	10	10	4.1	690	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Naphthalene	91-20-3	ug/kg	9	10	1.4	230	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Phenanthrene	85-01-8	ug/kg	10	10	21	3,600	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Pyrene	129-00-0	ug/kg	2	10	140	310	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Explosives (mg/kg)																		
1,3,5-Trinitrobenzene	99-35-4	mg/kg	10	10	0.074	0.074	8.6	I	N	18.1	I	N	--	--	NS	--	--	NS
1,3-Dinitrobenzene	99-65-0	mg/kg	10	10	0.076	0.076	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	9	10	0.15	0.15	2.4	H	N	1.2	H	N	--	--	NS	--	--	NS
2,4-Dinitrotoluene	121-14-2	mg/kg	9	10	0.1	0.1	5.3	I	N	19.8	I	N	--	--	NS	--	--	NS
2,6-Dinitrotoluene	606-20-2	mg/kg	10	10	0.2	0.2	4.5	I	N	6.9	I	N	--	--	NS	--	--	NS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	10	10	0.22	0.22	80	J	N	--	--	NS	--	--	NS	--	--	NS
2-Nitrotoluene	88-72-2	mg/kg	10	10	0.17	0.17	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3-Nitrotoluene	99-08-1	mg/kg	10	10	0.21	2.5	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	mg/kg	10	10	0.3	0.3	80	J	N	--	--	NS	--	--	NS	--	--	NS
4-Nitrotoluene	99-99-0	mg/kg	10	10	0.2	0.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
HMX	2691-41-0	mg/kg	4	10	0.066	0.066	--	--	NS	6.3	I	N	--	--	NS	--	--	NS
Nitrobenzene	98-95-3	mg/kg	10	10	0.03	0.03	--	--	NS	--	--	NS	--	--	NS	--	--	NS
RDX	121-82-4	mg/kg	10	10	0.048	0.048	100	K	N	98.6	I	N	--	--	NS	--	--	NS
Tetryl	479-45-8	mg/kg	10	10	0.065	0.065	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Nitroglycerin/PETN (mg/kg)																		
Nitroglycerin	55-63-0	mg/kg	9	10	0.39	0.39	--	--	NS	--	--	NS	--	--	NS	--	--	NS
PETN	78-11-5	mg/kg	10	10	0.23	0.23	--	--	NS	--	--	NS	--	--	NS	--	--	NS

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
ug/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
PETN = Pentaerythritol Tetranitrate
MDL = Method Detection Limit
SL = Screening Level
Eco SSL = Ecological Soil Screening Level

Sources:
A = USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
B = ORNL - Earthworms - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
C = BTAG - Fauna - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
E = ORNL - Microbial Processes - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
F = ORNL - Plants - Toxilogical Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision Efroymson et al.)
G = BTAG - Flora - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
H = Best, E.P.H., H.E. Tatem, K.N. Geter, M.L. Wells and B.K. Lane. 2004. Toxicity and Metabolites of 2,4,6 Trinitrotoluene (TNT) in Plants and Worms from Exposure to Aged Soil.
I = Kuperman. R. 2003. Development of Ecological Toxicity and Biomagnification Data for Explosives Contaminants in Soil.
J = Pennington, Judith C. 1988. Plant Uptake of 2,4,6-Trinitrotoluene, 4-Amino-2,6-Dinitrotoluene, and 2-Amino-4,6-Dinitrotoluene Using 14C-Labeled and Unlabeled Compounds.
K = Simini, M., R.S. Wentsel, R.T. Checkai, C.T. Phillips, N.A. Chester, M.A. Major, and J.C. Amos. 1995. Evaluation of Soil Toxicity at Joliet Army Ammunition Plant.

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

Table F.2-3a
Summary of Total PCBs at SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date Sample Depth (ft bgs)	CAS #	35SB1A 11/13/2007 0-1		35SB2A 11/13/2007 0-1		35SB3A 11/12/2007 0-1		35SB4A DUP AVG 11/13/2007 0-1		35SB5A DUP AVG 11/14/2007 0-1	
		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
PCBs (ug/kg)											
Aroclor 1254	11097-69-1	32	J,J,g	350		320		119.5		173.5	,J,f
Aroclor 1260	11096-82-5	<78	U	<81	U	<74	U	<80	U	<85	U,UL,s
Total PCBs	--	32		350		320		119.5		173.5	

Notes:
CAS = Chemical Abstract Service
ug/kg = Microgram per kilogram
ND = Not Detected
PBC = PolyChlorinated Biphenyl
See Table 4-1 for flag definitions

Table F.2-3a
Summary of Total PCBs at SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date Sample Depth (ft bgs)	CAS #	35SB6A 11/13/2007 0-1		35SB7A 11/14/2007 0-1		35SB8A 11/14/2007 0-1		35SB9A 11/13/2007 0-1		35SB10A 11/13/2007 0-1	
		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
PCBs (ug/kg)											
Aroclor 1254	11097-69-1	1,700	,L,s	580	,J,g	300		330	,J,g	590	
Aroclor 1260	11096-82-5	800	,L,s	<130	U	<83	U	<92	U,UL,s	<130	U
Total PCBs	--	2,500		580		300		330		590	

Notes:
CAS = Chemical Abstract Service
ug/kg = Microgram per kilogram
ND = Not Detected
PBC = PolyChlorinated Biphenyl
See Table 4-1 for flag definitions

Table F.2-3b
Summary of Low and High Molecular Weight PAHs at SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date Sample Depth (ft bgs)	CAS #	35SB1A 11/13/2007 0-1		35SB2A 11/13/2007 0-1		35SB3A 11/12/2007 0-1		35SB4A DUP AVG 11/13/2007 0-1		35SB5A DUP AVG 11/14/2007 0-1		35SB6A 11/13/2007 0-1		35SB7A 11/14/2007 0-1		35SB8A 11/14/2007 0-1		35SB9A 11/13/2007 0-1		35SB10A 11/13/2007 0-1	
		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TCL PAHs (ug/kg)																					
Naphthalene	91-20-3	<99	U	<510	U	3.7	J	<100	U	<7,500	U	<1,400	U	<9,600	U	<2,600	U	<1,200	U,UL,s	<17,000	U
Low Molecular Weight PAHs	--	ND		ND		3.7		ND		ND		ND		ND		ND		ND		ND	
Benzo(a)anthracene	56-55-3	3.9	J	30	J	22	J	7.95	J	<7,500	U	57	J	<9,600	U	100	J	46	J,L,s	<17,000	U
Benzo(a)pyrene	50-32-8	<99	U	<510	U	18	J	5.5	J	<7,500	U	<1,400	U	<9,600	U	<2,600	U	<1,200	U,UL,s	<17,000	U
Benzo(b)fluoranthene	205-99-2	<99	U	<510	U	29	J	9.275	J	<7,500	U	<1,400	U	<9,600	U	<2,600	U	<1,200	U,UL,s	<17,000	U
Benzo(k)fluoranthene	207-08-9	<99	U	<510	U	18	J	<100	U	<7,500	U	<1,400	U	<9,600	U	<2,600	U	<1,200	U,UL,s	<17,000	U
Chrysene	218-01-9	<99	U	20	J	15	J	6.95	J	<7,500	U	57	J	<9,600	U	<2,600	U	<1,200	U,UL,s	<17,000	U
Pyrene	129-00-0	1.9	J	20	J	18	J	7.95	J	<7,500	U	57	J	190	J	52	J	46	J,L,s	<17,000	U
High Molecular Weight PAHs	--	5.8		70		120		37.625		ND		171		190		152		92		ND	

Notes:
CAS = Chemical Abstract Service
ug/kg = Microgram per kilogram
ND = Not Detected
TAL = Target Analyte List
PAH = Polynuclear Aromatic Hydrocarbon
See Table 4-1 for flag definitions

Table F.2-4
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Exposure to Contaminants in SWMU 35 Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Soil	Aluminum	mg/kg	21,500	23,028	25,000	23,028	mg/kg	95% Student's t UCL	ProUCL 4.0
	Arsenic	mg/kg	5.03	6.908	10	6.908	mg/kg	95% Student's t UCL	ProUCL 4.0
	Cadmium	mg/kg	1.625	1.811	2.2	1.81	mg/kg	95% Student's t UCL	ProUCL 4.0
	Calcium	mg/kg	26,160	49,323	87,000	49,323	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Chromium	mg/kg	81.4	130	160	130	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Copper	mg/kg	66.90	102	200	102	mg/kg	95% Student's t UCL	ProUCL 4.0
	Iron	mg/kg	25,700	27,594	31,000	27,594	mg/kg	95% Student's t UCL	ProUCL 4.0
	Lead	mg/kg	233.6	445.5	750	445.5	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Manganese	mg/kg	513.5	594.2	675	594	mg/kg	95% Student's t UCL	ProUCL 4.0
	Mercury	mg/kg	0.276	0.675	0.83	0.675	mg/kg	95% Chebyshev (MVUE) UCL	ProUCL 4.0
	Nickel	mg/kg	26.05	32.58	45	32.58	mg/kg	95% Student's t UCL	ProUCL 4.0
	Selenium	mg/kg	0.266	0.314	0.37	0.314	mg/kg	95% Student's t UCL	ProUCL 4.0
	Vanadium	mg/kg	34.55	38.69	43.5	38.69	mg/kg	95% Student's t UCL	ProUCL 4.0
	Zinc	mg/kg	139.5	177.6	280	177.6	mg/kg	95% Student's t UCL	ProUCL 4.0
	4,4-DDT*	mg/kg	--	--	0.0015	0.0015	mg/lkg	Maximum Detected Concentration	--
	Aroclor 1254	mg/kg	0.450	0.839	1.7	0.839	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Aroclor 1260*	mg/kg	--	--	0.8	0.8	mg/kg	Maximum Detected Concentration	--
	2,4,6-Trinitrotoluene	mg/kg	--	--	0.31	0.31	mg/kg	Maximum Detected Concentration	--
	2,4-Dinitrotoluene	mg/kg	--	--	0.52	0.52	mg/kg	Maximum Detected Concentration	--
	HMX	mg/kg	--	--	7	7	mg/kg	Maximum Detected Concentration	--
	Nitroglycerin*	mg/kg	--	--	11	11	mg/kg	Maximum Detected Concentration	--

Notes:
FOD = frequency of detection
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
* Due to the low frequency of detection, a mean and UCL were not calculated.

Table F.2-5
Plant Screening Level Sources - Soil
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Screening Level (mg/kg)	Source
TAL Metals			
Aluminum	7429-90-5	50	ORNL-Plants
Antimony	7440-36-0	5	ORNL-Plants
Arsenic	7440-38-2	18	ECO SSL
Barium	7440-39-3	500	ORNL-Plants
Beryllium	7440-41-7	10	ORNL-Plants
Cadmium	7440-43-9	32	ECO SSL
Calcium	7440-70-2	4	ORNL-Plants
Chromium	7440-47-3	1	ORNL-Plants
Cobalt	7440-48-4	13	ECO SSL
Copper	7440-50-8	70	ECO SSL
Iron	7439-89-6	NV	--
Lead	7439-92-1	120	ECO SSL
Magnesium	7439-95-4	NV	--
Manganese	7439-96-5	220	ECO SSL
Mercury	7439-97-6	0.3	ORNL-Plants
Nickel	7440-02-0	38	ECO SSL
Potassium	7440-09-7	NV	--
Selenium	7782-49-2	0.52	ECO SSL
Silver	7440-22-4	560	ECO SSL
Sodium	7440-23-5	NV	--
Thallium	7440-28-0	1	ORNL-Plants
Vanadium	7440-62-2	2	ORNL-Plants
Zinc	7440-66-6	160	ECO SSL
Pesticides/PCBs			
4,4'-DDT	50-29-3	0.1	BTAG - Flora
Heptachlor epoxide	1024-57-3	0.1	BTAG - Flora
Total PCBs	--	40	ORNL-Plants
TCL VOCs			
2-Butanone	78-93-3	NV	--
Acetone	67-64-1	NV	--
Carbon disulfide	75-15-0	NV	--
Methyl acetate	79-20-9	NV	--
Methylene chloride	75-09-2	0.3	BTAG - Flora
Toluene	108-88-3	200	ORNL-Plants
TCL SVOCs			
Benzaldehyde	100-52-7	NV	--
Bis(2-ethylhexyl) Phthalate	117-81-7	NV	--
Carbazole	86-74-8	NV	--
Di-n-butylphthalate	84-74-2	200	ORNL-Plants
Diethylphthalate	84-66-2	NV	--
N-Nitrosodiphenylamine	86-30-6	NV	--
Low Molecular Weight PAHs	--	NV	--
High Molecular Weight PAHs	--	NV	--
Explosives			
2,4,6-Trinitrotoluene	118-96-7	2.4	Best et al. 2004
2,4-Dinitrotoluene	121-14-2	5.3	Kuperman 2003
HMX	2691-41-0	NV	--
Nitroglycerin			
Nitroglycerin	55-63-0	NV	--

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
NV = No Value Available
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
ORNL - Plants - Toxilogical Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision Efroymson et al.
BTAG - Flora - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
Best, E.P.H., H.E. Tatem, K.N. Geter, M.L. Wells and B.K. Lane. 2004. Toxicity and Metabolites of 2,4,6 Trinitrotoluene (TNT) in Plants and Worms from Exposure to Aged Soil. U.S. Army Corps of Engineers, Engineer Research and Development Center. ERDC/EL TR-04-18.
Kuperman. R. 2003. Development of Ecological Toxicity and Biomagnification Data for Explosives Contaminants in Soil. U.S. Army Edgewood Chemical Biological Center. Final Techinical Report. Project CU-1221.

Table F.2-6
Plant Screening - Soil
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Constituent of Potential Ecological Concern	CAS #	Maximum Soil Concentration (mg/kg)	Screening Level (mg/kg)	Hazard Quotient (unitless)	EPC (mg/kg)	EPC Hazard Quotient (unitless)
Inorganics						
Aluminum	7429-90-5	25,000	50	**5.0E+02**	23,028	**4.6E+02**
Antimony	7440-36-0	1.1	5	2.2E-01	NC	NC
Arsenic	7440-38-2	10	18	5.6E-01	NC	NC
Barium	7440-39-3	180	500	3.6E-01	NC	NC
Beryllium	7440-41-7	1.1	10	1.1E-01	NC	NC
Cadmium	7440-43-9	2.2	32	6.9E-02	NC	NC
Calcium	7440-70-2	87,000	4	**2.2E+04**	49,323	**1.2E+04**
Chromium	7440-47-3	160	1	**1.6E+02**	130	**1.3E+02**
Cobalt	7440-48-4	11.5	13	8.8E-01	NC	NC
Copper	7440-50-8	200	70	**2.9E+00**	102	**1.5E+00**
Iron	7439-89-6	31,000	NV	NC	NC	NC
Lead	7439-92-1	750	120	**6.3E+00**	445.5	**3.7E+00**
Magnesium	7439-95-4	14,000	NV	NC	NC	NC
Manganese	7439-96-5	675	220	**3.1E+00**	594	**2.7E+00**
Mercury	7439-97-6	0.83	0.3	**2.8E+00**	0.675	**2.3E+00**
Nickel	7440-02-0	45	38	**1.2E+00**	32.58	8.6E-01
Potassium	7440-09-7	1,700	NV	NC	NC	NC
Selenium	7782-49-2	0.37	0.52	7.1E-01	NC	NC
Silver	7440-22-4	25	560	4.5E-02	NC	NC
Sodium	7440-23-5	85	NV	NC	NC	NC
Thallium	7440-28-0	0.235	1	2.4E-01	NC	NC
Vanadium	7440-62-2	44	2	**2.2E+01**	38.69	**1.9E+01**
Zinc	7440-66-6	280	160	**1.8E+00**	177.6	**1.1E+00**
Pesticides/PCBs						
4,4'-DDT	50-29-3	0.0015	0.1	1.5E-02	NC	NC
Heptachlor epoxide	1024-57-3	0.0065	0.1	6.5E-02	NC	NC
Total PCBs	--	2.5	40	6.3E-02	NC	NC
TCL VOCs						
2-Butanone	78-93-3	0.017	NV	NC	NC	NC
Acetone	67-64-1	0.24	NV	NC	NC	NC
Carbon disulfide	75-15-0	0.0062	NV	NC	NC	NC
Methyl acetate	79-20-9	0.2	NV	NC	NC	NC
Methylene chloride	75-09-2	0.0055	0.3	1.8E-02	NC	NC
Toluene	108-88-3	0.0551275	200	2.8E-04	NC	NC
TCL SVOCs						
Benzaldehyde	100-52-7	4.6	NV	NC	NC	NC
Bis(2-ethylhexyl) Phthalate	117-81-7	0.54	NV	NC	NC	NC
Carbazole	86-74-8	0.0074	NV	NC	NC	NC
Di-n-butylphthalate	84-74-2	4.85	200	2.4E-02	NC	NC
Diethylphthalate	84-66-2	0.03	NV	NC	NC	NC
N-Nitrosodiphenylamine	86-30-6	0.25	NV	NC	NC	NC
Low Molecular Weight PAHs	--	0.0037	NV	NC	NC	NC
High Molecular Weight PAHs	--	0.19	NV	NC	NC	NC
Explosives						
2,4,6-Trinitrotoluene	118-96-7	0.31	2.4	1.3E-01	NC	NC
2,4-Dinitrotoluene	121-14-2	0.52	5.3	9.8E-02	NC	NC
HMX	2691-41-0	7	NV	NC	NC	NC
Nitroglycerin						
Nitroglycerin	55-63-0	11	NV	NC	NC	NC

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
NV = No Value Available
NC = Not Calculated
Hazard Quotient = Soil Concentration/Screening Level
EPC = Exposure Point Concentration
See Table F.2-3a for Total PCBs
See Table F.2-3b for Total Low and High Molecular Weight PAHs

Table F.2-7
Invertebrate and Microbial Screening Level Sources - Soil
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Screening Level (mg/kg)	Source
TAL Metals			
Aluminum	7429-90-5	NV	--
Antimony	7440-36-0	78	ECO SSL
Arsenic	7440-38-2	60	ORNL-Earthworm
Barium	7440-39-3	330	ECO SSL
Beryllium	7440-41-7	40	ECO SSL
Cadmium	7440-43-9	140	ECO SSL
Calcium	7440-70-2	NV	--
Chromium	7440-47-3	0.4	ORNL-Earthworm
Cobalt	7440-48-4	200	BTAG - Fauna
Copper	7440-50-8	80	ECO SSL
Iron	7439-89-6	200	ORNL - Microbial
Lead	7439-92-1	1,700	ECO SSL
Magnesium	7439-95-4	NV	--
Manganese	7439-96-5	450	ECO SSL
Mercury	7439-97-6	0.1	ORNL-Earthworm
Nickel	7440-02-0	280	ECO SSL
Potassium	7440-09-7	NV	--
Selenium	7782-49-2	4.1	ECO SSL
Silver	7440-22-4	50	ORNL - Microbial
Sodium	7440-23-5	NV	--
Thallium	7440-28-0	NV	--
Vanadium	7440-62-2	20	ORNL - Microbial
Zinc	7440-66-6	120	Eco SSL
Pesticides/PCBs			
4,4'-DDT	50-29-3	0.1	BTAG - Fauna
Heptachlor epoxide	1024-57-3	0.1	BTAG - Fauna
Total PCBs	--	NV	--
TCL VOCs			
2-Butanone	78-93-3	NV	--
Acetone	67-64-1	NV	--
Carbon disulfide	75-15-0	NV	--
Methyl acetate	79-20-9	NV	--
Methylene chloride	75-09-2	0.3	BTAG - Fauna
Toluene	108-88-3	0.1	BTAG - Fauna
TCL SVOCs			
Benzaldehyde	100-52-7	NV	--
Bis(2-ethylhexyl) Phthalate	117-81-7	NV	--
Carbazole	86-74-8	NV	--
Di-n-butylphthalate	84-74-2	NV	--
Diethylphthalate	84-66-2	NV	--
N-Nitrosodiphenylamine	86-30-6	NV	--
Low Molecular Weight PAHs	--	29	ECO SSL
High Molecular Weight PAHs	--	18	ECO SSL
Explosives			
2,4,6-Trinitrotoluene	118-96-7	1.2	Best et al. 2004
2,4-Dinitrotoluene	121-14-2	19.8	Kuperman 2003
HMX	2691-41-0	6.3	Kuperman 2003
Nitroglycerin			
Nitroglycerin	55-63-0	NV	--

Table F.2-7
Invertebrate and Microbial Screening Level Sources - Soil
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
NV = No Value Available
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
ORNL - Earthworms - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
ORNL - Microbial Processes - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
BTAG - Fauna - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
Best, E.P.H., H.E. Tatem, K.N. Geter, M.L. Wells and B.K. Lane. 2004. Toxicity and Metabolites of 2,4,6 Trinitrotoluene (TNT) in Plants and Worms from Exposure to Aged Soil. U.S. Army Corps of Engineers, Engineer Research and Development Center. ERDC/EL TR-04-18.
Kuperman. R. 2003. Development of Ecological Toxicity and Biomagnification Data for Explosives Contaminants in Soil. U.S. Army Edgewood Chemical Biological Center. Final Techinical Report. Project CU-1221.

Table F.2-8
Invertebrate and Microbial Screening - Soil
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Constituent of Potential Ecological Concern	CAS #	Maximum Soil Concentration (mg/kg)	Screening Level (mg/kg)	Hazard Quotient (unitless)	EPC (mg/kg)	EPC Hazard Quotient (unitless)
Inorganics						
Aluminum	7429-90-5	25,000	NV	NC	NC	NC
Antimony	7440-36-0	1.1	78	1.4E-02	NC	NC
Arsenic	7440-38-2	10	60	1.7E-01	NC	NC
Barium	7440-39-3	180	330	5.5E-01	NC	NC
Beryllium	7440-41-7	1.1	40	2.8E-02	NC	NC
Cadmium	7440-43-9	2.2	140	1.6E-02	NC	NC
Calcium	7440-70-2	87,000	NV	NC	NC	NC
Chromium	7440-47-3	160	0.4	**4.0E+02**	130	**3.3E+02**
Cobalt	7440-48-4	11.5	200	5.8E-02	NC	NC
Copper	7440-50-8	200	80	**2.5E+00**	102	**1.3E+00**
Iron	7439-89-6	31,000	200	**1.6E+02**	27,594	**1.4E+02**
Lead	7439-92-1	750	1,700	4.4E-01	NC	NC
Magnesium	7439-95-4	14,000	NV	NC	NC	NC
Manganese	7439-96-5	675	450	**1.5E+00**	594	**1.3E+00**
Mercury	7439-97-6	0.83	0.1	**8.3E+00**	0.68	**6.8E+00**
Nickel	7440-02-0	45	280	1.6E-01	NC	NC
Potassium	7440-09-7	1,700	NV	NC	NC	NC
Selenium	7782-49-2	0.37	4	9.0E-02	NC	NC
Silver	7440-22-4	25	50	5.0E-01	NC	NC
Sodium	7440-23-5	85	NV	NC	NC	NC
Thallium	7440-28-0	0.235	NV	NC	NC	NC
Vanadium	7440-62-2	43.5	20	**2.2E+00**	39	**1.9E+00**
Zinc	7440-66-6	280	120	**2.3E+00**	178	**1.5E+00**
Pesticides/PCBs						
4,4'-DDT	50-29-3	0.0015	0.1	1.5E-02	NC	NC
Heptachlor epoxide	1024-57-3	0.0065	0.1	6.5E-02	NC	NC
Total PCBs	--	2.5	NV	NC	NC	NC
TCL VOCs						
2-Butanone	78-93-3	0.017	NV	NC	NC	NC
Acetone	67-64-1	0.24	NV	NC	NC	NC
Carbon disulfide	75-15-0	0.0062	NV	NC	NC	NC
Methyl acetate	79-20-9	0.2	NV	NC	NC	NC
Methylene chloride	75-09-2	0.0055	0.3	1.8E-02	NC	NC
Toluene	108-88-3	0.0551275	0.1	5.5E-01	NC	NC
TCL SVOCs						
Benzaldehyde	100-52-7	4.6	NV	NC	NC	NC
Bis(2-ethylhexyl) Phthalate	117-81-7	0.54	NV	NC	NC	NC
Carbazole	86-74-8	0.0074	NV	NC	NC	NC
Di-n-butylphthalate	84-74-2	4.85	NV	NC	NC	NC
Diethylphthalate	84-66-2	0.03	NV	NC	NC	NC
N-Nitrosodiphenylamine	86-30-6	0.25	NV	NC	NC	NC
Low Molecular Weight PAHs	--	0.0037	29	1.3E-04	NC	NC
High Molecular Weight PAHs	--	0.19	18	1.1E-02	NC	NC
Explosives						
2,4,6-Trinitrotoluene	118-96-7	0.31	1.2	2.6E-01	NC	NC
2,4-Dinitrotoluene	121-14-2	0.52	19.8	2.6E-02	NC	NC
HMX	2691-41-0	7	6.3	**1.1E+00**	NC	NC
Nitroglycerin						
Nitroglycerin	55-63-0	11	NV	NC	NC	NC

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
NV = No Value Available
NC = Not Calculated
Hazard Quotient = Soil Concentration/Screening Level
EPC = Exposure Point Concentration
See Table F.2-3b for Total Low and High Molecular Weight PAHs

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Table F.2-9
Wildlife Profiles
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

							Preliminary Assessment					Refined Assessment					
Representative Species			Composition of Diet [1] (%)				Minimum Body Weight [1]	Maximum Body Weight [1]	Maximum Food Ingestion Rate[2]	Maximum Substrate Ingestion Rate [3]		Average Body Weight [1]	Average Food Ingestion Rate [2]	Average Substrate Ingestion Rate [3]	Home Range (ha)	Proportion of Year Species Active	AUFs
Food-web Classification	Common Name	Scientific Name	Plants (incl. fungi)	Inverte-brates	Small mammals	Fish	kg	kg	kg dw/day	% of dry intake	kg dry wt./day	kg	kg dw/day	kg dry wt./day			Study Area (0.012) hectares
Birds																	
soil-probing invertivore	American robin	*Turdus migratorius*	62%	38%			0.0635	0.103	0.020	5%	0.001	0.077	0.016	0.0008	0.48	1	0.25
large carnivore	Red-tailed hawk	*Buteo jamaicensis*			100%		0.957	1.235	0.063	0%	0	1.134	0.059	0	250	1	0.0005
Mammals																	
small herbivore	Meadow vole	*Microtus pennsylvanicus*	100%				0.017	0.0524	0.010	2.4%	0.00024	0.037	0.008	0.00019	0.037	1	1
medium carnivore	Red fox	*Vulpes vulpes*	17%	4%	79%		2.95	7.04	0.342	2.8%	0.0096	4.53	0.238	0.0067	96	1	0.0013
small invertivore	Short-tailed shrew	*Blarina brevicauda*	14%	86%			0.0125	0.0225	0.003	13%	0.00039	0.015	0.002	0.00026	0.39	1	0.31

Notes:
kg = Kilogram
kg dw/day = Kilogram Dry-weight per Day
L/day = Liter per Day

[1]Wildlife Exposure Factors Handbook. U.S. Environmental Protection Agency (EPA). 1993. Office of Research and Development. 2 Volumes. EPA/600/R93/187a&b. December.
[2] Estimated food intake rate (kg [dw]/day) calculated as follows:
FI ((kg/day) = 0.0687 $Wt.^{0.882}$ for mammals (red fox and short-tailed shrew)
FI ((g/day) = 0.577 $Wt.^{0.727}$ for herbivores (meadow vole)
FI ((g/day) = 0.301 $Wt.^{0.751}$ for non-passerine birds (red-tailed hawk)
FI ((g/day) = 0.398 $Wt.^{0.850}$ for passerine birds (american robin)
[3]Estimating Exposure to Terrestrial Wildlife to Contaminants. Sample and Sutter. 1994. ES/ER/TM-125.
The soil ingestion rate for the american robin set equal to 38% of the american woodcock value (0.34*10.4%=4%), based on a robin diet of 38% invertbrates.

Table F.2-10
Wildlife TRVs
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38 and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	AVIAN TEST SPECIES				MAMMALIAN TEST SPECIES					AVIAN RECEPTORS				MAMMALIAN RECEPTORS					
											American Robin		Red-tailed Hawk		Meadow Vole		Red Fox		Short-tailed Shrew	
		Chronic LOAEL	Chronic NOAEL	Test Animal	Source	Chronic LOAEL	Chronic NOAEL	Test Animal	Test Animal Body Weight (kg)	Source	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL
		(mg/kg-bw/d)				(mg/kg-bw/d)					(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)	
Arsenic	7440-38-2	1.28E+01	5.14E+00	mallard duck	ORNL 1996	1.26	0.126	mouse	0.03	ORNL 1996	1.28E+01	5.14E+00	1.28E+01	5.14E+00	1.20E+00	1.20E-01	3.59E-01	3.59E-02	1.50E+00	1.50E-01
Cadmium	7440-43-9	2.00E+01	1.45E+00	mallard duck	ORNL 1996	10	1	rat	0.3	ORNL 1996	2.00E+01	1.45E+00	2.00E+01	1.45E+00	1.69E+01	1.69E+00	5.07E+00	5.07E-01	2.11E+01	2.11E+00
Chromium	7440-47-3	5.00E+00	1.00E+00	black duck	ORNL 1996	32.8	3.28	rat	0.35	ORNL 1996	5.00E+00	1.00E+00	5.00E+00	1.00E+00	5.75E+01	5.75E+00	1.73E+01	1.73E+00	7.21E+01	7.21E+00
Copper	7440-50-8	6.17E+01	4.70E+01	1 day old chicks	ORNL 1996	15.4	11.7	mink	1	ORNL 1996	6.17E+01	4.70E+01	6.17E+01	4.70E+01	3.51E+01	2.67E+01	1.06E+01	8.02E+00	4.40E+01	3.34E+01
Lead	7439-92-1	1.13E+01	1.13E+00	Japanese quail	ORNL 1996	80	8	rat	0.35	ORNL 1996	1.13E+01	1.13E+00	1.13E+01	1.13E+00	1.40E+02	1.40E+01	4.22E+01	4.22E+00	1.76E+02	1.76E+01
Mercury	7439-97-6	9.00E-01	4.50E-01	Japanese Quail	ORNL 1996	132	13.2	mink	1	ORNL 1996	9.00E-01	4.50E-01	9.00E-01	4.50E-01	3.01E+02	3.01E+01	9.05E+01	9.05E+00	3.77E+02	3.77E+01
Nickel	7440-02-0	1.07E+02	7.74E+01	mallard duckling	ORNL 1996	80	40	rat	0.35	ORNL 1996	1.07E+02	7.74E+01	1.07E+02	7.74E+01	1.40E+02	7.01E+01	4.22E+01	2.11E+01	1.76E+02	8.79E+01
Selenium	7782-49-2	8.00E-01	4.00E-01	mallard duck	ORNL 1996	0.33	0.2	rat	0.35	ORNL 1996	8.00E-01	4.00E-01	8.00E-01	4.00E-01	5.79E-01	3.51E-01	1.74E-01	1.05E-01	7.25E-01	4.40E-01
Silver	7440-22-4	1.24E+02	1.66E+01	turkey	Matuk et al. 1981	222	22.2	rat	0.35	Matuk et al. 1981	1.24E+02	1.66E+01	1.24E+02	1.66E+01	3.89E+02	3.89E+01	1.17E+02	1.17E+01	4.88E+02	4.88E+01
Zinc	7440-66-6	1.31E+02	1.45E+01	white leghorn hen	ORNL 1996	320	160	rat	0.35	ORNL 1996	1.31E+02	1.45E+01	1.31E+02	1.45E+01	5.61E+02	2.81E+02	1.69E+02	8.44E+01	7.03E+02	3.52E+02
PAHs																				
Benzo(a)anthracene	56-55-3	--	--	--	USACE 1998	2	0.2	rodents	0.165	USACE 1998	NV	NV	NV	NV	2.91E+00	2.91E-01	8.74E-01	8.74E-02	3.64E+00	3.64E-01
Benzo(a)pyrene	50-32-8	2.50E+00	5.00E-01	duck	ORNL 1996	10	1	mouse	0.03	ORNL 1996	2.50E+00	5.00E-01	2.50E+00	5.00E-01	9.49E+00	9.49E-01	2.85E+00	2.85E-01	1.19E+01	1.19E+00
Benzo(b)fluoranthene	205-99-2	--	--	--	ORNL 1996	10	1	mouse	0.03	ORNL 1996	NV	NV	NV	NV	9.49E+00	9.49E-01	2.85E+00	2.85E-01	1.19E+01	1.19E+00
Benzo(k)fluoranthene	207-08-9	--	--	--	USACE 1998	72	7.2	rodents	0.165	USACE 1998	NV	NV	NV	NV	1.05E+02	1.05E+01	3.15E+01	3.15E+00	1.31E+02	1.31E+01
Chrysene	218-01-9	--	--	--	USACE 1998	99	9.9	rodents	0.165	USACE 1998	NV	NV	NV	NV	1.44E+02	1.44E+01	4.32E+01	4.32E+00	1.80E+02	1.80E+01
Pyrene	129-00-0	--	--	--	USACE 1998	40	8	mouse	0.03	USACE 1998	NV	NV	NV	NV	3.80E+01	7.59E+00	1.14E+01	2.28E+00	4.76E+01	9.51E+00
Pesticides																				
4,4'-DDT	50-29-3	2.80E-02	2.80E-03	brown pelican	ORNL 1996	4	0.8	rat	0.35	ORNL 1996	2.80E-02	2.80E-03	2.80E-02	2.80E-03	7.01E+00	1.40E+00	2.11E+00	4.22E-01	8.79E+00	1.76E+00
Heptachlor epoxide	1024-57-3	4.95E+00	9.90E-01	Japanese quail	USACE 1998	0.25	0.025	rat	0.35	USACE 1998	4.95E+00	9.90E-01	4.95E+00	9.90E-01	4.38E-01	4.38E-02	1.32E-01	1.32E-02	5.49E-01	5.49E-02
PCBs																				
Aroclor 1254	11097-69-1	1.80E+00	1.80E-01	ring-necked pheasant	ORNL 1996	3.43	1.37	mink	1	Aroclor 1016 Value	1.80E+00	1.80E-01	1.80E+00	1.80E-01	7.82E+00	3.12E+00	2.35E+00	9.39E-01	9.80E+00	3.91E+00
Aroclor 1260	11096-82-5	1.80E+00	1.80E-01	ring-necked pheasant	Aroclor 1254 Value	3.43	1.37	mink	1	Aroclor 1016 Value	1.80E+00	1.80E-01	1.80E+00	1.80E-01	7.82E+00	3.12E+00	2.35E+00	9.39E-01	9.80E+00	3.91E+00
Exposives																				
2,4,6-Trinitrotoluene[5,7]	118-96-7	1.8	0.07	Northern Bobwhite	USCHPPM 2001b	8	2	Dog (beagle)	14	USCHPPM 2001b (Levine et al. 1990)	1.80E+00	7.00E-02	1.80E+00	7.00E-02	3.53E+01	8.82E+00	1.06E+01	2.65E+00	4.42E+01	1.11E+01
2,4-Dinitrotoluene[1]	121-14-2	1.25	0.1	Northern Bobwhite	Johnson et al. 2005a	--	--	--	--	--	1.25E+00	1.00E-01	1.25E+00	1.00E-01	NV	NV	NV	NV	NV	NV
HMX[6]	2691-41-0	--	--	--	--	62.5	9	Mouse	0.035	USCHPPM 2001c	NV	NV	NV	NV	6.16E+01	8.88E+00	1.85E+01	2.67E+00	7.72E+01	1.11E+01
Nitroglycerin[4]	55-63-0	--	--	--	--	32	3	Rat	0.325	USCHPPM 2007	NV	NV	NV	NV	5.51E+01	5.16E+00	1.66E+01	1.55E+00	6.90E+01	6.47E+00
Dioxin/Furans																				
2,3,7,8-TCDD	1746-01-6	1.40E-04	1.40E-05	ring-necked pheasant	ORNL 1996	0.00001	0.000001	mouse	0.03	ORNL 1996	1.40E-04	1.40E-05	1.40E-04	1.40E-05	9.49E-06	9.49E-07	2.85E-06	2.85E-07	1.19E-05	1.19E-06

Notes:

CAS = Chemical Abstract Service
TRV = Toxic Reference Value
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw/d = Body Weight Per Day
kg = kilogram
PAH = Polynuclear Aromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
USACE = U.S. Army Corps of Engineers
ORNL = Oak Ridge National Laboratory
NOAEL and LOAEL values were derived from acute values by applying an uncertainty factor of 150.
LD_{50} = Lethal Dose for 50% of test organisms

Sources:

Johnson et al 2005a. Johnson, M.S., M.W. Michie, M.A. Bazar, and R.M. Gogal Jr. 2005a. Influence of Oral 2,4-Dinitrotoluene Exposure to the Northern Bobwhite (*Colinus virginianus*). Intern. J. of Tox. 24:265-274.
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U.S. EPA 1988. Recommendations for and documentation of biological values for use in risk assessment. Environmental Criteria and Assessment Office. Cincinnati, OH. EPA/600/6-87/008.

[1] - Avian TRVs derived from subchronic NOAEL value of 1 and subchronic LOAEL value of 5 from a northern bobwhite and applying an uncertainty factor of 10 and 4 to derive NOAEL-based and LOAEL-based TRVs.
[2] - Used 2,4-dinitrotoluene avian TRVs as surrogate.
[3] - Avian chronic NOAEL TRV derived from subchronic NOAEL value of 26 from a northern bobwhite and applying an uncertainty factor of 10. Mammalian chronic NOAEL TRV derived from Chronic LOAEL value of 40 from a rat and applying an uncertainty factor of 5.
[4]- Mature rat body weight (average male & female) = 0.325 kg (U.S. EPA, 1988).
[5]- Mature Bobwhite Body Weight (seasonal average) = 0.191 kg (U.S. EPA, 1993).
[6]- Mature mouse body weight (female) = 0.035 kg (U.S.EPA, 1988).
[7]- Mature dog body weight (average male & female) = 14 kg (U.S. EPA, 1988).

Table F.2-11
Soil Biocaccumulation/Bioconcentration Factors- Soil to Plant Pathway
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

					Preliminary Assessment		Refined Assessment			
Chemical	**CAS**	**Log K_{ow} Range**	**Selected K_{ow}**	**Source**	**BAF**	**Basis**	**C_s EPC (mg/kg)**	**BAF[1]**	**Basis**	**Source**
Inorganics										
ARSENIC	7440-38-2	-- - --	--	--	1.103	90th percentile	6.91	0.0375	Median	Bechtel Jacobs 1998
CADMIUM	7440-43-9	-- - --	--	--	3.25	90th percentile	1.81	0.4750	$C_p = e^{(0.546*ln(Cs) - 0.475)}$	Bechtel Jacobs 1998
CHROMIUM	7440-47-3	-- - --	--	--	0.084	90th percentile	130.00	0.0410	Median	Bechtel Jacobs 1998
COPPER	7440-50-8	-- - --	--	--	0.625	90th percentile	102.00	0.1183	$C_p = e^{(0.394*ln(Cs) + 0.668)}$	Bechtel Jacobs 1998
LEAD	7439-92-1	-- - --	--	--	0.468	90th percentile	445.50	0.0182	$C_p = e^{(0.561*ln(Cs) - 1.328)}$	Bechtel Jacobs 1998
MERCURY	7439-97-6	-- - --	--	--	5.0	90th percentile	0.68	0.4423	$C_p = e^{(0.544*ln(Cs) - 0.995)}$	Bechtel Jacobs 1998
NICKEL	7440-02-0	-- - --	--	--	1.411	90th percentile	32.58	0.0450	$C_p = e^{(0.748*ln(Cs) + 2.223)}$	Bechtel Jacobs 1998
SELENIUM	7782-49-2	-- - --	--	--	3.012	90th percentile	0.31	0.4505	$C_p = e^{(1.104*ln(Cs) - 0.677)}$	Bechtel Jacobs 1998
SILVER	7440-22-4	-- - --	--	--	0.037	90th percentile	22.60	0.0140	Median	Bechtel Jacobs 1998
ZINC	7440-66-6	-- - --	--	--	1.82	90th percentile	177.60	0.4795	$C_p = e^{(0.554*ln(Cs) + 1.575)}$	Bechtel Jacobs 1998
Pesticides										
4,4'-DDT	50-29-3	5.56 - 7.01	6.53	USEPA 1995	0.62	Maximum	0.00	0.4060	$C_p = e^{(0.752*ln(Cs) - 2.512)}$	USEPA 2005
HEPTACHLOR EPOXIDE	1024-57-3	3.5 - 5.4	5	USEPA 1995	1	Default Value	NC	0.0499	K_{ow} Regression Eq.	Travis and Arms 1988
PCBs										
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	0.0068	K_{ow} Regression Eq.	0.84	0.0068	K_{ow} Regression Eq.	Travis and Arms 1988
AROCLOR-1260	11096-82-5	-- - --	6.8	Jones et al. 1997	0.0045	K_{ow} Regression Eq.	0.80	0.0045	K_{ow} Regression Eq.	Travis and Arms 1988
VOCs and SVOCs										
BENZO(A)ANTHRACENE	56-55-3	5.61 - 5.79	5.7	USEPA 1995	0.54	Maximum	0.06	0.2073	$C_p = e^{(0.5944*ln(Cs) - 2.708)}$	USEPA 2005
BENZO(A)PYRENE	50-32-8	5.98 - 6.34	6.11	USEPA 1995	3.3	Maximum	NC	NC	$C_p = e^{(0.975*ln(Cs) - 2.0615)}$	USEPA 2005
BENZO(B)FLUORANTHENE	205-99-2	5.79 - 6.4	6.2	USEPA 1995	0.48	Maximum	NC	0.31	Median BAF	USEPA 2005
BENZO(K)FLUORANTHENE	207-08-9	6.12 - 6.27	6.2	USEPA 1995	1.0	Maximum	NC	NC	$C_p = e^{(0.860*ln(Cs) - 2.158)}$	USEPA 2005
CHRYSENE	218-01-9	5.41 - 5.79	5.7	USEPA 1995	1.05	Maximum	NC	NC	$C_p = e^{(0.594*ln(Cs) - 2.708)}$	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	5.11	USEPA 1995	3.7	Maximum	NC	0.72	Median BAF	USEPA 2005
Explosives										
2,4-DNT	121-14-2	-- - --	1.6	SRC	8.46	TNT as surrogate	0.52	4.23	TNT as surrogate	--
2,4,6-TNT	118-96-7	-- - --	1.6	SRC	8.46	Maximum	0.31	4.23	Median BAF	USEPA 2005
HMX	2691-41-0	-- - --	0.87	SRC	5.26	RDX as surrogate	7	0.43	RDX as surrogate	--
NITROGLYCERIN	55-63-0	-- - --	1.6	SRC	1	Default Value	11	1	Default Value	--

Notes:
CAS = Chemical Abstract Services
BAF = Bioaccumulation Factor
K_{ow} = Chemical octanol-water coefficient
NC = Not Calculated
C_s = Chemical Concentration in Soil
C_p = Chemical Concentration in Plant Matter (dry weight)
[1] = BAFs for chemical using Cp regression equation calculated by as follows: BAF = C_p/C_s

Source(s):
USEPA 1995: United States Environmental Protection Agency. 1995. Karickhoff, S.W. , and J.M. Long. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.
Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision
Bechtel Jacobs 1998: Bechtel Jacobs Company. September 1998. Emperical Models for the Uptake of Inorganic Chemical from Soil by Plants.
USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.
Travis and Arms 1988: Travis and Arms. 1988. Bioconcentration of Organics in Beef, Milk, and Vegetation. BAF values calculated for Tier I using lowest Kow value and for Tier II using the selected Kow value.
K_{ow} Regression Equation: BAF =10^((-0.578*K_{ow})+1.588))

Table F.2-12
Soil Biocaccumulation/Bioconcentration Factors - Soil to Invertebrate Pathway
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

							Preliminary Assessment		Refined Assessment			
Chemical	**CAS**	**Log K_{ow} Range**	**Selected Log K_{ow}**	**Reference**	**K_{oc}**	**Reference**	**Value**	**Basis**	**C_s EPC (mg/kg)**	**BAF[1]**	**Basis**	**Source**
Inorganics												
ARSENIC	7440-38-2	-- - --	--	--	--	--	0.52	90th percentile	6.908	0.1368	$C_e = e^{(0.706*\ln(Cs) - 1.421)}$	Sample et al. 1998
CADMIUM	7440-43-9	-- - --	--	--	--	--	40.7	90th percentile	1.81	7.3329	$C_e = e^{(0.795*\ln(Cs) + 2.114)}$	Sample et al. 1998
CHROMIUM	7440-47-3	-- - --	--	--	--	--	3.16	90th percentile	130	0.31	Median	Sample et al. 1998
COPPER	7440-50-8	-- - --	--	--	--	--	1.53	90th percentile	102	0.52	Median	Sample et al. 1998
LEAD	7439-92-1	-- - --	--	--	--	--	1.52	90th percentile	445.5	0.2478	$C_e = e^{(0.807*\ln(Cs) - 0.218)}$	Sample et al. 1998
MERCURY	7439-97-6	-- - --	--	--	--	--	20.6	90th percentile	0.675	1.69	Median	Sample et al. 1998
NICKEL	7440-02-0	-- - --	--	--	--	--	4.73	90th percentile	32.58	1.06	Median	Sample et al. 1998
SELENIUM	7782-49-2	-- - --	--	--	--	--	1.34	90th percentile	0.314	1.2640	$C_e = e^{(0.733*\ln(Cs) - 0.075)}$	Sample et al. 1998
SILVER	7440-22-4	-- - --	--	--	--	--	15.3	90th percentile	22.6	2.05	Median	Sample et al. 1998
ZINC	7440-66-6	-- - --	--	--	--	--	12.9	90th percentile	177.6	2.6336	$C_e = e^{(0.328*\ln(Cs) + 4.449)}$	Sample et al. 1998
Pesticides												
4,4'-DDT	50-29-3	5.56 - 7.01	6.53	USEPA 1995	--	--	29.4	90th percentile	0.0015	22.8338	$C_e = e^{(0.8689*\ln(Cs) + 2.1287)}$	USEPA 2005
HEPTACHLOR EPOXIDE	1024-57-3	3.5 - 5.4	5	USEPA 1995	1.06E+01	SRC, CF	8.39	Not Specified	NC	8.39	Not Specified	USEPA 1999
PCBs												
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	--	--	15.9	90th percentile	0.839	6.67	Median	Sample et al. 1998
AROCLOR-1260	11096-82-5	-- - --	6.8	Jones et al. 1997	--	--	15.9	90th percentile	0.8	6.67	Median	Sample et al. 1998
VOCs and SVOCs												
BENZO(A)ANTHRACENE	56-55-3	5.61 - 5.79	5.7	USEPA 1995	3.58E+05	USEPA 2005	8.10	Jager Model	0.061	6.76	Jager Model	USEPA 2005
BENZO(A)PYRENE	50-32-8	5.98 - 6.34	6.11	USEPA 1995	9.69E+05	USEPA 2005	9.00	Jager Model	NC	5.68	Jager Model	USEPA 2005
BENZO(B)FLUORANTHENE	205-99-2	5.79 - 6.4	6.2	USEPA 1995	5.96E+05	USEPA 2005	16.50	Jager Model	NC	11.06	Jager Model	USEPA 2005
BENZO(K)FLUORANTHENE	207-08-9	6.12 - 6.27	6.2	USEPA 1995	5.96E+05	USEPA 2005	12.72	Jager Model	NC	11.06	Jager Model	USEPA 2005
CHRYSENE	218-01-9	5.41 - 5.79	5.7	USEPA 1995	2.48E+05	USEPA 2005	11.69	Jager Model	NC	9.76	Jager Model	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	4.88	USEPA 1995	6.27E+04	USEPA 2005	26.91	Jager Model	NC	7.47	Jager Model	USEPA 2005
Explosives												
2,4-DNT	121-14-2	-- - --	--	--	--	--	1	Default Value	0.52	1	Default Value	--
2,4,6-TNT	118-96-7	-- - --	--	--	--	--	1	Default Value	0.31	1	Default Value	--
HMX	2691-41-0	-- - --	--	--	--	--	1	Default Value	7	1	Default Value	--
NITROGLYCERIN	55-63-0	-- - --	--	--	--	--	1	Default Value	11	1	Default Value	--

Notes:
CAS = Chemical Abstract Services
C_s = Chemical Concentration in Soil
C_e = Chemical Concentration in Earthworm (dry weight)
K_{ow} = Chemical octanol-water coefficient
K_{oc} = Chemical water to soil partitioning coefficient
K_{ww} = Chemical worm to soil partitioning coefficient
foc = mean fraction organic content in soil (0.00235 mean from physical samples - see Appendix C.1)
[1] = BAFs for chemical using Ce regression equation calculated by as follows: BAF = C_e/C_s

Source(s):
USEPA 1995: United States Environmental Protection Agency. Karickhoff, S.W. , and J.M. Long. 1995. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.
Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision
Sample et al. 1998: Sample, B.E., Beauchamp, J.J., Efroymson, R.A., Sutter, G.W., Ashwood, T.L., February 1998. Development and Validation of Bioaccumulation Models for Earthworms.
Jager Model: As presented in USEPA 2005, Guidance for Developing Ecological Screening Levels, Appendix 4-1, Table 5.
BAF = K_{ww}(L/kg worl dw)/K_d (L/kg soil dw)
K_{ww} (dry weight) = 10^(0.87*logK_{ow} - 2.0) / 0.16
Wet weight to dry weight assuming 16% solids
$K_d = f_{oc} * K_{oc}$
foc = 0.00235 from site specific physical soil data
Note: The maximum Kow utilized for the preliminary calculation and the Selected Kow utilized for the refined calculation.
Edwards and Bohlen 1992: Edwards, C.A. and Bohlen, P.J. 1992. The effects of toxic chemicals on earthworms. Reviews of Environmental Contamination and Toxicology, 125: 23-99.
USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.
SRC/CF: Syracuse Research Corporation (SRC). Physical Properties Database. http://www.syrres.com/esc/physdemo.htm

Table F.2-13
Soil Bioaccumulation/Bioconcentration Factors - Soil to Mammal Pathway
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS	Log K_{ow} Range	Selected K_{ow}	Reference	Preliminary Assessment		Refined Assessment			Source
					Value	Basis	C_s (mg/kg)	BAF[1]	Basis	
Inorganics										
ARSENIC	7440-38-2	-- - --	--	--	0.0149	90th percentile	6.908	0.0055	$C_m = e^{(0.819*ln(Cs) - 4.847)}$	Sample et al. 1998
CADMIUM	7440-43-9	-- - --	--	--	3.991	90th percentile	1.81	0.2080	$C_m = e^{(0.472*ln(Cs) - 1.257)}$	Sample et al. 1998
CHROMIUM	7440-47-3	-- - --	--	--	0.333	90th percentile	130	0.0636	$C_m = e^{(0.734*ln(Cs) - 1.46)}$	Sample et al. 1998
COPPER	7440-50-8	-- - --	--	--	1.045	90th percentile	102	0.1473	$C_m = e^{(0.144*ln(Cs) + 2.042)}$	Sample et al. 1998
LEAD	7439-92-1	-- - --	--	--	0.286	90th percentile	445.5	0.0359	$C_m = e^{(0.442*ln(Cs) + 0.0761)}$	Sample et al. 1998
MERCURY	7439-97-6	-- - --	--	--	0.192	90th percentile	0.675	0.0543	Median	Sample et al. 1998
NICKEL	7440-02-0	-- - --	--	--	0.589	90th percentile	32.58	0.1216	$C_m = e^{(0.466*ln(Cs) - 0.246)}$	Sample et al. 1998
SELENIUM	7782-49-2	-- - --	--	--	1.187	90th percentile	0.314	1.3587	$C_m = e^{(0.376*ln(Cs) -0.416)}$	Sample et al. 1998
SILVER	7440-22-4	-- - --	--	--	0.501	90th percentile	22.6	0.004	Median	Sample et al. 1998
ZINC	7440-66-6	-- - --	--	--	2.69	90th percentile	177.6	0.6372	$C_m = e^{(0.071*ln(Cs) + 4.363)}$	Sample et al. 1998
Pesticides										
4,4'-DDT	50-29-3	5.56 - 7.01	6.53	USEPA 1995	1	Default Value	NC	NC	$C_m = e^{(0.725*ln(Cd) + 1.179)}$	USEPA 2005
HEPTACHLOR EPOXIDE	1024-57-3	3.5 - 5.4	5	USEPA 1995	1	Default Value	NC	1	Default Value	--
PCBs										
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	1	Default Value	0.839	1	Default Value	--
AROCLOR-1260	11096-82-5	-- - --	6.8	Jones et al. 1997	1	Default Value	0.8	1	Default Value	--
VOCs and SVOCs										
BENZO(A)ANTHRACENE	56-55-3	5.61 - 5.79	5.7	USEPA 1995	1	Default Value	0.061	0	--	USEPA 2005
BENZO(A)PYRENE	50-32-8	5.98 - 6.34	6.11	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
BENZO(B)FLUORANTHENE	205-99-2	5.79 - 6.4	6.2	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
BENZO(K)FLUORANTHENE	207-08-9	6.12 - 6.27	6.2	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
CHRYSENE	218-01-9	5.41 - 5.79	5.7	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	5.11	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
Explosives										
2,4-DNT	121-14-2	-- - --	--	--	1	Default Value	0.52	0	TNT as surrogate	--
2,4,6-TNT	118-96-7	-- - --	--	--	1	Default Value	0.31	0	Cm = 0	USEPA 2005
HMX	2691-41-0	-- - --	--	--	1	Default Value	7	0	RDX as surrogate	--
NITROGLYCERIN	55-63-0	-- - --	--	--	1	Default Value	11	0	TNT as surrogate	--

Notes:
CAS = Chemical Abstract Services
C_s = Chemical Concentration in Soil
C_d = Chemical Concentration in Prey (assumed to be 100% earthworms (dry weight))
C_m = Chemical Concentration in Mammal (dry weight)
K_{ow} = Chemical octanol to water partitioning coefficient
[1] = BAFs for chemical using Ce regression equation calculated by as follows: BAF = C_m/C_s

Source(s):

USEPA 1995: United States Environmental Protection Agency. Karickhoff, S.W. , and J.M. Long. 1995. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.
Sample et al. 1998: Sample et al. 1998. Development and Validation of Bioaccumulation Models for Small Mammals.
Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision
USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.

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Table F.2-14
Preliminary Wildlife Risk Characterization - Meadow Vole
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment									
				Soil									
				Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics													
Arsenic	7440-38-2	1.20E-01	1.20E+00	10	1.1E+00	1.1E+01	1.8E-01	1.8E+00	**5.54E+01**	**5.5E+00**	**Y**	6.908	**3.8E+01**
Cadmium	7440-43-9	1.69E+00	1.69E+01	2.2	3.3E+00	7.2E+00	8.8E-01	8.8E+00	**2.51E+00**	2.5E-01	**Y**	1.81	**2.1E+00**
Chromium	7440-47-3	5.75E+00	5.75E+01	160	8.4E-02	1.3E+01	9.1E+01	9.1E+02	**1.77E+00**	1.8E-01	**Y**	130	**1.4E+00**
Copper	7440-50-8	2.67E+01	3.51E+01	200	6.3E-01	1.3E+02	7.0E+01	9.2E+01	**2.86E+00**	**2.2E+00**	**Y**	102	**1.5E+00**
Lead	7439-92-1	1.40E+01	1.40E+02	750	4.7E-01	3.5E+02	4.8E+01	4.8E+02	**1.55E+01**	**1.5E+00**	**Y**	445.5	**9.2E+00**
Mercury	7439-97-6	3.01E+01	3.01E+02	0.83	5.0E+00	4.2E+00	1.0E+01	1.0E+02	8.15E-02	8.1E-03	N	--	--
Nickel	7440-02-0	7.01E+01	1.40E+02	45	1.4E+00	6.3E+01	8.3E+01	1.7E+02	5.41E-01	2.7E-01	N	--	--
Selenium	7782-49-2	3.51E-01	5.79E-01	0.37	3.0E+00	1.1E+00	2.0E-01	3.2E-01	**1.88E+00**	**1.1E+00**	**Y**	0.314	**1.6E+00**
Silver	7440-22-4	3.89E+01	3.89E+02	25	3.7E-02	9.3E-01	1.1E+03	1.1E+04	2.30E-02	2.3E-03	N	--	--
Zinc	7440-66-6	2.81E+02	5.61E+02	280	1.8E+00	5.1E+02	2.6E+02	5.2E+02	**1.08E+00**	5.4E-01	**Y**	177.6	6.9E-01
Pesticides/PCBs													
4,4'-DDT	50-29-3	1.40E+00	7.01E+00	0.0015	6.2E-01	9.3E-04	3.7E+00	1.9E+01	4.05E-04	8.1E-05	N	--	--
Heptachlor epoxide	1024-57-3	4.38E-02	4.38E-01	0.0065	1.0E+00	6.5E-03	7.3E-02	7.3E-01	8.93E-02	8.9E-03	N	--	--
Aroclor 1254	11097-69-1	6.45E-02	6.45E-01	1.7	6.8E-03	1.2E-02	3.6E+00	3.6E+01	4.77E-01	4.8E-02	N	--	--
Aroclor 1260	11096-82-5	6.45E-02	6.45E-01	0.8	4.5E-03	3.6E-03	3.8E+00	3.8E+01	2.08E-01	2.1E-02	N	--	--
TCL SVOCs													
Benzo(a)anthracene	56-55-3	2.91E-01	2.91E+00	0.1	5.4E-01	5.4E-02	8.8E-01	8.8E+00	1.14E-01	1.1E-02	N	--	--
Benzo(a)pyrene	50-32-8	9.49E-01	9.49E+00	0.018	3.3E+00	5.9E-02	4.9E-01	4.9E+00	3.71E-02	3.7E-03	N	--	--
Benzo(b)fluoranthene	205-99-2	9.49E-01	9.49E+00	0.029	4.8E-01	1.4E-02	3.2E+00	3.2E+01	9.06E-03	9.1E-04	N	--	--
Benzo(k)fluoranthene	207-08-9	1.05E+01	1.05E+02	0.018	1.0E+00	1.8E-02	1.7E+01	1.7E+02	1.04E-03	1.0E-04	N	--	--
Chrysene	218-01-9	1.44E+01	1.44E+02	0.057	1.1E+00	6.0E-02	2.3E+01	2.3E+02	2.50E-03	2.5E-04	N	--	--
Pyrene	129-00-0	7.59E+00	3.80E+01	0.19	3.7E+00	7.0E-01	3.5E+00	1.7E+01	5.48E-02	1.1E-02	N	--	--
Explosives													
2,4,6-Trinitrotoluene	118-96-7	8.82E+00	3.53E+01	0.31	8.5E+00	2.6E+00	1.8E+00	7.1E+00	1.75E-01	4.4E-02	N	--	--
2,4-Dinitrotoluene	121-14-2	NV	NV	0.52	8.5E+00	4.4E+00	--	--	**--**	**--**	--	--	--
HMX	2691-41-0	8.88E+00	6.16E+01	7	5.3E+00	3.7E+01	2.9E+00	2.0E+01	**2.45E+00**	3.5E-01	**Y**	7	**2.5E+00**
Nitroglycerin													
Nitroglycerin	55-63-0	5.16E+00	5.51E+01	11	1.0E+00	1.1E+01	8.6E+00	9.1E+01	**1.28E+00**	1.2E-01	**Y**	11	**1.3E+00**

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soi)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Minimum Body Weigth of Receptor (kg)

IR_{food} = Maximum Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)

DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = 100% Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

EPC = Exposure Point Concentration

Meadow Vole Specific Data from Table F.2-9

BW=	0.017	kg
IR_{food} =	0.010	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00024	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration

LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration

EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.2-15
Refined Wildlife Risk Characterization - Meadow Vole
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment						
				Soil						
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics										
Arsenic	7440-38-2	1.20E-01	1.20E+00	6.908	3.8E-02	2.6E-01	9.0E+00	9.0E+01	7.7E-01	7.7E-02
Cadmium	7440-43-9	1.69E+00	1.69E+01	1.81	4.8E-01	8.6E-01	1.6E+01	1.6E+02	1.2E-01	1.2E-02
Chromium	7440-47-3	5.75E+00	5.75E+01	130	4.1E-02	5.3E+00	4.1E+02	4.1E+03	3.2E-01	3.2E-02
Copper	7440-50-8	2.67E+01	3.51E+01	102	1.2E-01	1.2E+01	8.7E+02	1.1E+03	1.2E-01	8.9E-02
Lead	7439-92-1	1.40E+01	1.40E+02	445.5	1.8E-02	8.1E+00	1.5E+03	1.5E+04	2.9E-01	2.9E-02
Selenium	7782-49-2	3.51E-01	5.79E-01	0.314	4.5E-01	1.4E-01	3.4E+00	5.6E+00	9.2E-02	5.6E-02
Zinc	7440-66-6	2.81E+02	5.61E+02	177.6	4.8E-01	8.5E+01	2.6E+03	5.2E+03	6.9E-02	3.4E-02
Explosives										
HMX	2691-41-0	8.88E+00	6.16E+01	7	4.3E-01	3.0E+00	9.0E+01	6.3E+02	7.7E-02	1.1E-02
Nitroglycerin										
Nitroglycerin	55-63-0	5.16E+00	5.51E+01	11	1.0E+00	1.1E+01	2.3E+01	2.5E+02	4.7E-01	4.4E-02

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soi)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Meadow Vole Specific Data from Table F.2-9

BW=	0.037	kg
IR_{food} =	0.008	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	1.00	unitless
IR_{soil} =	0.00019	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.2-16
Preliminary Wildlife Risk Characterization - Short-tailed Shrew
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment – Soil: Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																
Arsenic	7440-38-2	1.50E-01	1.50E+00	10	1.1E+00	1.1E+01	5.2E-01	5.2E+00	Plant	5.1E-01	5.1E+00	**2.0E+01**	**2.0E+00**	**Y**	6.908	**1.4E+01**
Cadmium	7440-43-9	2.11E+00	2.11E+01	2.2	3.3E+00	7.2E+00	4.1E+01	9.0E+01	Invertebrate	2.2E-01	2.2E+00	**1.0E+01**	1.0E+00	**Y**	1.81	**8.4E+00**
Chromium	7440-47-3	7.21E+00	7.21E+01	160	8.4E-02	1.3E+01	3.2E+00	5.1E+02	Invertebrate	9.1E+00	9.1E+01	**1.8E+01**	**1.8E+00**	**Y**	130	**1.4E+01**
Copper	7440-50-8	3.34E+01	4.40E+01	200	6.3E-01	1.3E+02	1.5E+00	3.1E+02	Invertebrate	8.4E+01	1.1E+02	**2.4E+00**	**1.8E+00**	**Y**	102	**1.2E+00**
Lead	7439-92-1	1.76E+01	1.76E+02	750	4.7E-01	3.5E+02	1.5E+00	1.1E+03	Invertebrate	4.4E+01	4.4E+02	**1.7E+01**	**1.7E+00**	**Y**	445.5	**1.0E+01**
Mercury	7439-97-6	3.77E+01	3.77E+02	0.83	5.0E+00	4.2E+00	2.1E+01	1.7E+01	Invertebrate	7.6E+00	7.6E+01	1.1E-01	1.1E-02	N	--	--
Nickel	7440-02-0	8.79E+01	1.76E+02	45	1.4E+00	6.3E+01	4.7E+00	2.1E+02	Invertebrate	7.5E+01	1.5E+02	6.0E-01	3.0E-01	N	--	--
Selenium	7782-49-2	4.40E-01	7.25E-01	0.37	3.0E+00	1.1E+00	1.3E+00	5.0E-01	Plant	5.8E-01	9.6E-01	6.3E-01	3.8E-01	N	--	--
Silver	7440-22-4	4.88E+01	4.88E+02	25	3.7E-02	9.3E-01	1.5E+01	3.8E+02	Invertebrate	1.3E+01	1.3E+02	**1.9E+00**	1.9E-01	**Y**	22.6	**1.7E+00**
Zinc	7440-66-6	3.52E+02	7.03E+02	280	1.8E+00	5.1E+02	1.3E+01	3.6E+03	Invertebrate	1.1E+02	2.3E+02	**2.5E+00**	**1.2E+00**	**Y**	177.6	**1.6E+00**
Pesticides/PCBs																
4,4'-DDT	50-29-3	1.76E+00	8.79E+00	0.0015	6.2E-01	9.3E-04	2.9E+01	4.4E-02	Invertebrate	2.5E-01	1.2E+00	6.0E-03	1.2E-03	N	--	--
Heptachlor epoxide	1024-57-3	5.49E-02	5.49E-01	0.0065	1.0E+00	6.5E-03	8.4E+00	5.5E-02	Invertebrate	2.7E-02	2.7E-01	2.4E-01	2.4E-02	N	--	--
Aroclor 1254	11097-69-1	8.09E-02	8.09E-01	1.7	6.8E-03	1.2E-02	1.6E+01	2.7E+01	Invertebrate	2.1E-02	2.1E-01	**8.1E+01**	**8.1E+00**	**Y**	0.839	**4.0E+01**
Aroclor 1260	11096-82-5	8.09E-02	8.09E-01	0.8	4.5E-03	3.6E-03	1.6E+01	1.3E+01	Invertebrate	2.1E-02	2.1E-01	**3.8E+01**	**3.8E+00**	**Y**	0.8	**3.8E+01**
TCL SVOCs																
Benzo(a)anthracene	56-55-3	3.64E-01	3.64E+00	0.1	5.4E-01	5.4E-02	8.1E+00	8.1E-01	Invertebrate	1.8E-01	1.8E+00	5.4E-01	5.4E-02	N	--	--
Benzo(a)pyrene	50-32-8	1.19E+00	1.19E+01	0.018	3.3E+00	5.9E-02	9.0E+00	1.6E-01	Invertebrate	5.4E-01	5.4E+00	3.3E-02	3.3E-03	N	--	--
Benzo(b)fluoranthene	205-99-2	1.19E+00	1.19E+01	0.029	4.8E-01	1.4E-02	1.7E+01	4.8E-01	Invertebrate	3.0E-01	3.0E+00	9.7E-02	9.7E-03	N	--	--
Benzo(k)fluoranthene	207-08-9	1.31E+01	1.31E+02	0.018	1.0E+00	1.8E-02	1.3E+01	2.3E-01	Invertebrate	4.3E+00	4.3E+01	4.2E-03	4.2E-04	N	--	--
Chrysene	218-01-9	1.80E+01	1.80E+02	0.057	1.1E+00	6.0E-02	1.2E+01	6.7E-01	Invertebrate	6.4E+00	6.4E+01	9.0E-03	9.0E-04	N	--	--
Pyrene	129-00-0	9.51E+00	4.76E+01	0.19	3.7E+00	7.0E-01	2.7E+01	5.1E+00	Invertebrate	1.5E+00	7.3E+00	1.3E-01	2.6E-02	N	--	--
Explosives																
2,4,6-Trinitrotoluene	118-96-7	1.11E+01	4.42E+01	0.31	8.5E+00	2.6E+00	1.0E+00	3.1E-01	Plant	5.4E+00	2.1E+01	5.8E-02	1.4E-02	N	--	--
2,4-Dinitrotoluene	121-14-2	NV	NV	0.52	8.5E+00	4.4E+00	1.0E+00	5.2E-01	Plant	--	--	**--**	**--**	--	--	--
HMX	2691-41-0	1.11E+01	7.72E+01	7	5.3E+00	3.7E+01	1.0E+00	7.0E+00	Plant	8.6E+00	6.0E+01	8.1E-01	1.2E-01	N	--	--
Nitroglycerin																
Nitroglycerin	55-63-0	6.47E+00	6.90E+01	11	1.0E+00	1.1E+01	1.0E+00	1.1E+01	Plant	2.4E+01	2.5E+02	4.6E-01	4.3E-02	N	--	--

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10
BW = Minimum Body Weigth of Receptor (kg)
IR_{food} = Maximum Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)
DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = 100% Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
EPC = Exposure Point Concentration

Short-tailed Shrew Specific Data from Table F.2-9

BW=	0.0125	kg
IR_{food} =	0.003	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00039	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Screening Level
LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Screening Level
EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.2-17
Refined Wildlife Risk Characterization - Short-tailed Shrew
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment								
				Soil								
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics												
Arsenic	7440-38-2	1.50E-01	1.50E+00	6.908	3.8E-02	2.6E-01	1.37E-01	9.5E-01	1.4E+01	1.4E+02	4.8E-01	4.8E-02
Cadmium	7440-43-9	2.11E+00	2.11E+01	1.81	4.8E-01	8.6E-01	7.33E+00	1.3E+01	7.9E+00	7.9E+01	2.3E-01	2.3E-02
Chromium	7440-47-3	7.21E+00	7.21E+01	130	4.1E-02	5.3E+00	3.06E-01	4.0E+01	4.4E+02	4.4E+03	3.0E-01	3.0E-02
Copper	7440-50-8	3.34E+01	4.40E+01	102	1.2E-01	1.2E+01	5.15E-01	5.3E+01	1.4E+03	1.8E+03	7.4E-02	5.6E-02
Lead	7439-92-1	1.76E+01	1.76E+02	445.5	1.8E-02	8.1E+00	2.48E-01	1.1E+02	1.2E+03	1.2E+04	3.6E-01	3.6E-02
Silver	7440-22-4	4.88E+01	4.88E+02	22.6	1.4E-02	3.2E-01	2.05E+00	4.6E+01	6.2E+02	6.2E+03	3.6E-02	3.6E-03
Zinc	7440-66-6	3.52E+02	7.03E+02	177.6	4.8E-01	8.5E+01	2.63E+00	4.7E+02	3.5E+03	6.9E+03	5.1E-02	2.6E-02
Pesticides/PCBs												
Aroclor 1254	11097-69-1	8.09E-02	8.09E-01	0.839	6.8E-03	5.7E-03	6.67E+00	5.6E+00	3.3E-01	3.3E+00	**2.5E+00**	2.5E-01
Aroclor 1260	11096-82-5	8.09E-02	8.09E-01	0.8	4.5E-03	3.6E-03	6.67E+00	5.3E+00	3.3E-01	3.3E+00	**2.4E+00**	2.4E-01

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Short-tailed Shrew Specific Data from Table F.2-9

BW=	0.015	kg
IR_{food} =	0.002	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.14	unitless
DF_{inv} =	0.86	unitless
IR_{soil} =	0.00026	kg dw/day
AF =	0.310	unitless

[a] = The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.2-18
Preliminary Wildlife Risk Characterization - Red Fox
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment														
				Soil														
				Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																		
Arsenic	7440-38-2	3.59E-02	3.59E-01	10	1.1E+00	1.1E+01	5.2E-01	5.2E+00	1.5E-02	1.5E-01	Plant	2.7E-01	2.7E+00	**3.6E+01**	**3.6E+00**	**Y**	6.908	**2.5E+01**
Cadmium	7440-43-9	5.07E-01	5.07E+00	2.2	3.3E+00	7.2E+00	4.1E+01	9.0E+01	4.0E+00	8.8E+00	Invertebrate	1.1E-01	1.1E+00	**2.0E+01**	**2.0E+00**	**Y**	1.81	**1.7E+01**
Chromium	7440-47-3	1.73E+00	1.73E+01	160	8.4E-02	1.3E+01	3.2E+00	5.1E+02	3.3E-01	5.3E+01	Invertebrate	4.7E+00	4.7E+01	**3.4E+01**	**3.4E+00**	**Y**	130	**2.8E+01**
Copper	7440-50-8	8.02E+00	1.06E+01	200	6.3E-01	1.3E+02	1.5E+00	3.1E+02	1.0E+00	2.1E+02	Invertebrate	4.4E+01	5.8E+01	**4.5E+00**	**3.4E+00**	**Y**	102	**2.3E+00**
Lead	7439-92-1	4.22E+00	4.22E+01	750	4.7E-01	3.5E+02	1.5E+00	1.1E+03	2.9E-01	2.1E+02	Invertebrate	2.3E+01	2.3E+02	**3.2E+01**	**3.2E+00**	**Y**	445.5	**1.9E+01**
Mercury	7439-97-6	9.05E+00	9.05E+01	0.83	5.0E+00	4.2E+00	2.1E+01	1.7E+01	1.9E-01	1.6E-01	Invertebrate	3.8E+00	3.8E+01	2.2E-01	2.2E-02	N	--	--
Nickel	7440-02-0	2.11E+01	4.22E+01	45	1.4E+00	6.3E+01	4.7E+00	2.1E+02	5.9E-01	2.7E+01	Invertebrate	3.8E+01	7.6E+01	**1.2E+00**	5.9E-01	**Y**	32.58	8.5E-01
Selenium	7782-49-2	1.05E-01	1.74E-01	0.37	3.0E+00	1.1E+00	1.3E+00	5.0E-01	1.2E+00	4.4E-01	Plant	3.0E-01	4.9E-01	**1.2E+00**	7.5E-01	**Y**	0.314	**1.0E+00**
Silver	7440-22-4	1.17E+01	1.17E+02	25	3.7E-02	9.3E-01	1.5E+01	3.8E+02	5.0E-01	1.3E+01	Invertebrate	6.6E+00	6.6E+01	**3.8E+00**	3.8E-01	**Y**	22.6	**3.4E+00**
Zinc	7440-66-6	8.44E+01	1.69E+02	280	1.8E+00	5.1E+02	1.3E+01	3.6E+03	2.7E+00	7.5E+02	Invertebrate	5.6E+01	1.1E+02	**5.0E+00**	**2.5E+00**	**Y**	177.6	**3.2E+00**
Pesticides/PCBs																		
4,4'-DDT	50-29-3	4.22E-01	2.11E+00	0.0015	6.2E-01	9.3E-04	2.9E+01	4.4E-02	1.0E+00	1.5E-03	Invertebrate	1.2E-01	6.2E-01	1.2E-02	2.4E-03	N	--	--
Heptachlor epoxide	1024-57-3	1.32E-02	1.32E-01	0.0065	1.0E+00	6.5E-03	8.4E+00	5.5E-02	1.0E+00	6.5E-03	Invertebrate	1.4E-02	1.4E-01	4.8E-01	4.8E-02	N	--	--
Aroclor 1254	11097-69-1	1.94E-02	1.94E-01	1.7	6.8E-03	1.2E-02	1.6E+01	2.7E+01	1.0E+00	1.7E+00	Invertebrate	1.1E-02	1.1E-01	**1.6E+02**	**1.6E+01**	**Y**	0.839	**8.0E+01**
Aroclor 1260	11096-82-5	1.94E-02	1.94E-01	0.8	4.5E-03	3.6E-03	1.6E+01	1.3E+01	1.0E+00	8.0E-01	Invertebrate	1.1E-02	1.1E-01	**7.6E+01**	**7.6E+00**	**Y**	0.8	**7.6E+01**
TCL SVOCs																		
Benzo(a)anthracene	56-55-3	8.74E-02	8.74E-01	0.1	5.4E-01	5.4E-02	8.1E+00	8.1E-01	1.0E+00	1.0E-01	Invertebrate	9.3E-02	9.3E-01	**1.1E+00**	1.1E-01	**Y**	0.061	6.6E-01
Benzo(a)pyrene	50-32-8	2.85E-01	2.85E+00	0.018	3.3E+00	5.9E-02	9.0E+00	1.6E-01	1.0E+00	1.8E-02	Invertebrate	2.7E-01	2.7E+00	6.6E-02	6.6E-03	N	--	--
Benzo(b)fluoranthene	205-99-2	2.85E-01	2.85E+00	0.029	4.8E-01	1.4E-02	1.7E+01	4.8E-01	1.0E+00	2.9E-02	Invertebrate	1.5E-01	1.5E+00	1.9E-01	1.9E-02	N	--	--
Benzo(k)fluoranthene	207-08-9	3.15E+00	3.15E+01	0.018	1.0E+00	1.8E-02	1.3E+01	2.3E-01	1.0E+00	1.8E-02	Invertebrate	2.1E+00	2.1E+01	8.5E-03	8.5E-04	N	--	--
Chrysene	218-01-9	4.32E+00	4.32E+01	0.057	1.1E+00	6.0E-02	1.2E+01	6.7E-01	1.0E+00	5.7E-02	Invertebrate	3.2E+00	3.2E+01	1.8E-02	1.8E-03	N	--	--
Pyrene	129-00-0	2.28E+00	1.14E+01	0.19	3.7E+00	7.0E-01	2.7E+01	5.1E+00	1.0E+00	1.9E-01	Invertebrate	7.3E-01	3.7E+00	2.6E-01	5.2E-02	N	--	--
Explosives																		
2,4,6-Trinitrotoluene	118-96-7	2.65E+00	1.06E+01	0.31	8.5E+00	2.6E+00	1.0E+00	3.1E-01	1.0E+00	3.1E-01	Plant	2.7E+00	1.1E+01	1.2E-01	2.9E-02	N	--	--
2,4-Dinitrotoluene	121-14-2	NV	NV	0.52	8.5E+00	4.4E+00	1.0E+00	5.2E-01	1.0E+00	5.2E-01	Plant	--	--	**--**	**--**	--	--	--
HMX	2691-41-0	2.67E+00	1.85E+01	7	5.3E+00	3.7E+01	1.0E+00	7.0E+00	1.0E+00	7.0E+00	Plant	4.4E+00	3.0E+01	**1.6E+00**	2.3E-01	**Y**	7	**1.6E+00**
Nitroglycerin																		
Nitroglycerin	55-63-0	1.55E+00	1.66E+01	11	1.0E+00	1.1E+01	1.0E+00	1.1E+01	1.0E+00	1.1E+01	Mammal	1.3E+01	1.4E+02	8.4E-01	7.9E-02	N	--	--

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10
BW = Minimum Body Weigth of Receptor (kg)
IR_{food} = Maximum Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)
DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = 100% Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
EPC = Exposure Point Concentration

Red FoxSpecific Data from Table F.2-9

BW=	2.9500	kg
IR_{food} =	0.342	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00960	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Screening Level
LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Screening Level
EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.2-19
Refined Wildlife Risk Characterization - Red Fox
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment										
				Soil										
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics														
Arsenic	7440-38-2	3.59E-02	3.59E-01	6.908	3.8E-02	2.6E-01	1.4E-01	9.5E-01	5.5E-03	3.8E-02	1.2E+04	1.2E+05	5.8E-04	5.8E-05
Cadmium	7440-43-9	5.07E-01	5.07E+00	1.81	4.8E-01	8.6E-01	7.3E+00	1.3E+01	2.1E-01	3.8E-01	1.3E+04	1.3E+05	1.4E-04	1.4E-05
Chromium	7440-47-3	1.73E+00	1.73E+01	130	4.1E-02	5.3E+00	3.1E-01	4.0E+01	6.4E-02	8.3E+00	2.6E+05	2.6E+06	5.0E-04	5.0E-05
Copper	7440-50-8	8.02E+00	1.06E+01	102	1.2E-01	1.2E+01	5.2E-01	5.3E+01	1.5E-01	1.5E+01	6.3E+05	8.3E+05	1.6E-04	1.2E-04
Lead	7439-92-1	4.22E+00	4.22E+01	445.5	1.8E-02	8.1E+00	2.5E-01	1.1E+02	3.6E-02	1.6E+01	8.9E+05	8.9E+06	5.0E-04	5.0E-05
Nickel	7440-02-0	2.11E+01	4.22E+01	32.58	4.5E-02	1.5E+00	1.1E+00	3.5E+01	1.2E-01	4.0E+00	1.8E+06	3.5E+06	1.8E-05	9.2E-06
Selenium	7782-49-2	1.05E-01	1.74E-01	0.314	4.5E-01	1.4E-01	1.3E+00	4.0E-01	1.4E+00	4.3E-01	1.3E+03	2.1E+03	2.5E-04	1.5E-04
Silver	7440-22-4	1.17E+01	1.17E+02	22.6	1.4E-02	3.2E-01	2.0E+00	4.6E+01	4.0E-03	9.0E-02	1.5E+06	1.5E+07	1.5E-05	1.5E-06
Zinc	7440-66-6	8.44E+01	1.69E+02	177.6	4.8E-01	8.5E+01	2.6E+00	4.7E+02	6.4E-01	1.1E+02	1.7E+06	3.4E+06	1.0E-04	5.2E-05
Pesticides/PCBs														
Aroclor 1254	11097-69-1	1.94E-02	1.94E-01	0.839	6.8E-03	5.7E-03	6.7E+00	5.6E+00	1.0E+00	8.4E-01	2.6E+02	2.6E+03	3.2E-03	3.2E-04
Aroclor 1260	11096-82-5	1.94E-02	1.94E-01	0.8	4.5E-03	3.6E-03	6.7E+00	5.3E+00	1.0E+00	8.0E-01	2.6E+02	2.6E+03	3.1E-03	3.1E-04
TCL SVOCs														
Benzo(a)anthracene	56-55-3	8.74E-02	8.74E-01	0.061	2.1E-01	1.3E-02	6.8E+00	4.1E-01	0.0E+00	0.0E+00	3.8E+03	3.8E+04	1.6E-05	1.6E-06
Explosives														
HMX	2691-41-0	2.67E+00	1.85E+01	7	4.3E-01	3.0E+00	1.0E+00	7.0E+00	0.0E+00	0.0E+00	2.8E+05	1.9E+06	2.5E-05	3.6E-06

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10
BW = Average Body Weigth of Receptor (kg)
IR_{food} = Average Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor, specific to prey type and chemical
DF = Dietary fraction
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
BDL = Below Detection Limit
EPC = Exposure Point Concentration

Red FoxSpecific Data from Table F.2-9

BW=	4.5300	kg
IR_{food} =	0.238	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.17	unitless
DF_{inv} =	0.04	unitless
DF_{mam} =	0.79	unitless
IR_{soil} =	0.00670	kg dw/day
AF =	0.0013	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level
LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.2-20
Preliminary Wildlife Risk Characterization - American Robin
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment – Soil: Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																
Arsenic	7440-38-2	5.14E+00	1.28E+01	10	1.1E+00	1.1E+01	5.2E-01	5.2E+00	Plant	1.4E+01	3.5E+01	7.1E-01	2.8E-01	N	--	--
Cadmium	7440-43-9	1.45E+00	2.00E+01	2.2	3.3E+00	7.2E+00	4.1E+01	9.0E+01	Invertebrate	1.1E-01	1.6E+00	**1.9E+01**	**1.4E+00**	**Y**	1.81	**1.6E+01**
Chromium	7440-47-3	1.00E+00	5.00E+00	160	8.4E-02	1.3E+01	3.2E+00	5.1E+02	Invertebrate	9.9E-01	4.9E+00	**1.6E+02**	**3.2E+01**	**Y**	130	**1.3E+02**
Copper	7440-50-8	4.70E+01	6.17E+01	200	6.3E-01	1.3E+02	1.5E+00	3.1E+02	Invertebrate	9.4E+01	1.2E+02	**2.1E+00**	**1.6E+00**	**Y**	102	**1.1E+00**
Lead	7439-92-1	1.13E+00	1.13E+01	750	4.7E-01	3.5E+02	1.5E+00	1.1E+03	Invertebrate	2.3E+00	2.3E+01	**3.3E+02**	**3.3E+01**	**Y**	445.5	**2.0E+02**
Mercury	7439-97-6	4.50E-01	9.00E-01	0.83	5.0E+00	4.2E+00	2.1E+01	1.7E+01	Invertebrate	6.9E-02	1.4E-01	**1.2E+01**	**6.0E+00**	**Y**	0.675	**9.8E+00**
Nickel	7440-02-0	7.74E+01	1.07E+02	45	1.4E+00	6.3E+01	4.7E+00	2.1E+02	Invertebrate	5.1E+01	7.1E+01	8.8E-01	6.3E-01	N	--	--
Selenium	7782-49-2	4.00E-01	8.00E-01	0.37	3.0E+00	1.1E+00	1.3E+00	5.0E-01	Plant	4.1E-01	8.3E-01	8.9E-01	4.5E-01	N	--	--
Silver	7440-22-4	1.66E+01	1.24E+02	25	3.7E-02	9.3E-01	1.5E+01	3.8E+02	Invertebrate	3.4E+00	2.6E+01	**7.3E+00**	9.7E-01	**Y**	22.6	**6.6E+00**
Zinc	7440-66-6	1.45E+01	1.31E+02	280	1.8E+00	5.1E+02	1.3E+01	3.6E+03	Invertebrate	3.6E+00	3.2E+01	**7.9E+01**	**8.7E+00**	**Y**	177.6	**5.0E+01**
Pesticides/PCBs																
4,4'-DDT	50-29-3	2.80E-03	2.80E-02	0.0015	6.2E-01	9.3E-04	2.9E+01	4.4E-02	Invertebrate	3.0E-04	3.0E-03	**5.0E+00**	5.0E-01	**Y**	0.0015	**5.0E+00**
Heptachlor epoxide	1024-57-3	9.90E-01	4.95E+00	0.0065	1.0E+00	6.5E-03	8.4E+00	5.5E-02	Invertebrate	3.7E-01	1.9E+00	1.7E-02	3.5E-03	N	--	--
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	1.7	6.8E-03	1.2E-02	1.6E+01	2.7E+01	Invertebrate	8.2E-02	8.2E-01	**2.1E+01**	**2.1E+00**	**Y**	0.839	**1.0E+01**
Aroclor 1260	11096-82-5	4.10E-01	4.10E+00	0.8	4.5E-03	3.6E-03	1.6E+01	1.3E+01	Invertebrate	8.2E-02	8.2E-01	**9.8E+00**	9.8E-01	**Y**	0.8	**9.8E+00**
TCL SVOCs																
Benzo(a)anthracene	56-55-3	NV	NV	0.1	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Benzo(a)pyrene	50-32-8	5.00E-01	2.50E+00	0.018	3.3E+00	5.9E-02	9.0E+00	1.6E-01	Invertebrate	1.8E-01	8.8E-01	1.0E-01	2.1E-02	N	--	--
Benzo(b)fluoranthene	205-99-2	NV	NV	0.029	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Benzo(k)fluoranthene	207-08-9	NV	NV	0.018	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Chrysene	218-01-9	NV	NV	0.057	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Pyrene	129-00-0	NV	NV	0.19	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Explosives																
2,4,6-Trinitrotoluene	118-96-7	7.00E-02	1.80E+00	0.31	8.5E+00	2.6E+00	1.0E+00	3.1E-01	Plant	2.6E-02	6.7E-01	**1.2E+01**	4.6E-01	**Y**	0.31	**1.2E+01**
2,4-Dinitrotoluene	121-14-2	1.00E-01	1.25E+00	0.52	8.5E+00	4.4E+00	1.0E+00	5.2E-01	Plant	3.7E-02	4.7E-01	**1.4E+01**	**1.1E+00**	**Y**	0.52	**1.4E+01**
HMX	2691-41-0	NV	NV	7	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Nitroglycerin																
Nitroglycerin	55-63-0	NV	NV	11	--	--	--	--	--	--	--	**--**	**--**	--	--	--

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10
BW = Minimum Body Weigth of Receptor (kg)
IR_{food} = Maximum Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)
DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = 100% Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
EPC = Exposure Point Concentration

American Robin Specific Data from Table F.2-9

BW=	0.0635	kg
IR_{food} =	0.020	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00100	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration
LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration
EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.2-21
Refined Wildlife Risk Characterization - American Robin
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment								
				Soil								
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics												
Cadmium	7440-43-9	1.45E+00	2.00E+01	1.81	4.8E-01	8.6E-01	7.3E+00	1.3E+01	8.9E+00	1.2E+02	2.0E-01	1.5E-02
Chromium	7440-47-3	1.00E+00	5.00E+00	130	4.1E-02	5.3E+00	3.1E-01	4.0E+01	1.0E+02	5.0E+02	**1.3E+00**	2.6E-01
Copper	7440-50-8	4.70E+01	6.17E+01	102	1.2E-01	1.2E+01	5.2E-01	5.3E+01	2.8E+03	3.7E+03	3.6E-02	2.7E-02
Lead	7439-92-1	1.13E+00	1.13E+01	445.5	1.8E-02	8.1E+00	2.5E-01	1.1E+02	1.4E+02	1.4E+03	**3.2E+00**	3.2E-01
Mercury	7439-97-6	4.50E-01	9.00E-01	0.675	4.4E-01	3.0E-01	1.7E+00	1.1E+00	9.0E+00	1.8E+01	7.5E-02	3.8E-02
Silver	7440-22-4	1.66E+01	1.24E+02	22.6	1.4E-02	3.2E-01	2.0E+00	4.6E+01	3.8E+02	2.9E+03	5.9E-02	7.9E-03
Zinc	7440-66-6	1.45E+01	1.31E+02	177.6	4.8E-01	8.5E+01	2.6E+00	4.7E+02	2.1E+02	1.9E+03	8.5E-01	9.5E-02
Pesticides/PCBs												
4,4'-DDT	50-29-3	2.80E-03	2.80E-02	0.0015	4.1E-01	6.1E-04	2.3E+01	3.4E-02	6.0E-03	6.0E-02	2.5E-01	2.5E-02
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	0.839	6.8E-03	5.7E-03	6.7E+00	5.6E+00	3.1E+00	3.1E+01	2.7E-01	2.7E-02
Aroclor 1260	11096-82-5	4.10E-01	4.10E+00	0.8	4.5E-03	3.6E-03	6.7E+00	5.3E+00	3.1E+00	3.1E+01	2.6E-01	2.6E-02
Explosives												
2,4,6-Trinitrotoluene	118-96-7	7.00E-02	1.80E+00	0.31	4.2E+00	1.3E+00	1.0E+00	3.1E-01	4.4E-01	1.1E+01	7.0E-01	2.7E-02
2,4-Dinitrotoluene	121-14-2	1.00E-01	1.25E+00	0.52	4.2E+00	2.2E+00	1.0E+00	5.2E-01	6.3E-01	7.9E+00	8.2E-01	6.6E-02

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10
BW = Average Body Weigth of Receptor (kg)
IR_{food} = Average Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor, specific to prey type and chemical
DF = Dietary fraction
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
BDL = Below Detection Limit
EPC = Exposure Point Concentration

American Robin Specific Data from Table F.2-9

BW=	0.0773	kg
IR_{food} =	0.016	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.62	unitless
DF_{inv} =	0.38	unitless
IR_{soil} =	0.0008	kg dw/day
AF =	0.250	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level
LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.2-22
Preliminary Wildlife Risk Characterization - Red-tailed Hawk
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment									
				Soil									
				Maximum Detected Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics													
Arsenic	7440-38-2	5.14E+00	1.28E+01	10	1.5E-02	1.5E-01	5.2E+03	2.1E+03	1.9E-03	7.6E-04	N	--	--
Cadmium	7440-43-9	1.45E+00	2.00E+01	2.2	4.0E+00	8.8E+00	5.5E+00	4.0E-01	4.0E-01	2.9E-02	N	--	--
Chromium	7440-47-3	1.00E+00	5.00E+00	160	3.3E-01	5.3E+01	4.6E+01	9.1E+00	**3.5E+00**	7.0E-01	**Y**	130	**2.8E+00**
Copper	7440-50-8	4.70E+01	6.17E+01	200	1.0E+00	2.1E+02	6.8E+02	5.2E+02	2.9E-01	2.2E-01	N	--	--
Lead	7439-92-1	1.13E+00	1.13E+01	750	2.9E-01	2.1E+02	6.0E+01	6.0E+00	**1.3E+01**	**1.3E+00**	**Y**	445.5	**7.4E+00**
Mercury	7439-97-6	4.50E-01	9.00E-01	0.83	1.9E-01	1.6E-01	3.6E+01	1.8E+01	2.3E-02	1.2E-02	N	--	--
Nickel	7440-02-0	7.74E+01	1.07E+02	45	5.9E-01	2.7E+01	2.0E+03	1.4E+03	2.3E-02	1.6E-02	N	--	--
Selenium	7782-49-2	4.00E-01	8.00E-01	0.37	1.2E+00	4.4E-01	5.1E+00	2.6E+00	7.2E-02	3.6E-02	N	--	--
Silver	7440-22-4	1.66E+01	1.24E+02	25	5.0E-01	1.3E+01	5.0E+02	6.7E+01	5.0E-02	6.6E-03	N	--	--
Zinc	7440-66-6	1.45E+01	1.31E+02	280	2.7E+00	7.5E+02	8.2E+01	9.1E+00	**3.4E+00**	3.8E-01	**Y**	177.6	**2.2E+00**
Pesticides/PCBs													
4,4'-DDT	50-29-3	2.80E-03	2.80E-02	0.0015	1.0E+00	1.5E-03	4.3E-02	4.3E-03	3.5E-02	3.5E-03	N	--	--
Heptachlor epoxide	1024-57-3	9.90E-01	4.95E+00	0.0065	1.0E+00	6.5E-03	1.5E+01	3.0E+00	4.3E-04	8.6E-05	N	--	--
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	1.7	1.0E+00	1.7E+00	6.2E+00	6.2E-01	2.7E-01	2.7E-02	N	--	--
Aroclor 1260	11096-82-5	4.10E-01	4.10E+00	0.8	1.0E+00	8.0E-01	6.2E+00	6.2E-01	1.3E-01	1.3E-02	N	--	--
TCL SVOCs													
Benzo(a)anthracene	56-55-3	NV	NV	0.1	--	--	--	--	**--**	**--**	--	--	--
Benzo(a)pyrene	50-32-8	5.00E-01	2.50E+00	0.018	1.0E+00	1.8E-02	7.6E+00	1.5E+00	2.4E-03	4.7E-04	N	--	--
Benzo(b)fluoranthene	205-99-2	NV	NV	0.029	--	--	--	--	**--**	**--**	--	--	--
Benzo(k)fluoranthene	207-08-9	NV	NV	0.018	--	--	--	--	**--**	**--**	--	--	--
Chrysene	218-01-9	NV	NV	0.057	--	--	--	--	**--**	**--**	--	--	--
Pyrene	129-00-0	NV	NV	0.19	--	--	--	--	**--**	**--**	--	--	--
Explosives													
2,4,6-Trinitrotoluene	118-96-7	7.00E-02	1.80E+00	0.31	1.0E+00	3.1E-01	1.1E+00	4.1E-02	2.9E-01	1.1E-02	N	--	--
2,4-Dinitrotoluene	121-14-2	1.00E-01	1.25E+00	0.52	1.0E+00	5.2E-01	1.5E+00	1.2E-01	3.4E-01	2.7E-02	N	--	--
HMX	2691-41-0	NV	NV	7	--	--	--	--	**--**	**--**	--	--	--
Nitroglycerin													
Nitroglycerin	55-63-0	NV	NV	11	--	--	--	--	**--**	**--**	--	--	--

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10
BW_i = Minimum Body Weigth of Receptor (kg)
IR_{food} = Maximum Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)
DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = 100% Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
EPC = Exposure Point Concentration

Red-tailed Hawk Specific Data from Table F.2-9

BW=	0.957	kg
IR_{food} =	0.063	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{mam} =	1.00	unitless
IR_{soil} =	0.00	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screenning levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration
LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration
EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.2-23
Refined Wildlife Risk Characterization - Red-tailed Hawk
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment						
				Soil						
				EPC (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Soil Screening Level[a] (mg/kg)	Calculated LOAEL-Based Soil Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics										
Chromium	7440-47-3	1.00E+00	5.00E+00	130	6.4E-02	8.3E+00	6.3E+05	3.1E+06	2.1E-04	4.1E-05
Lead	7439-92-1	1.13E+00	1.13E+01	445.5	3.6E-02	1.6E+01	1.3E+06	1.3E+07	3.5E-04	3.5E-05
Zinc	7440-66-6	1.45E+01	1.31E+02	177.6	6.4E-01	1.1E+02	9.1E+05	8.2E+06	1.9E-04	2.2E-05

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.2-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Red-tailed Hawk Specific Data from Table F.2-9

BW=	1.134	kg
IR_{food} =	0.059	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{mam} =	1.00	unitless
IR_{soil} =	0.0	kg dw/day
AF =	0.0005	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.2-24
Wildlife Summary
Screening Level Ecological Risk Assessment - SWMU 35
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS#	Meadow Vole					Short-tailed Shrew					Red Fox					American Robin					Red-tailed Hawk				
		Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ
Inorganics																										
Arsenic	7440-38-2	**5.5E+01**	**5.5E+00**	**3.8E+01**	7.7E-01	7.7E-02	**2.0E+01**	**2.0E+00**	**1.4E+01**	4.8E-01	4.8E-02	**3.6E+01**	**3.6E+00**	**2.5E+01**	5.8E-04	5.8E-05	7.1E-01	2.8E-01	NC	NC	NC	1.9E-03	7.6E-04	NC	NC	NC
Cadmium	7440-43-9	**2.5E+00**	2.5E-01	**2.1E+00**	1.2E-01	1.2E-02	**1.0E+01**	1.0E+00	**8.4E+00**	2.3E-01	2.3E-02	**2.0E+01**	**2.0E+00**	**1.7E+01**	1.4E-04	1.4E-05	**1.9E+01**	**1.4E+00**	**1.6E+01**	2.0E-01	1.5E-02	4.0E-01	2.9E-02	NC	NC	NC
Chromium	7440-47-3	**1.8E+00**	1.8E-01	**1.4E+00**	3.2E-01	3.2E-02	**1.8E+01**	**1.8E+00**	**1.4E+01**	3.0E-01	3.0E-02	**3.4E+01**	**3.4E+00**	**2.8E+01**	5.0E-04	5.0E-05	**1.6E+02**	**3.2E+01**	**1.3E+02**	**1.3E+00**	2.6E-01	**3.5E+00**	7.0E-01	**2.8E+00**	2.1E-04	4.1E-05
Copper	7440-50-8	**2.9E+00**	**2.2E+00**	**1.5E+00**	1.2E-01	8.9E-02	**2.4E+00**	**1.8E+00**	**1.2E+00**	7.4E-02	5.6E-02	**4.5E+00**	**3.4E+00**	**2.3E+00**	1.6E-04	1.2E-04	**2.1E+00**	**1.6E+00**	**1.1E+00**	3.6E-02	2.7E-02	2.9E-01	2.2E-01	NC	NC	NC
Lead	7439-92-1	**1.5E+01**	**1.5E+00**	**9.2E+00**	2.9E-01	2.9E-02	**1.7E+01**	**1.7E+00**	**1.0E+01**	3.6E-01	3.6E-02	**3.2E+01**	**3.2E+00**	**1.9E+01**	5.0E-04	5.0E-05	**3.3E+02**	**3.3E+01**	**2.0E+02**	**3.2E+00**	3.2E-01	**1.3E+01**	**1.3E+00**	**7.4E+00**	3.5E-04	3.5E-05
Mercury	7439-97-6	8.1E-02	8.1E-03	NC	NC	NC	1.1E-01	1.1E-02	NC	NC	NC	2.2E-01	2.2E-02	NC	NC	NC	**1.2E+01**	**6.0E+00**	**9.8E+00**	7.5E-02	3.8E-02	2.3E-02	1.2E-02	NC	NC	NC
Nickel	7440-02-0	5.4E-01	2.7E-01	NC	NC	NC	6.0E-01	3.0E-01	NC	NC	NC	**1.2E+00**	5.9E-01	8.5E-01	1.8E-05	9.2E-06	8.8E-01	6.3E-01	NC	NC	NC	2.3E-02	1.6E-02	NC	NC	NC
Selenium	7782-49-2	**1.9E+00**	**1.1E+00**	**1.6E+00**	9.2E-02	5.6E-02	6.3E-01	3.8E-01	NC	NC	NC	**1.2E+00**	7.5E-01	**1.0E+00**	2.5E-04	1.5E-04	8.9E-01	4.5E-01	NC	NC	NC	7.2E-02	3.6E-02	NC	NC	NC
Silver	7440-22-4	2.3E-02	2.3E-03	NC	NC	NC	**1.9E+00**	1.9E-01	**1.7E+00**	3.6E-02	3.6E-03	**3.8E+00**	3.8E-01	**3.4E+00**	1.5E-05	1.5E-06	**7.3E+00**	9.7E-01	**6.6E+00**	5.9E-02	7.9E-03	5.0E-02	6.6E-03	NC	NC	NC
Zinc	7440-66-6	**1.1E+00**	5.4E-01	6.9E-01	6.9E-02	3.4E-02	**2.5E+00**	**1.2E+00**	**1.6E+00**	5.1E-02	2.6E-02	**5.0E+00**	**2.5E+00**	**3.2E+00**	1.0E-04	5.2E-05	**7.9E+01**	**8.7E+00**	**5.0E+01**	8.5E-01	9.5E-02	**3.4E+00**	3.8E-01	**2.2E+00**	1.9E-04	2.2E-05
Pesticides/PCBs																										
4,4'-DDT	50-29-3	4.1E-04	8.1E-05	NC	NC	NC	6.0E-03	1.2E-03	NC	NC	NC	1.2E-02	2.4E-03	NC	NC	NC	**5.0E+00**	5.0E-01	**5.0E+00**	2.5E-01	2.5E-02	3.5E-02	3.5E-03	NC	NC	NC
Heptachlor epoxide	1024-57-3	8.9E-02	8.9E-03	NC	NC	NC	2.4E-01	2.4E-02	NC	NC	NC	4.8E-01	4.8E-02	NC	NC	NC	1.7E-02	3.5E-03	NC	NC	NC	4.3E-04	8.6E-05	NC	NC	NC
Aroclor 1254	11097-69-1	4.8E-01	4.8E-02	NC	NC	NC	**8.1E+01**	**8.1E+00**	**4.0E+01**	**2.5E+00**	2.5E-01	**1.6E+02**	**1.6E+01**	**8.0E+01**	3.2E-03	3.2E-04	**2.1E+01**	**2.1E+00**	**1.0E+01**	2.7E-01	2.7E-02	2.7E-01	2.7E-02	NC	NC	NC
Aroclor 1260	11096-82-5	2.1E-01	2.1E-02	NC	NC	NC	**3.8E+01**	**3.8E+00**	**3.8E+01**	**2.4E+00**	2.4E-01	**7.6E+01**	**7.6E+00**	**7.6E+01**	3.1E-03	3.1E-04	**9.8E+00**	9.8E-01	**9.8E+00**	2.6E-01	2.6E-02	1.3E-01	1.3E-02	NC	NC	NC
TCL SVOCs																										
Benzo(a)anthracene	56-55-3	1.1E-01	1.1E-02	NC	NC	NC	5.4E-01	5.4E-02	NC	NC	NC	**1.1E+00**	1.1E-01	6.6E-01	1.6E-05	1.6E-06	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	50-32-8	3.7E-02	3.7E-03	NC	NC	NC	3.3E-02	3.3E-03	NC	NC	NC	6.6E-02	6.6E-03	NC	NC	NC	1.0E-01	2.1E-02	NC	NC	NC	2.4E-03	4.7E-04	NC	NC	NC
Benzo(b)fluoranthene	205-99-2	9.1E-03	9.1E-04	NC	NC	NC	9.7E-02	9.7E-03	NC	NC	NC	1.9E-01	1.9E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	207-08-9	1.0E-03	1.0E-04	NC	NC	NC	4.2E-03	4.2E-04	NC	NC	NC	8.5E-03	8.5E-04	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	218-01-9	2.5E-03	2.5E-04	NC	NC	NC	9.0E-03	9.0E-04	NC	NC	NC	1.8E-02	1.8E-03	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	129-00-0	5.5E-02	1.1E-02	NC	NC	NC	1.3E-01	2.6E-02	NC	NC	NC	2.6E-01	5.2E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Explosives																										
2,4,6-Trinitrotoluene	118-96-7	1.8E-01	4.4E-02	NC	NC	NC	5.8E-02	1.4E-02	NC	NC	NC	1.2E-01	2.9E-02	NC	NC	NC	**1.2E+01**	4.6E-01	**1.2E+01**	7.0E-01	2.7E-02	2.9E-01	1.1E-02	NC	NC	NC
2,4-Dinitrotoluene	121-14-2	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	**1.4E+01**	**1.1E+00**	**1.4E+01**	8.2E-01	6.6E-02	3.4E-01	2.7E-02	NC	NC	NC
HMX	2691-41-0	**2.5E+00**	3.5E-01	**2.5E+00**	7.7E-02	1.1E-02	8.1E-01	1.2E-01	NC	NC	NC	**1.6E+00**	2.3E-01	**1.6E+00**	2.5E-05	3.6E-06	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Nitroglycerin																										
Nitroglycerin	55-63-0	**1.3E+00**	1.2E-01	**1.3E+00**	4.7E-01	4.4E-02	4.6E-01	4.3E-02	NC	NC	NC	8.4E-01	7.9E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Notes:
CAS = Chemical Abstract Services
NC = Not Calculated
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
HQ = Hazard Quotient
EPC = Exposure Point Concentration

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APPENDIX F.3

SWMU 37 SLERA

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Table F.3-1
SLERA Occurence/Distribution - SWMU 37 Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Units	Location of Maximum Concentration	Total Samples Analyzed	Detection Frequency	Concentration Used for Screening
TAL Metals								
Aluminum	7429-90-5	9,400	29,000	mg/kg	37SB7A	10	10/10	29,000
Antimony	7440-36-0	0.076	1.2	mg/kg	37SB2A	10	10/10	1.2
Arsenic	7440-38-2	1	11	mg/kg	37SB7A	10	10/10	11
Barium	7440-39-3	47	103	mg/kg	37SB3A	10	10/10	103
Beryllium	7440-41-7	0.46	1.4	mg/kg	37SB7A	10	10/10	1.4
Cadmium	7440-43-9	0.93	2.6	mg/kg	37SB10A	10	10/10	2.6
Calcium	7440-70-2	250	106,000	mg/kg	37SB2A	10	10/10	106,000
Chromium	7440-47-3	15	200	mg/kg	37SB10A	10	10/10	200
Cobalt	7440-48-4	2.8	9.6	mg/kg	37SB5A	10	10/10	9.6
Copper	7440-50-8	6.9	210	mg/kg	37SB7A	10	10/10	210
Iron	7439-89-6	14,300	29,000	mg/kg	37SB5A	10	10/10	29,000
Lead	7439-92-1	10	315	mg/kg	37SB8A DUP AVG	10	10/10	315
Magnesium	7439-95-4	880	6,900	mg/kg	37SB10A	10	10/10	6,900
Manganese	7439-96-5	130	470	mg/kg	37SB5A	10	10/10	470
Mercury	7439-97-6	0.013	3.3	mg/kg	37SB7A	10	10/10	3.3
Nickel	7440-02-0	7.2	53	mg/kg	37SB8A DUP AVG	10	10/10	53
Potassium	7440-09-7	677	1,700	mg/kg	37SB5A	10	10/10	1,700
Selenium	7782-49-2	0.07075	0.47	mg/kg	37SB1A	10	8/10	0.47
Silver	7440-22-4	0.028	0.3	mg/kg	37SB7A	10	10/10	0.3
Sodium	7440-23-5	28	110	mg/kg	37SB10A	10	10/10	110
Thallium	7440-28-0	0.048	0.2	mg/kg	37SB5A	10	10/10	0.2
Vanadium	7440-62-2	16	49	mg/kg	37SB5A	10	10/10	49
Zinc	7440-66-6	31	150	mg/kg	37SB7A	10	10/10	150
Pesticides/PCBs								
Dieldrin	60-57-1	1.1E-02	1.1E-02	mg/kg	37SB1A	8	1/8	0.011
Endrin	72-20-8	3.5E-03	8.3E-03	mg/kg	37SB10A	8	4/8	0.0083
Aroclor 1254	11097-69-1	1.7E-02	1.0E+00	mg/kg	37SB7A	8	6/8	1
TCL VOCs								
2-Butanone	78-93-3	2.4E-02	2.4E-02	mg/kg	37SB3A	3	1/3	0.024
Acetone	67-64-1	3.7E-02	1.1E-01	mg/kg	37SB1A	3	3/3	0.11
Methylene chloride	75-09-2	4.5E-03	1.0E-02	mg/kg	37SB2A	3	2/3	0.01
TCL SVOCs								
2,4-Dinitrotoluene	121-14-2	2.6E-01	1.8E+00	mg/kg	37SB2A	3	2/3	1.8
Dinitrotoluene Mix	--	2.6E-01	1.8E+00	mg/kg	37SB2A	3	2/3	1.8
4-Chloro-3-Methylphenol	59-50-7	1.2E-02	1.2E-02	mg/kg	37SB3A	3	1/3	0.012
Bis(2-ethylhexyl) Phthalate	117-81-7	4.6E-02	1.0E+00	mg/kg	37SB2A	3	3/3	1
Di-n-butylphthalate	84-74-2	5.9E-02	2.6E+01	mg/kg	37SB2A	3	3/3	26
Diethylphthalate	84-66-2	1.8E-02	1.2E-01	mg/kg	37SB2A	3	2/3	0.12
Fluoranthene	206-44-0	1.2E-01	1.9E-01	mg/kg	37SB2A	3	2/3	0.19
N-Nitrosodiphenylamine	86-30-6	3.0E-01	4.5E-01	mg/kg	37SB1A	3	2/3	0.45
Phenanthrene	85-01-8	4.0E-02	4.0E-02	mg/kg	37SB1A	3	1/3	0.04
Pyrene	129-00-0	1.1E-01	1.1E-01	mg/kg	37SB1A	3	2/3	0.11
Explosives								
2,4-Dinitrotoluene	121-14-2	2.7E-01	6.3E-01	mg/kg	37SB2A	10	3/10	0.63
Dinitrotoluene Mix	--	2.7E-01	6.3E-01	mg/kg	37SB2A	10	3/10	0.63

Notes:
CAS = Chemical Abstracts Service
COPEC = Chemical of Potential Ecological Concern
mg/kg = Milligram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
TIC = Tentatively Identified Compound

Table F.3-2
Non-detected Chemicals MDL Screening for SWMU 37 - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
TAL Metals																		
Selenium	7782-49-2	mg/kg	2	10	0.089	0.089	0.52	A	N	4.1	A	N	1.2	A	N	0.63	A	N
Pesticides/PCBs																		
4,4'-DDD	72-54-8	ug/kg	8	8	0.381	2.3	100	G	N	100	C	N	--	--	NS	--	--	NS
4,4'-DDE	72-55-9	ug/kg	8	8	0.28	1.9	100	G	N	100	C	N	--	--	NS	--	--	NS
4,4'-DDT	50-29-3	ug/kg	8	8	0.288	2.1	100	G	N	100	C	N	93	A	N	21	A	N
Aldrin	309-00-2	ug/kg	8	8	0.486	1.1	100	G	N	100	C	N	--	--	NS	--	--	NS
alpha-BHC	319-84-6	ug/kg	8	8	0.4	0.73	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
alpha-Chlordane	5103-71-9	ug/kg	8	8	0.694	1.4	100	G	N	100	C	N	--	--	NS	--	--	NS
beta-BHC	319-85-7	ug/kg	8	8	0.76	1.81	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
delta-BHC	319-86-8	ug/kg	8	8	1.1	1.9	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
Dieldrin	60-57-1	ug/kg	7	8	0.52	0.95	100	G	N	100	C	N	22	A	N	4.9	A	N
Endosulfan I	959-98-8	ug/kg	8	8	1	1.9	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endosulfan II	33213-65-9	ug/kg	8	8	0.342	1.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endosulfan Sulfate	1031-07-8	ug/kg	8	8	0.805	2.1	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endrin	72-20-8	ug/kg	4	8	0.477	0.64	100	G	N	100	C	N	--	--	NS	--	--	NS
Endrin Aldehyde	7421-93-4	ug/kg	8	8	1.2	2.2	100	G	N	100	C	N	--	--	NS	--	--	NS
Endrin Ketone	53494-70-5	ug/kg	8	8	0.44	2.1	100	G	N	100	C	N	--	--	NS	--	--	NS
gamma-BHC (Lindane)	58-89-9	ug/kg	8	8	0.31	1.3	100	G	N	100	C	N	--	--	NS	--	--	NS
gamma-Chlordane	5103-74-2	ug/kg	8	8	0.53	1.12	100	G	N	100	C	N	--	--	NS	--	--	NS
Heptachlor	76-44-8	ug/kg	8	8	1.13	2.5	100	G	N	100	C	N	--	--	NS	--	--	NS
Heptachlor Epoxide	1024-57-3	ug/kg	8	8	0.47	0.86	100	G	N	100	C	N	--	--	NS	--	--	NS
Methoxychlor	72-43-5	ug/kg	8	8	0.448	2.7	100	G	N	100	C	N	--	--	NS	--	--	NS
Toxaphene	8001-35-2	ug/kg	8	8	25	46	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Aroclor 1016	12674-11-2	ug/kg	8	8	4.8	25.6	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1221	11104-28-2	ug/kg	8	8	3.2	15	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1232	11141-16-5	ug/kg	8	8	8	17	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1242	53469-21-9	ug/kg	8	8	4.8	34	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1248	12672-29-6	ug/kg	8	8	6	11	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1254	11097-69-1	ug/kg	2	8	5	5.3	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1260	11096-82-5	ug/kg	8	8	11.2	33	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1262	37324-23-5	ug/kg	7	7	5.9	11	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1268	11100-14-4	ug/kg	7	7	5	9.1	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Herbicides																		
2,4,5-T	93-76-5	ug/kg	1	1	32	32	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4,5-TP (Silvex)	93-72-1	ug/kg	1	1	64	64	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4-D	94-75-7	ug/kg	1	1	256	256	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4-DB	94-82-6	ug/kg	1	1	992	992	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dalapon	75-99-0	ug/kg	1	1	912	912	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dicamba	1918-00-9	ug/kg	1	1	32	32	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dichlorprop	120-36-5	ug/kg	1	1	272	272	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dinoseb	88-85-7	ug/kg	1	1	21	21	--	--	NS	--	--	NS	--	--	NS	--	--	NS
MCPA	94-74-6	ug/kg	1	1	22,300	22,300	--	--	NS	--	--	NS	--	--	NS	--	--	NS
MCPP	93-65-2	ug/kg	1	1	80,900	80,900	--	--	NS	--	--	NS	--	--	NS	--	--	NS
TCL VOCs																		
1,1,1-Trichloroethane	71-55-6	ug/kg	3	3	0.486	0.699	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	3	3	0.744	1.07	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/kg	3	3	0.865	1.24	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,1,2-Trichloroethane	79-00-5	ug/kg	3	3	0.676	0.973	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1-Dichloroethane	75-34-3	ug/kg	3	3	0.825	1.19	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1-Dichloroethene	75-35-4	ug/kg	3	3	0.836	1.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,3-Trichlorobenzene	87-61-6	ug/kg	3	3	0.62	0.892	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/kg	3	3	0.467	0.672	100	G	N	100	C	N	--	--	NS	--	--	NS
1,2-Dibromo-3-chloropropane	96-12-8	ug/kg	3	3	2.37	3.41	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2-Dibromoethane	106-93-4	ug/kg	3	3	0.781	1.12	--	--	NS	5,000	C	N	--	--	NS	--	--	NS
1,2-Dichlorobenzene	95-50-1	ug/kg	3	3	0.552	0.794	100	G	N	100	C	N	--	--	NS	--	--	NS
1,2-Dichloroethane	107-06-2	ug/kg	3	3	0.491	0.707	870,000	G	N	--	--	NS	--	--	NS	--	--	NS
1,2-Dichloropropane	78-87-5	ug/kg	3	3	0.668	0.961	300	G	N	300	C	N	--	--	NS	--	--	NS
1,3-Dichlorobenzene	541-73-1	ug/kg	3	3	0.306	0.44	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,4-Dichlorobenzene	106-46-7	ug/kg	3	3	0.809	1.16	100	G	N	20,000	B	N	--	--	NS	--	--	NS
2-Butanone	78-93-3	ug/kg	2	3	7.95	8.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS

Table F.3-2
Non-detected Chemicals MDL Screening for SWMU 37 - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
2-Hexanone	591-78-6	ug/kg	3	3	2.58	3.71	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Methyl-2-pentanone	108-10-1	ug/kg	3	3	1.66	2.39	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
Benzene	71-43-2	ug/kg	3	3	0.601	0.864	100	G	N	100	C	N	--	--	NS	--	--	NS
Bromochloromethane	74-97-5	ug/kg	3	3	0.868	1.25	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bromodichloromethane	75-27-4	ug/kg	3	3	0.571	0.822	450,000	G	N	--	--	NS	--	--	NS	--	--	NS
Bromoform	75-25-2	ug/kg	3	3	0.659	0.948	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bromomethane	74-83-9	ug/kg	3	3	1.71	2.46	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbon Disulfide	75-15-0	ug/kg	3	3	1.65	2.38	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbon Tetrachloride	56-23-5	ug/kg	3	3	0.531	0.764	300	G	N	300	C	N	--	--	NS	--	--	NS
Chlorobenzene	108-90-7	ug/kg	3	3	0.754	1.08	100	G	N	40,000	B	N	--	--	NS	--	--	NS
Chloroethane	75-00-3	ug/kg	3	3	1.54	2.21	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Chloroform	67-66-3	ug/kg	3	3	0.508	0.731	300	G	N	300	C	N	--	--	NS	--	--	NS
Chloromethane	74-87-3	ug/kg	3	3	0.951	1.37	--	--	NS	--	--	NS	--	--	NS	--	--	NS
cis-1,2-Dichloroethene	156-59-2	ug/kg	3	3	0.809	1.16	300	G	N	300	C	N	--	--	NS	--	--	NS
cis-1,3-Dichloropropene	10061-01-5	ug/kg	3	3	0.56	0.805	300	G	N	300	C	N	--	--	NS	--	--	NS
Cyclohexane	110-82-7	ug/kg	3	3	0.36	0.518	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dibromochloromethane	124-48-1	ug/kg	3	3	0.589	0.848	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dichlorodifluoromethane	75-71-8	ug/kg	3	3	0.762	1.1	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Ethylbenzene	100-41-4	ug/kg	3	3	0.482	0.694	100	G	N	100	C	N	--	--	NS	--	--	NS
Isopropylbenzene	98-82-8	ug/kg	3	3	0.622	0.895	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methyl Acetate	79-20-9	ug/kg	3	3	3.96	5.69	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methyl tert-Butyl Ether	1634-04-4	ug/kg	3	3	0.731	1.05	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methylcyclohexane	108-87-2	ug/kg	3	3	0.963	1.39	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methylene Chloride	75-09-2	ug/kg	1	3	4.61	4.61	300	G	N	300	C	N	--	--	NS	--	--	NS
Styrene	100-42-5	ug/kg	3	3	0.504	0.725	300,000	F	N	100	C	N	--	--	NS	--	--	NS
Tetrachloroethene	127-18-4	ug/kg	3	3	0.699	1.01	300	G	N	300	C	N	--	--	NS	--	--	NS
Toluene	108-88-3	ug/kg	3	3	0.529	1	200,000	F	N	100	C	N	--	--	NS	--	--	NS
trans-1,2-Dichloroethene	156-60-5	ug/kg	3	3	0.801	1	300	G	N	300	C	N	--	--	NS	--	--	NS
trans-1,3-Dichloropropene	10061-02-6	ug/kg	3	3	0.594	1	300	G	N	300	C	N	--	--	NS	--	--	NS
Trichloroethene	79-01-6	ug/kg	3	3	0.772	1	300	G	N	300	C	N	--	--	NS	--	--	NS
Trichlorofluoromethane	75-69-4	ug/kg	3	3	0.847	1	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Vinyl Chloride	75-01-4	ug/kg	3	3	0.422	1	300	G	N	300	C	N	--	--	NS	--	--	NS
Xylenes	1330-20-7	ug/kg	3	3	0.48	1	100	G	N	--	--	NS	--	--	NS	--	--	NS
TCL SVOCs																		
1,1'-Biphenyl	92-52-4	ug/kg	3	3	2.71	59	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/kg	3	3	31.6	689	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,2'-oxybis(1-Chloropropane)	108-60-1	ug/kg	3	3	1.45	31.7	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4,5-Trichlorophenol	95-95-4	ug/kg	3	3	3.67	80	4,000	F	N	9,000	B	N	--	--	NS	--	--	NS
2,4,6-Trichlorophenol	88-06-2	ug/kg	3	3	2.88	63	100	G	N	10,000	B	N	--	--	NS	--	--	NS
2,4-Dichlorophenol	120-83-2	ug/kg	3	3	3.87	85	100	G	N	100	C	N	--	--	NS	--	--	NS
2,4-Dimethylphenol	105-67-9	ug/kg	3	3	8.73	191	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
2,4-Dinitrophenol	51-28-5	ug/kg	3	3	3.52	77	20,000	F	N	100	C	N	--	--	NS	--	--	NS
2,4-Dinitrotoluene	121-14-2	ug/kg	1	3	3.47	3	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,6-Dinitrotoluene	606-20-2	ug/kg	3	3	30.5	665	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Chloronaphthalene	91-58-7	ug/kg	3	3	2.53	55	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Chlorophenol	95-57-8	ug/kg	3	3	2.21	48	7,000	F	N	10,000	B	N	--	--	NS	--	--	NS
2-Methylnaphthalene	91-57-6	ug/kg	3	3	3.01	65.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Methylphenol	95-48-7	ug/kg	3	3	5.32	116	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
2-Nitroaniline	88-74-4	ug/kg	3	3	5.06	110	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Nitrophenol	88-75-5	ug/kg	3	3	1.87	41	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3,3'-Dichlorobenzidine	91-94-1	ug/kg	3	3	73.4	1,600	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3-Nitroaniline	99-09-2	ug/kg	3	3	36.6	799	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4,6-Dinitro-2-methylphenol	534-52-1	ug/kg	3	3	4.96	108	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Bromophenyl-PhenylEther	101-55-3	ug/kg	3	3	3.72	81.1	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Chloro-3-methylphenol	59-50-7	ug/kg	2	3	83.4	125	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Chloroaniline	106-47-8	ug/kg	3	3	1.39	30	20,000	F	N	--	--	NS	--	--	NS	--	--	NS
4-Chlorophenyl-PhenylEther	7005-72-3	ug/kg	3	3	3.6	78.5	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Methylphenol	106-44-5	ug/kg	3	3	7.01	153	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
4-Nitroaniline	100-01-6	ug/kg	3	3	7.98	174	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Nitrophenol	100-02-7	ug/kg	3	3	3.11	67.9	100	G	N	7,000	B	N	--	--	NS	--	--	NS
Acenaphthene	83-32-9	ug/kg	3	3	1.89	41.3	100	G	N	100	C	N	--	--	NS	--	--	NS

Table F.3-2
Non-detected Chemicals MDL Screening for SWMU 37 - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
Acenaphthylene	208-96-8	ug/kg	3	3	1.65	36	100	G	N	100	C	N	--	--	NS	--	--	NS
Acetophenone	98-86-2	ug/kg	3	3	2.09	45.6	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Anthracene	120-12-7	ug/kg	3	3	5.08	111	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Atrazine	1912-24-9	ug/kg	3	3	7.57	165	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Benzaldehyde	100-52-7	ug/kg	3	3	4.46	97.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Benzo(a)anthracene	56-55-3	ug/kg	3	3	14.6	319	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Benzo(a)pyrene	50-32-8	ug/kg	3	3	6.28	1,370	100	G	**Y**	--	--	NS	--	--	NS	--	--	NS
Benzo(b)fluoranthene	205-99-2	ug/kg	3	3	10.7	2,340	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Benzo(g,h,i)perylene	191-24-2	ug/kg	3	3	9.59	2,090	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Benzo(k)fluoranthene	207-08-9	ug/kg	3	3	14.7	3,220	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Bis(2-chloroethoxy)methane	111-91-1	ug/kg	3	3	3.45	75.4	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bis(2-chloroethyl)Ether	111-44-4	ug/kg	3	3	1.9	41.5	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Butylbenzylphthalate	85-68-7	ug/kg	3	3	4.93	108	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Caprolactam	105-60-2	ug/kg	3	3	7.02	153	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbazole	86-74-8	ug/kg	3	3	6.71	146	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Chrysene	218-01-9	ug/kg	3	3	11.2	245	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Di-n-octylphthalate	117-84-0	ug/kg	3	3	3.41	74.4	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dibenz(a,h)anthracene	53-70-3	ug/kg	3	3	6.49	1,420	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Dibenzofuran	132-64-9	ug/kg	3	3	3.48	75.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Diethylphthalate	84-66-2	ug/kg	1	3	30.4	30	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dimethylphthalate	131-11-3	ug/kg	3	3	3.64	79.4	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Fluoranthene	206-44-0	ug/kg	1	3	2.59	3	100	G	N	100	C	N	--	--	NS	--	--	NS
Fluorene	86-73-7	ug/kg	3	3	1.85	40.3	100	G	N	100	C	N	--	--	NS	--	--	NS
Hexachlorobenzene	118-74-1	ug/kg	3	3	2.76	60.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachlorobutadiene	87-68-3	ug/kg	3	3	4.26	92.9	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachlorocyclopentadiene	77-47-4	ug/kg	3	3	2.18	48	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachloroethane	67-72-1	ug/kg	3	3	2.57	56	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	3	3	4.31	941	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Isophorone	78-59-1	ug/kg	3	3	1.9	41.5	--	--	NS	--	--	NS	--	--	NS	--	--	NS
N-Nitrosodi-n-propylamine	621-64-7	ug/kg	3	3	3.62	79	--	--	NS	--	--	NS	--	--	NS	--	--	NS
N-Nitrosodiphenylamine	86-30-6	ug/kg	1	3	5.23	5.23	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Naphthalene	91-20-3	ug/kg	3	3	3.03	66	100	G	N	100	C	N	--	--	NS	--	--	NS
Nitrobenzene	98-95-3	ug/kg	3	3	3.52	76.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Pentachlorophenol	87-86-5	ug/kg	3	3	4.83	105	5,000	A	N	31,000	A	N	2,100	A	N	2,800	A	N
Phenanthrene	85-01-8	ug/kg	2	3	2.53	55.2	100	G	N	100	C	N	--	--	NS	--	--	NS
Phenol	108-95-2	ug/kg	3	3	4.36	95	100	G	N	30,000	B	N	--	--	NS	--	--	NS
Pyrene	129-00-0	ug/kg	1	3	1.63	1.63	100	G	N	100	C	N	--	--	NS	--	--	NS
PAHs																		
Acenaphthene	83-32-9	ug/kg	3	3	10.3	15.4	100	G	N	100	C	N	--	--	NS	--	--	NS
Acenaphthylene	208-96-8	ug/kg	3	3	12.8	19	100	G	N	100	C	N	--	--	NS	--	--	NS
Anthracene	120-12-7	ug/kg	2	3	0.77	1.15	100	G	N	100	C	N	--	--	NS	--	--	NS
Benzo(a)anthracene	56-55-3	ug/kg	3	3	0.88	1.31	100	G	N	100	C	N	--	--	NS	--	--	NS
Benzo(a)pyrene	50-32-8	ug/kg	3	3	1.1	1.64	100	G	N	--	--	NS	--	--	NS	--	--	NS
Benzo(b)fluoranthene	205-99-2	ug/kg	2	3	1.43	2.13	100	G	N	100	C	N	--	--	NS	--	--	NS
Benzo(g,h,i)perylene	191-24-2	ug/kg	3	3	13.8	20.5	100	G	N	100	C	N	--	--	NS	--	--	NS
Benzo(k)fluoranthene	207-08-9	ug/kg	2	3	1.1	1.64	100	G	N	100	C	N	--	--	NS	--	--	NS
Chrysene	218-01-9	ug/kg	2	3	1.32	1.97	100	G	N	100	C	N	--	--	NS	--	--	NS
Dibenz(a,h)anthracene	53-70-3	ug/kg	3	3	1.54	2.3	100	G	N	100	C	N	--	--	NS	--	--	NS
Fluoranthene	206-44-0	ug/kg	0	3	0	0	100	G	N	100	C	N	--	--	NS	--	--	NS
Fluorene	86-73-7	ug/kg	3	3	1.43	2.13	100	G	N	100	C	N	--	--	NS	--	--	NS
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	2	3	0.77	1.15	100	G	N	100	C	N	--	--	NS	--	--	NS
Naphthalene	91-20-3	ug/kg	3	3	8.69	13	100	G	N	100	C	N	--	--	NS	--	--	NS
Phenanthrene	85-01-8	ug/kg	1	3	0.66	0.66	100	G	N	100	C	N	--	--	NS	--	--	NS
Pyrene	129-00-0	ug/kg	0	3	0	0	100	G	N	100	C	N	--	--	NS	--	--	NS
Explosives																		
1,3,5-Trinitrobenzene	99-35-4	mg/kg	10	10	0.074	0.14	8.6	I	N	18.1	I	N	--	--	NS	--	--	NS
1,3-Dinitrobenzene	99-65-0	mg/kg	10	10	0.076	0.159	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	10	10	0.15	0.167	2.4	H	N	1.2	H	N	--	--	NS	--	--	NS
2,4-Dinitrotoluene	121-14-2	mg/kg	7	10	0.1	0.142	5.3	I	N	19.8	I	N	--	--	NS	--	--	NS
2,6-Dinitrotoluene	606-20-2	mg/kg	10	10	0.2	0.25	4.5	I	N	6.9	I	N	--	--	NS	--	--	NS

Table F.3-2
Non-detected Chemicals MDL Screening for SWMU 37 - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	10	10	0.151	0.22	80	J	N	--	--	NS	--	--	NS	--	--	NS
2-Nitrotoluene	88-72-2	mg/kg	10	10	0.17	0.266	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3-Nitrotoluene	99-08-1	mg/kg	10	10	0.184	0.21	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	mg/kg	10	10	0.162	0.3	80	J	N	--	--	NS	--	--	NS	--	--	NS
4-Nitrotoluene	99-99-0	mg/kg	10	10	0.2	0.251	--	--	NS	--	--	NS	--	--	NS	--	--	NS
HMX	2691-41-0	mg/kg	10	10	0.066	0.229	--	--	NS	6.3	I	N	--	--	NS	--	--	NS
Nitrobenzene	98-95-3	mg/kg	10	10	0.03	0.102	--	--	NS	--	--	NS	--	--	NS	--	--	NS
RDX	121-82-4	mg/kg	10	10	0.048	0.131	100	K	N	98.6	I	N	--	--	NS	--	--	NS
Tetryl	479-45-8	mg/kg	10	10	0.065	0.169	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Nitroglycerin/PETN																		
Nitroglycerin	55-63-0	mg/kg	10	10	0.183	0.39	--	--	NS	--	--	NS	--	--	NS	--	--	NS
PETN	78-11-5	mg/kg	10	10	0.23	0.511	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Cyanide																		
Cyanide	57-12-5	mg/kg	1	3	0.0356	0.0356	--	--	NS	0.9	D	N	--	--	NS	--	--	NS

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
ug/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
PETN = Pentaerythritol Tetranitrate
MDL = Method Detection Limit
SL = Screening Level
Eco SSL = Ecological Soil Screening Level

Sources:
A = USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
B = ORNL - Earthworms - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
C = BTAG - Fauna - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
D = CCME, 2006
E = ORNL - Microbial Processes - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
F = ORNL - Plants - Toxilogical Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision Efroymson et al.)
G = BTAG - Flora - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
H = Best, E.P.H., H.E. Tatem, K.N. Geter, M.L. Wells and B.K. Lane. 2004. Toxicity and Metabolites of 2,4,6 Trinitrotoluene (TNT) in Plants and Worms from Exposure to Aged Soil.
I = Kuperman. R. 2003. Development of Ecological Toxicity and Biomagnification Data for Explosives Contaminants in Soil.
J = Pennington, Judith C. 1988. Plant Uptake of 2,4,6-Trinitrotoluene, 4-Amino-2,6-Dinitrotoluene, and 2-Amino-4,6-Dinitrotoluene Using 14C-Labeled and Unlabeled Compounds.
K = Simini, M., R.S. Wentsel, R.T. Checkai, C.T. Phillips, N.A. Chester, M.A. Major, and J.C. Amos. 1995. Evaluation of Soil Toxicity at Joliet Army Ammunition Plant.

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

Table F.3-3a
Summary of Total PCBs at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date Sample Depth (ft bgs)	CAS #	37SB1A 10/1/2003 0-1		37SB4A 11/15/2007 0-1		37SB5A 11/15/2007 0-1		37SB6A 11/15/2007 0-1		37SB7A 11/14/2007 0-1		37SB8A DUP AVG 11/15/2007 0-1		37SB9A DUP AVG 11/14/2007 0-1		37SB10A 11/14/2007 0-1	
		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
PCBs (ug/kg)																	
Aroclor 1254	11097-69-1	180		<37	U	17	J	<40	U	1,000	,L,s	585	,L,s	425		1,000	,L,s
Total PCBs	--	180		ND		17		ND		1,000		585		425		1,000	

Notes:
CAS = Chemical Abstract Service
ug/kg = Microgram per kilogram
ND = Not Detected
PBC = PolyChlorinated Biphenyl
See Table 4-1 for flag definitions

Table F.3-3b
Summary of Low and High Molecular Weight PAHs at SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date Sample Depth (ft bgs)	CAS #	37SB1A 10/1/2003 0-1		37SB2A 10/2/2003 0-1		37SB3A 10/2/2003 0-1	
		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TCL PAHs (ug/kg)							
Phenanthrene	85-01-8	40	J	<4,000	U	<190	U
Low Molecular Weight PAHs	--	40		ND		ND	
Fluoranthene	206-44-0	120	J	190	J,J,m	<190	U
Pyrene	129-00-0	110	J	110	J	<190	J
High Molecular Weight PAHs	--	230		300		ND	

Notes:
CAS = Chemical Abstract Service
ug/kg = Microgram per kilogram
ND = Not Detected
TCL = Target Compound List
PAH = Polynuclear Aromatic Hydrocarbon
See Table 4-1 for flag definitions

Table F.3-4
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Exposure to Contaminants in SWMU 37 Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Soil	Aluminum	mg/kg	18,310	22,122	29,000	22,122	mg/kg	95% Student's t UCL	ProUCL 4.0
	Arsenic	mg/kg	4.865	6.925	11	6.925	mg/kg	95% Student's t UCL	ProUCL 4.0
	Cadmium	mg/kg	1.718	2.047	2.6	2.047	mg/kg	95% Student's t UCL	ProUCL 4.0
	Calcium	mg/kg	37,303	60,628	106,000	60,628	mg/kg	95% Student's t UCL	ProUCL 4.0
	Chromium	mg/kg	94	135.7	200	135.7	mg/kg	95% Student's t UCL	ProUCL 4.0
	Copper	mg/kg	95.4	144.5	210	144.5	mg/kg	95% Student's t UCL	ProUCL 4.0
	Iron	mg/kg	21,220	24,383	29,000	24,383	mg/kg	95% Student's t UCL	ProUCL 4.0
	Lead	mg/kg	121	186.7	315	186.7	mg/kg	95% Student's t UCL	ProUCL 4.0
	Manganese	mg/kg	250.9	341.5	470	341.5	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Mercury	mg/kg	0.913	2.428	3.3	2.428	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Nickel	mg/kg	29.6	48.13	53	48.13	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Selenium	mg/kg	0.245	0.307	0.47	0.307	mg/kg	95% KM (t) UCL	ProUCL 4.0
	Vanadium	mg/kg	25.3	32.6	49	32.6	mg/kg	95% Student's t UCL	ProUCL 4.0
	Zinc	mg/kg	89.2	113.2	150	113.2	mg/kg	95% Student's t UCL	ProUCL 4.0
	Dieldrin*	mg/kg	--	--	0.011	0.011	mg/lkg	Maximum Detected Concentration	--
	Aroclor 1254	mg/kg	0.535	0.69	1	0.69	mg/kg	95% KM (t) UCL	ProUCL 4.0
	2,4-Dinitrotoluene	mg/kg	--	--	0.63	0.63	mg/kg	Maximum Detected Concentration	--

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
* Due to the low frequency of detection, a mean and UCL were not calculated.

Table F.3-5
Plant Screening Level Sources - Soil
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Screening Level (mg/kg)	Source
TAL Metals			
Aluminum	7429-90-5	50	ORNL-Plants
Antimony	7440-36-0	5	ORNL-Plants
Arsenic	7440-38-2	18	ECO SSL
Barium	7440-39-3	500	ORNL-Plants
Beryllium	7440-41-7	10	ORNL-Plants
Cadmium	7440-43-9	32	ECO SSL
Calcium	7440-70-2	4	ORNL-Plants
Chromium	7440-47-3	1	ORNL-Plants
Cobalt	7440-48-4	13	ECO SSL
Copper	7440-50-8	70	ECO SSL
Iron	7439-89-6	NV	--
Lead	7439-92-1	120	ECO SSL
Magnesium	7439-95-4	NV	--
Manganese	7439-96-5	220	ECO SSL
Mercury	7439-97-6	0.3	ORNL-Plants
Nickel	7440-02-0	38	ECO SSL
Potassium	7440-09-7	NV	--
Selenium	7782-49-2	0.52	ECO SSL
Silver	7440-22-4	560	ECO SSL
Sodium	7440-23-5	NV	--
Thallium	7440-28-0	1	ORNL-Plants
Vanadium	7440-62-2	2	ORNL-Plants
Zinc	7440-66-6	160	ECO SSL
Pesticides/PCBs			
Dieldrin	60-57-1	NV	--
Endrin	72-20-8	0.1	BTAG - Flora
Aroclor 1254	11097-69-1	NV	--
TCL VOCs			
2-Butanone	78-93-3	NV	--
Acetone	67-64-1	NV	--
Methylene chloride	75-09-2	0.3	BTAG - Flora
TCL SVOCs			
4-Chloro-3-Methylphenol	59-50-7	NV	--
Bis(2-ethylhexyl) Phthalate	117-81-7	NV	--
Di-n-butylphthalate	84-74-2	200	ORNL-Plants
Diethylphthalate	84-66-2	NV	--
N-Nitrosodiphenylamine	86-30-6	NV	--
Low Molecular Weight PAHs	--	NV	--
High Molecular Weight PAHs	--	NV	--
Explosives			
2,4-Dinitrotoluene	121-14-2	5.3	Kuperman 2003

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
NV = No Value Available
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
ORNL - Plants - (Toxilogical Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision Efroymson et al.)
BTAG - Flora - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
Kuperman. R. 2003. Development of Ecological Toxicity and Biomagnification Data for Explosives Contaminants in Soil. U.S. Army Edgewood Chemical Biological Center. Final Techinical Report. Project CU-1221.

Table F.3-6
Plant Screening - Soil
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Constituent of Potential Ecological Concern	CAS #	Maximum Soil Concentration (mg/kg)	Screening Level (mg/kg)	Hazard Quotient (unitless)	EPC (mg/kg)	EPC Hazard Quotient (unitless)
Inorganics						
Aluminum	7429-90-5	29,000	50	**5.8E+02**	22,122	**4.4E+02**
Antimony	7440-36-0	1.2	5	2.4E-01	NC	NC
Arsenic	7440-38-2	11	18	6.1E-01	NC	NC
Barium	7440-39-3	103	500	2.1E-01	NC	NC
Beryllium	7440-41-7	1.4	10	1.4E-01	NC	NC
Cadmium	7440-43-9	2.6	32	8.1E-02	NC	NC
Calcium	7440-70-2	106,000	4	**2.7E+04**	60,628	**1.5E+04**
Chromium	7440-47-3	200	1	**2.0E+02**	135.7	**1.4E+02**
Cobalt	7440-48-4	9.6	13	7.4E-01	NC	NC
Copper	7440-50-8	210	70	**3.0E+00**	144.5	**2.1E+00**
Iron	7439-89-6	29,000	NV	NC	NC	NC
Lead	7439-92-1	315	120	**2.6E+00**	186.7	**1.6E+00**
Magnesium	7439-95-4	6,900	NV	NC	NC	NC
Manganese	7439-96-5	470	220	**2.1E+00**	341.5	**1.6E+00**
Mercury	7439-97-6	3.3	0.3	**1.1E+01**	2.428	**8.1E+00**
Nickel	7440-02-0	53	38	**1.4E+00**	48.13	**1.3E+00**
Potassium	7440-09-7	1,700	NV	NC	NC	NC
Selenium	7782-49-2	0.47	0.52	9.0E-01	NC	NC
Silver	7440-22-4	0.3	560	5.4E-04	NC	NC
Sodium	7440-23-5	110	NV	NC	NC	NC
Thallium	7440-28-0	0.2	1	2.0E-01	NC	NC
Vanadium	7440-62-2	49	2	**2.5E+01**	32.6	**1.6E+01**
Zinc	7440-66-6	150	160	9.4E-01	NC	NC
Cyanide						
Cyanide	57-12-5	0.8	NV	NC	NC	NC
Pesticides/PCBs						
Dieldrin	60-57-1	0.011	NV	NC	NC	NC
Endrin	72-20-8	0.0083	0.1	8.3E-02	NC	NC
Aroclor 1254	11097-69-1	1	NV	NC	NC	NC
TCL VOCs						
2-Butanone	78-93-3	0.024	NV	NC	NC	NC
Acetone	67-64-1	0.11	NV	NC	NC	NC
Methylene chloride	75-09-2	0.01	0.3	3.3E-02	NC	NC
TCL SVOCs						
4-Chloro-3-Methylphenol	59-50-7	0.012	NV	NC	NC	NC
Bis(2-ethylhexyl) Phthalate	117-81-7	1	NV	NC	NC	NC
Di-n-butylphthalate	84-74-2	26	200	1.3E-01	NC	NC
Diethylphthalate	84-66-2	0.12	NV	NC	NC	NC
N-Nitrosodiphenylamine	86-30-6	0.45	NV	NC	NC	NC
Low Molecular Weight PAHs	--	0.04	NV	NC	NC	NC
High Molecular Weight PAHs	--	0.3	NV	NC	NC	NC
Explosives						
2,4-Dinitrotoluene	121-14-2	0.63	5.3	1.2E-01	NC	NC

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

NV = No Value Available
NC = Not Calculated
Hazard Quotient = Soil Concentration/Screening Level
EPC = Exposure Point Concentration
See Table F.3-3a for Total PCBs
See Table F.3-3b for Total Low and High Molecular Weight PAHs

Table F.3-7
Invertebrate and Microbial Screening Level Sources - Soil
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Screening Level (mg/kg)	Source
TAL Metals			
Aluminum	7429-90-5	NV	--
Antimony	7440-36-0	78	ECO SSL
Arsenic	7440-38-2	60	ORNL-Earthworm
Barium	7440-39-3	330	ECO SSL
Beryllium	7440-41-7	40	ECO SSL
Cadmium	7440-43-9	140	ECO SSL
Calcium	7440-70-2	NV	--
Chromium	7440-47-3	0.4	ORNL-Earthworm
Cobalt	7440-48-4	200	BTAG - Fauna
Copper	7440-50-8	80	ECO SSL
Iron	7439-89-6	200	ORNL - Microbial
Lead	7439-92-1	1,700	ECO SSL
Magnesium	7439-95-4	NV	--
Manganese	7439-96-5	450	ECO SSL
Mercury	7439-97-6	0.1	ORNL-Earthworm
Nickel	7440-02-0	280	ECO SSL
Potassium	7440-09-7	NV	--
Selenium	7782-49-2	4.1	ECO SSL
Silver	7440-22-4	50	ORNL - Microbial
Sodium	7440-23-5	NV	--
Thallium	7440-28-0	NV	--
Vanadium	7440-62-2	20	ORNL - Microbial
Zinc	7440-66-6	120	Eco SSL
Pesticides/PCBs			
Dieldrin	60-57-1	NV	--
Endrin	72-20-8	0.1	BTAG - Fauna
Aroclor 1254	11097-69-1	NV	--
TCL VOCs			
2-Butanone	78-93-3	NV	--
Acetone	67-64-1	NV	--
Methylene chloride	75-09-2	0.3	BTAG - Fauna
TCL SVOCs			
4-Chloro-3-Methylphenol	59-50-7	NV	--
Bis(2-ethylhexyl) Phthalate	117-81-7	NV	--
Di-n-butylphthalate	84-74-2	NV	--
Diethylphthalate	84-66-2	NV	--
N-Nitrosodiphenylamine	86-30-6	NV	--
Low Molecular Weight PAHs	--	29	ECO SSL
High Molecular Weight PAHs	--	18	ECO SSL
Explosives			
2,4-Dinitrotoluene	121-14-2	19.8	Kuperman 2003

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
NV = No Value Available
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
ORNL - Earthworms - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
ORNL - Microbial Processes - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
BTAG - Fauna - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
Kuperman. R. 2003. Development of Ecological Toxicity and Biomagnification Data for Explosives Contaminants in Soil. U.S. Army Edgewood Chemical Biological Center. Final Techinical Report. Project CU-1221.

Table F.3-8
Invertebrate and Microbial Screening - Soil
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Constituent of Potential Ecological Concern	CAS #	Maximum Soil Concentration (mg/kg)	Screening Level (mg/kg)	Hazard Quotient (unitless)	EPC (mg/kg)	EPC Hazard Quotient (unitless)
Inorganics						
Aluminum	7429-90-5	29,000	NV	NC	NC	NC
Antimony	7440-36-0	1.2	78	1.5E-02	NC	NC
Arsenic	7440-38-2	11	60	1.8E-01	NC	NC
Barium	7440-39-3	103	330	3.1E-01	NC	NC
Beryllium	7440-41-7	1.4	40	3.5E-02	NC	NC
Cadmium	7440-43-9	2.6	140	1.9E-02	NC	NC
Calcium	7440-70-2	106,000	NV	NC	NC	NC
Chromium	7440-47-3	200	0.4	**5.0E+02**	135.7	**3.4E+02**
Cobalt	7440-48-4	9.6	200	4.8E-02	NC	NC
Copper	7440-50-8	210	80	**2.6E+00**	144.5	**1.8E+00**
Iron	7439-89-6	29,000	200	**1.5E+02**	24,383	**1.2E+02**
Lead	7439-92-1	315	1,700	1.9E-01	NC	NC
Magnesium	7439-95-4	6,900	NV	NC	NC	NC
Manganese	7439-96-5	470	450	**1.0E+00**	341.5	7.6E-01
Mercury	7439-97-6	3.3	0.1	**3.3E+01**	2.428	**2.4E+01**
Nickel	7440-02-0	53	280	1.9E-01	NC	NC
Potassium	7440-09-7	1,700	NV	NC	NC	NC
Selenium	7782-49-2	0.47	4	1.1E-01	NC	NC
Silver	7440-22-4	0.3	50	6.0E-03	NC	NC
Sodium	7440-23-5	110	NV	NC	NC	NC
Thallium	7440-28-0	0.2	NV	NC	NC	NC
Vanadium	7440-62-2	49	20	**2.5E+00**	32.6	**1.6E+00**
Zinc	7440-66-6	150	120	**1.3E+00**	113.2	9.4E-01
Cyanide						
Cyanide	57-12-5	0.8	0.9	8.9E-01	NC	NC
Pesticides/PCBs						
Dieldrin	60-57-1	0.011	NV	NC	NC	NC
Endrin	72-20-8	0.0083	0.1	8.3E-02	NC	NC
Aroclor 1254	11097-69-1	1	NV	NC	NC	NC
TCL VOCs						
2-Butanone	78-93-3	0.024	NV	NC	NC	NC
Acetone	67-64-1	0.11	NV	NC	NC	NC
Methylene chloride	75-09-2	0.01	0.3	3.3E-02	NC	NC
TCL SVOCs						
4-Chloro-3-Methylphenol	59-50-7	0.012	NV	NC	NC	NC
Bis(2-ethylhexyl) Phthalate	117-81-7	1	NV	NC	NC	NC
Di-n-butylphthalate	84-74-2	26	NV	NC	NC	NC
Diethylphthalate	84-66-2	0.12	NV	NC	NC	NC
N-Nitrosodiphenylamine	86-30-6	0.45	NV	NC	NC	NC
Low Molecular Weight PAHs	--	0.04	29	1.4E-03	NC	NC
High Molecular Weight PAHs	--	0.3	18	1.7E-02	NC	NC
Explosives						
2,4-Dinitrotoluene	121-14-2	0.63	19.8	3.2E-02	NC	NC

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
NV = No Value Available
NC = Not Calculated
Hazard Quotient = Soil Concentration/Screening Level
EPC = Exposure Point Concentration
See Table F.3-3b for Total Low and High Molecular Weight PAHs

Table F.3-9
Wildlife Profiles
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

							Preliminary Assessment					Refined Assessment					
Representative Species			Composition of Diet [1] (%)				Minimum Body Weight [1]	Maximum Body Weight [1]	Maximum Food Ingestion Rate [2]	Maximum Substrate Ingestion Rate [3]		Average Body Weight [1]	Average Food Ingestion Rate [2]	Average Substrate Ingestion Rate [3]	Home Range (ha)	Proportion of Year Species Active	AUFs
Food-web Classification	Common Name	Scientific Name	Plants (incl. fungi)	Inverte-brates	Small mammals	Fish	kg	kg	kg dw/day	% of dry intake	kg dry wt./day	kg	kg dw/day	kg dry wt./day			Study Area (0.37) hectares
Birds																	
soil-probing invertivore	American robin	*Turdus migratorius*	62%	38%			0.0635	0.103	0.020	5%	0.001	0.077	0.016	0.0008	0.48	1	0.77
large carnivore	Red-tailed hawk	*Buteo jamaicensis*			100%		0.957	1.235	0.063	0%	0	1.134	0.059	0	250	1	0.0015
Mammals																	
small herbivore	Meadow vole	*Microtus pennsylvanicus*	100%				0.017	0.0524	0.010	2.4%	0.00024	0.037	0.008	0.00019	0.037	1	1
medium carnivore	Red fox	*Vulpes vulpes*	17%	4%	79%		2.95	7.04	0.342	2.8%	0.0096	4.53	0.238	0.0067	96	1	0.0039
small invertivore	Short-tailed shrew	*Blarina brevicauda*	14%	86%			0.0125	0.0225	0.003	13%	0.00039	0.015	0.002	0.00026	0.39	1	0.95

Notes:
kg = Kilogram
kg dw/day = Kilogram Dry-weight per Day
L/day = Liter per Day

[1]Wildlife Exposure Factors Handbook. U.S. Environmental Protection Agency (EPA). 1993. Office of Research and Development. 2 Volumes. EPA/600/R93/187a&b. December.
[2] Estimated food intake rate (kg [dw]/day) calculated as follows:
FI ((kg/day) = 0.0687 $Wt.^{0.882}$ for mammals (red fox and short-tailed shrew)
FI ((g/day) = 0.577 $Wt.^{0.727}$ for herbivores (meadow vole)
FI ((g/day) = 0.301 $Wt.^{0.751}$ for non-passerine birds (red-tailed hawk)
FI ((g/day) = 0.398 $Wt.^{0.850}$ for passerine birds (american robin)
[3]Estimating Exposure to Terrestrial Wildlife to Contaminants. Sample and Sutter. 1994. ES/ER/TM-125.
The soil ingestion rate for the american robin set equal to 38% of the american woodcock value (0.34*10.4%=4%), based on a robin diet of 38% invertbrates.

Table F.3-10
Wildlife TRVs
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	AVIAN TEST SPECIES				MAMMALIAN TEST SPECIES					AVIAN RECEPTORS				MAMMALIAN RECEPTORS					
											American Robin		Red-tailed Hawk		Meadow Vole		Red Fox		Short-tailed Shrew	
		Chronic LOAEL	Chronic NOAEL	Test Animal	Source	Chronic LOAEL	Chronic NOAEL	Test Animal	Test Animal Body Weight (kg)	Source	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL
		(mg/kg-bw/d)				(mg/kg-bw/d)					(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)	
Arsenic	7440-38-2	1.28E+01	5.14E+00	mallard duck	ORNL 1996	1.26	0.126	mouse	0.03	ORNL 1996	1.28E+01	5.14E+00	1.28E+01	5.14E+00	1.20E+00	1.20E-01	3.59E-01	3.59E-02	1.50E+00	1.50E-01
Cadmium	7440-43-9	2.00E+01	1.45E+00	mallard duck	ORNL 1996	10	1	rat	0.3	ORNL 1996	2.00E+01	1.45E+00	2.00E+01	1.45E+00	1.69E+01	1.69E+00	5.07E+00	5.07E-01	2.11E+01	2.11E+00
Chromium	7440-47-3	5.00E+00	1.00E+00	black duck	ORNL 1996	32.8	3.28	rat	0.35	ORNL 1996	5.00E+00	1.00E+00	5.00E+00	1.00E+00	5.75E+01	5.75E+00	1.73E+01	1.73E+00	7.21E+01	7.21E+00
Copper	7440-50-8	6.17E+01	4.70E+01	1 day old chicks	ORNL 1996	15.4	11.7	mink	1	ORNL 1996	6.17E+01	4.70E+01	6.17E+01	4.70E+01	3.51E+01	2.67E+01	1.06E+01	8.02E+00	4.40E+01	3.34E+01
Lead	7439-92-1	1.13E+01	1.13E+00	Japanese quail	ORNL 1996	80	8	rat	0.35	ORNL 1996	1.13E+01	1.13E+00	1.13E+01	1.13E+00	1.40E+02	1.40E+01	4.22E+01	4.22E+00	1.76E+02	1.76E+01
Mercury	7439-97-6	9.00E-01	4.50E-01	Japanese Quail	ORNL 1996	132	13.2	mink	1	ORNL 1996	9.00E-01	4.50E-01	9.00E-01	4.50E-01	3.01E+02	3.01E+01	9.05E+01	9.05E+00	3.77E+02	3.77E+01
Nickel	7440-02-0	1.07E+02	7.74E+01	mallard duckling	ORNL 1996	80	40	rat	0.35	ORNL 1996	1.07E+02	7.74E+01	1.07E+02	7.74E+01	1.40E+02	7.01E+01	4.22E+01	2.11E+01	1.76E+02	8.79E+01
Selenium	7782-49-2	8.00E-01	4.00E-01	mallard duck	ORNL 1996	0.33	0.2	rat	0.35	ORNL 1996	8.00E-01	4.00E-01	8.00E-01	4.00E-01	5.79E-01	3.51E-01	1.74E-01	1.05E-01	7.25E-01	4.40E-01
Silver	7440-22-4	1.24E+02	1.66E+01	turkey	Matuk et al. 1981	222	22.2	rat	0.35	Matuk et al. 1981	1.24E+02	1.66E+01	1.24E+02	1.66E+01	3.89E+02	3.89E+01	1.17E+02	1.17E+01	4.88E+02	4.88E+01
Zinc	7440-66-6	1.31E+02	1.45E+01	white leghorn hen	ORNL 1996	320	160	rat	0.35	ORNL 1996	1.31E+02	1.45E+01	1.31E+02	1.45E+01	5.61E+02	2.81E+02	1.69E+02	8.44E+01	7.03E+02	3.52E+02
PAHs																				
Fluoranthene	206-44-0	--	--	--	USACE 1998	100	20	rodents	0.165	USACE 1998	NV	NV	NV	NV	1.45E+02	2.91E+01	4.37E+01	8.74E+00	1.82E+02	3.64E+01
Phenanthrene	85-01-8	5.65E+00	1.13E+00	red-winged blackbird	USACE 1998	35	7	mouse	0.03	USACE 1998	5.65E+00	1.13E+00	5.65E+00	1.13E+00	3.32E+01	6.64E+00	9.98E+00	2.00E+00	4.16E+01	8.32E+00
Pyrene	129-00-0	--	--	--	USACE 1998	40	8	mouse	0.03	USACE 1998	NV	NV	NV	NV	3.80E+01	7.59E+00	1.14E+01	2.28E+00	4.76E+01	9.51E+00
Pesticides																				
Dieldrin	60-57-1	7.70E-01	7.70E-02	barn owl	ORNL 1996	0.2	0.02	rat	0.35	ORNL 1996	7.70E-01	7.70E-02	7.70E-01	7.70E-02	3.51E-01	3.51E-02	1.05E-01	1.05E-02	4.40E-01	4.40E-02
Endrin	72-20-8	1.70E-01	2.80E-02	mallard duck	ORNL 1996	0.92	0.092	mouse	0.03	ORNL 1996	1.70E-01	2.80E-02	1.70E-01	2.80E-02	8.73E-01	8.73E-02	2.62E-01	2.62E-02	1.09E+00	1.09E-01
PCBs																				
Aroclor 1254	11097-69-1	1.80E+00	1.80E-01	ring-necked pheasant	ORNL 1996	3.43	1.37	mink	1	Aroclor 1016 Value	1.80E+00	1.80E-01	1.80E+00	1.80E-01	7.82E+00	3.12E+00	2.35E+00	9.39E-01	9.80E+00	3.91E+00
Explosives																				
2,4-Dinitrotoluene[1]	121-14-2	1.25	0.1	Northern Bobwhite	Johnson et al. 2005a	--	--	--	--	--	1.25E+00	1.00E-01	1.25E+00	1.00E-01	NV	NV	NV	NV	NV	NV

Notes:
CAS = Chemical Abstract Service
TRV = Toxic Reference Value
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw/d = Body Weight Per Day
kg = kilogram
PAH = Polynuclear Aromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
USACE = U.S. Army Corps of Engineers
ORNL = Oak Ridge National Laboratory
NOAEL and LOAEL values were derived from acute values by applying an uncertainty factor of 150.
LD_{50} = Lethal Dose for 50% of test organisms

Sources:

Johnson et al 2005a. Johnson, M.S., M.W. Michie, M.A. Bazar, and R.M. Gogal Jr. 2005a. Influence of Oral 2,4-Dinitrotoluene Exposure to the Northern Bobwhite (*Colinus virginianus*). Intern. J. of Tox. 24:265-274.
Matuk et al. 1981. Matuk, Y., M. Gosh and C. McCulloch. 1981. Distribution of silver in the eyes and plasma proteins of the albino rat. Can. J. Ophthalmol. 16: 145-150. (Cited in ATSDR, 1990)
ORNL 1996. Sample, B.E., D.M. Opresko and G.W. Suter II. 1996. Toxicological Benchmarks for Wildlife: 1996 Revision. ES/ER/TM-86/R3. Oak Ridge National Laboratory, Oak Ridge, Tennessee.
USACE 1998. U.S. Army Corps of Engineers (USACE). 1998. Final Ecological Risk Assessment, RCRA Facility Investigation, for Sunflower Army Ammunition Plant, De Soto, Kansas. USACE Kansas City District.
U.S. EPA 1993. Wildlife Exposure Factors Handbook. EPA/600/P-93/187a.
U.S. EPA 1988. Recommendations for and documentation of biological values for use in risk assessment. Environmental Criteria and Assessment Office. Cincinnati, OH. EPA/600/6-87/008.

[1] - Avian TRVs derived from subchronic NOAEL value of 1 and subchronic LOAEL value of 5 from a northern bobwhite and applying an uncertainty factor of 10 and 4 to derive NOAEL-based and LOAEL-based TRVs

Table F.3-11
Soil Biocaccumulation/Bioconcentration Factors- Soil to Plant Pathway
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS	Log K_{ow} Range	Selected K_{ow}	Source	Preliminary Assessment		Refined Assessment			
					BAF	Basis	C_s EPC (mg/kg)	BAF[1]	Basis	Source
Inorganics										
ARSENIC	7440-38-2	-- - --	--	--	1.103	90th percentile	6.93	0.0375	Median	Bechtel Jacobs 1998
CADMIUM	7440-43-9	-- - --	--	--	3.25	90th percentile	2.05	0.4492	$C_p = e^{(0.546*\ln(Cs) - 0.475)}$	Bechtel Jacobs 1998
CHROMIUM	7440-47-3	-- - --	--	--	0.084	90th percentile	135.70	0.0410	Median	Bechtel Jacobs 1998
COPPER	7440-50-8	-- - --	--	--	0.625	90th percentile	144.50	0.0958	$C_p = e^{(0.394*\ln(Cs) + 0.668)}$	Bechtel Jacobs 1998
LEAD	7439-92-1	-- - --	--	--	0.468	90th percentile	186.70	0.0267	$C_p = e^{(0.561*\ln(Cs) - 1.328)}$	Bechtel Jacobs 1998
MERCURY	7439-97-6	-- - --	--	--	5.0	90th percentile	2.43	0.2467	$C_p = e^{(0.544*\ln(Cs) - 0.995)}$	Bechtel Jacobs 1998
NICKEL	7440-02-0	-- - --	--	--	1.411	90th percentile	48.13	0.0408	$C_p = e^{(0.748*\ln(Cs) + 2.223)}$	Bechtel Jacobs 1998
SELENIUM	7782-49-2	-- - --	--	--	3.012	90th percentile	0.31	0.4494	$C_p = e^{(1.104*\ln(Cs) - 0.677)}$	Bechtel Jacobs 1998
SILVER	7440-22-4	-- - --	--	--	0.037	90th percentile	NC	0.0140	Median	Bechtel Jacobs 1998
ZINC	7440-66-6	-- - --	--	--	1.82	90th percentile	113.20	0.5861	$C_p = e^{(0.554*\ln(Cs) + 1.575)}$	Bechtel Jacobs 1998
Pesticides										
DIELDRIN	60-57-1	3.63 - 6.2	5.37	USEPA 1995	1	Default Value	0.01	0.41	Median	USEPA 2005
ENDRIN	72-20-8	2.92 - 5.2	5.06	USEPA 1995	1	Default Value	NC	0.0461	K_{ow} Regression Eq.	Travis and Arms 1988
PCBs										
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	0.0068	K_{ow} Regression Eq.	0.69	0.0068	K_{ow} Regression Eq.	Travis and Arms 1988
VOCs and SVOCs										
FLUORANTHENE	206-44-0	4.84 - 5.39	5.12	USEPA 1995	6.0	Maximum	NC	0.50	Median BAF	USEPA 2005
PHENANTHRENE	85-01-8	4.37 - 4.57	4.55	USEPA 1995	11	Maximum	NC	NC	$C_p = e^{(0.620*\ln(Cs) - 0.167)}$	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	5.11	USEPA 1995	3.7	Maximum	NC	0.72	Median BAF	USEPA 2005
Explosives										
2,4-DNT	121-14-2	-- - --	1.6	SRC	8.46	TNT as surrogate	0.63	4.23	TNT as surrogate	USEPA 2005

Notes:
CAS = Chemical Abstract Services
BAF = Bioaccumulation Factor
K_{ow} = Chemical octanol-water coefficient
NC = Not Calculated
C_s = Chemical Concentration in Soil
C_p = Chemical Concentration in Plant Matter (dry weight)
[1] = BAFs for chemical using Cp regression equation calculated by as follows: BAF = C_p/C_s

Source(s):

USEPA 1995: United States Environmental Protection Agency. 1995. Karickhoff, S.W. , and J.M. Long. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.
Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision
Bechtel Jacobs 1998: Bechtel Jacobs Company. September 1998. Emperical Models for the Uptake of Inorganic Chemical from Soil by Plants.
USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.
Travis and Arms 1988: Travis and Arms. 1988. Bioconcentration of Organics in Beef, Milk, and Vegetation. BAF values calculated for Tier I using lowest Kow value and for Tier II using the selected Kow value.
K_{ow} Regression Equation: BAF =10^((-0.578*K_{ow})+1.588))

Table F.3-12
Soil Biocaccumulation/Bioconcentration Factors - Soil to Invertebrate Pathway
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

							Preliminary Assessment		Refined Assessment			
Chemical	**CAS**	**Log K_{ow} Range**	**Selected Log K_{ow}**	**Reference**	**K_{oc}**	**Reference**	**Value**	**Basis**	**C_s EPC (mg/kg)**	**BAF[1]**	**Basis**	**Source**
Inorganics												
ARSENIC	7440-38-2	-- - --	--	--	--	--	0.52	90th percentile	6.925	0.1367	$C_e = e^{(0.706*\ln(Cs) - 1.421)}$	Sample et al. 1998
CADMIUM	7440-43-9	-- - --	--	--	--	--	40.7	90th percentile	2.047	7.1502	$C_e = e^{(0.795*\ln(Cs) + 2.114)}$	Sample et al. 1998
CHROMIUM	7440-47-3	-- - --	--	--	--	--	3.16	90th percentile	135.7	0.31	Median	Sample et al. 1998
COPPER	7440-50-8	-- - --	--	--	--	--	1.53	90th percentile	144.5	0.52	Median	Sample et al. 1998
LEAD	7439-92-1	-- - --	--	--	--	--	1.52	90th percentile	186.7	0.2931	$C_e = e^{(0.807*\ln(Cs) - 0.218)}$	Sample et al. 1998
MERCURY	7439-97-6	-- - --	--	--	--	--	20.6	90th percentile	2.428	1.69	Median	Sample et al. 1998
NICKEL	7440-02-0	-- - --	--	--	--	--	4.73	90th percentile	48.13	1.06	Median	Sample et al. 1998
SELENIUM	7782-49-2	-- - --	--	--	--	--	1.34	90th percentile	0.307	1.2716	$C_e = e^{(0.733*\ln(Cs) - 0.075)}$	Sample et al. 1998
SILVER	7440-22-4	-- - --	--	--	--	--	15.3	90th percentile	NC	2.05	Median	Sample et al. 1998
ZINC	7440-66-6	-- - --	--	--	--	--	12.9	90th percentile	113.2	3.5644	$C_e = e^{(0.328*\ln(Cs) + 4.449)}$	Sample et al. 1998
Pesticides												
DIELDRIN	60-57-1	3.63 - 6.2	5.37	USEPA 1995	--	--	79.6	Maximum	0.011	12.4976	$C_e = e^{(0.876*\ln(Cs) + 2.276)}$	USEPA 2005
ENDRIN	72-20-8	2.92 - 5.2	5.06	USEPA 1995	1.14E+04	SRC, CF	3.60	Not Specified	NC	3.60	Not Specified	Edwards and Bohlen 1992
PCBs												
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	--	--	15.9	90th percentile	0.69	6.67	Median	Sample et al. 1998
VOCs and SVOCs												
FLUORANTHENE	206-44-0	4.84 - 5.39	4.95	USEPA 1995	4.17E+04	USEPA 2005	31.19	Jager Model	NC	12.92	Jager Model	USEPA 2005
PHENANTHRENE	85-01-8	4.37 - 4.57	4.55	USEPA 1995	3.30E+04	USEPA 2005	7.62	Jager Model	NC	7.32	Jager Model	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	4.88	USEPA 1995	6.27E+04	USEPA 2005	26.91	Jager Model	NC	7.47	Jager Model	USEPA 2005
Explosives												
2,4-DNT	121-14-2	-- - --	--	--	--	--	1	Default Value	0.63	1	Default Value	--

Notes:
CAS = Chemical Abstract Services
C_s = Chemical Concentration in Soil
C_e = Chemical Concentration in Earthworm (dry weight)
K_{ow} = Chemical octanol-water coefficient
K_{oc} = Chemical water to soil partitioning coefficient
K_{ww} = Chemical worm to soil partitioning coefficient
foc = mean fraction organic content in soil (0.00235 mean from physical samples - see Appendix C.1)
[1] = BAFs for chemical using Ce regression equation calculated by as follows: BAF = C_e/C_s

Source(s):
USEPA 1995: United States Environmental Protection Agency. Karickhoff, S.W. , and J.M. Long. 1995. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.
Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision
Sample et al. 1998: Sample, B.E., Beauchamp, J.J., Efroymson, R.A., Sutter, G.W., Ashwood, T.L., February 1998. Development and Validation of Bioaccumulation Models for Earthworms.
Jager Model: As presented in USEPA 2005, Guidance for Developing Ecological Screening Levels, Appendix 4-1, Table 5.
BAF = K_{ww}(L/kg worl dw)/K_d (L/kg soil dw)
K_{ww} (dry weight) = 10^(0.87*logK_{ow} - 2.0) / 0.16
Wet weight to dry weight assuming 16% solids
$K_d = f_{oc} * K_{oc}$
foc = 0.00235 from site specific physical soil data
Note: The maximum Kow utilized for the preliminary calculation and the Selected Kow utilized for the refined calculation.
Edwards and Bohlen 1992: Edwards, C.A. and Bohlen, P.J. 1992. The effects of toxic chemicals on earthworms. Reviews of Environmental Contamination and Toxicology, 125: 23-99.
USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.
SRC/CF: Syracuse Research Corporation (SRC). Physical Properties Database. http://www.syrres.com/esc/physdemo.htm

Table F.3-13
Soil Bioaccumulation/Bioconcentration Factors - Soil to Mammal Pathway
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

					Preliminary Assessment		Refined Assessment			
Chemical	**CAS**	**Log K_{ow} Range**	**Selected K_{ow}**	**Reference**	**Value**	**Basis**	**C_s (mg/kg)**	**BAF[1]**	**Basis**	**Source**
Inorganics										
ARSENIC	7440-38-2	-- - --	--	--	0.0149	90th percentile	6.925	0.0055	$C_m = e^{(0.819*\ln(Cs) - 4.847)}$	Sample et al. 1998
CADMIUM	7440-43-9	-- - --	--	--	3.991	90th percentile	2.047	0.1949	$C_m = e^{(0.472*\ln(Cs) - 1.257)}$	Sample et al. 1998
CHROMIUM	7440-47-3	-- - --	--	--	0.333	90th percentile	135.7	0.0628	$C_m = e^{(0.734*\ln(Cs) - 1.46)}$	Sample et al. 1998
COPPER	7440-50-8	-- - --	--	--	1.045	90th percentile	144.5	0.1094	$C_m = e^{(0.144*\ln(Cs) + 2.042)}$	Sample et al. 1998
LEAD	7439-92-1	-- - --	--	--	0.286	90th percentile	186.7	0.0584	$C_m = e^{(0.442*\ln(Cs) + 0.0761)}$	Sample et al. 1998
MERCURY	7439-97-6	-- - --	--	--	0.192	90th percentile	2.428	0.0543	Median	Sample et al. 1998
NICKEL	7440-02-0	-- - --	--	--	0.589	90th percentile	48.13	0.0987	$C_m = e^{(0.466*\ln(Cs) - 0.246)}$	Sample et al. 1998
SELENIUM	7782-49-2	-- - --	--	--	1.187	90th percentile	0.307	1.3780	$C_m = e^{(0.376*\ln(Cs) - 0.416)}$	Sample et al. 1998
SILVER	7440-22-4	-- - --	--	--	0.501	90th percentile	NC	0.004	Median	Sample et al. 1998
ZINC	7440-66-6	-- - --	--	--	2.69	90th percentile	113.2	0.9684	$C_m = e^{(0.071*\ln(Cs) + 4.363)}$	Sample et al. 1998
Pesticides										
DIELDRIN	60-57-1	3.63 - 6.2	5.37	USEPA 1995	1	Default Value	0.011	0.0005	$C_m = e^{(0.6076*\ln(Cs) - 1.9582)}$	USEPA 2005
ENDRIN	72-20-8	2.92 - 5.2	5.06	USEPA 1995	1	Default Value	NC	1	Default Value	--
PCBs										
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	1	Default Value	0.69	1	Default Value	--
VOCs and SVOCs										
FLUORANTHENE	206-44-0	4.84 - 5.39	5.12	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
PHENANTHRENE	85-01-8	4.37 - 4.57	4.55	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	5.11	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
Explosives										
2,4-DNT	121-14-2	-- - --	--	--	1	Default Value	0.63	0	TNT as surrogate	USEPA 2005

Notes:

CAS = Chemical Abstract Services

C_s = Chemical Concentration in Soil

C_d = Chemical Concentration in Prey (assumed to be 100% earthworms (dry weight))

C_m = Chemical Concentration in Mammal (dry weight)

K_{ow} = Chemical octanol to water partitioning coefficient

[1] = BAFs for chemical using Ce regression equation calculated by as follows: $BAF = C_m/C_s$

Source(s):

USEPA 1995: United States Environmental Protection Agency. Karickhoff, S.W. , and J.M. Long. 1995. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.

Sample et al. 1998: Sample et al. 1998. Development and Validation of Bioaccumulation Models for Small Mammals.

Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision

USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.

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Table F.3-14
Preliminary Wildlife Risk Characterization - Meadow Vole
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment									
				Soil									
				Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics													
Arsenic	7440-38-2	1.20E-01	1.20E+00	11	1.1E+00	1.2E+01	1.8E-01	1.8E+00	**6.10E+01**	**6.1E+00**	**Y**	6.925	**3.8E+01**
Cadmium	7440-43-9	1.69E+00	1.69E+01	2.6	3.3E+00	8.5E+00	8.8E-01	8.8E+00	**2.97E+00**	3.0E-01	**Y**	2.047	**2.3E+00**
Chromium	7440-47-3	5.75E+00	5.75E+01	200	8.4E-02	1.7E+01	9.1E+01	9.1E+02	**2.21E+00**	2.2E-01	**Y**	135.7	**1.5E+00**
Copper	7440-50-8	2.67E+01	3.51E+01	210	6.3E-01	1.3E+02	7.0E+01	9.2E+01	**3.01E+00**	**2.3E+00**	**Y**	144.5	**2.1E+00**
Lead	7439-92-1	1.40E+01	1.40E+02	315	4.7E-01	1.5E+02	4.8E+01	4.8E+02	**6.50E+00**	6.5E-01	**Y**	186.7	**3.9E+00**
Mercury	7439-97-6	3.01E+01	3.01E+02	3.3	5.0E+00	1.7E+01	1.0E+01	1.0E+02	3.24E-01	3.2E-02	N	--	--
Nickel	7440-02-0	7.01E+01	1.40E+02	53	1.4E+00	7.5E+01	8.3E+01	1.7E+02	6.38E-01	3.2E-01	N	--	--
Selenium	7782-49-2	3.51E-01	5.79E-01	0.47	3.0E+00	1.4E+00	2.0E-01	3.2E-01	**2.39E+00**	**1.5E+00**	**Y**	0.307	**1.6E+00**
Silver	7440-22-4	3.89E+01	3.89E+02	0.3	3.7E-02	1.1E-02	1.1E+03	1.1E+04	2.76E-04	2.8E-05	N	--	--
Zinc	7440-66-6	2.81E+02	5.61E+02	150	1.8E+00	2.7E+02	2.6E+02	5.2E+02	5.80E-01	2.9E-01	N	--	--
Pesticides/PCBs													
Dieldrin	60-57-1	3.51E-02	3.51E-01	0.011	1.0E+00	1.1E-02	5.8E-02	5.8E-01	1.89E-01	1.9E-02	N	--	--
Endrin	72-20-8	8.73E-02	8.73E-01	0.0083	1.0E+00	8.3E-03	1.4E-01	1.4E+00	5.73E-02	5.7E-03	N	--	--
Aroclor 1254	11097-69-1	6.45E-02	6.45E-01	1	6.8E-03	6.8E-03	3.6E+00	3.6E+01	2.81E-01	2.8E-02	N	--	--
TCL SVOCs													
Fluoranthene	206-44-0	2.91E+01	1.45E+02	0.19	6.0E+00	1.1E+00	8.2E+00	4.1E+01	2.32E-02	4.6E-03	N	--	--
Phenanthrene	85-01-8	6.64E+00	3.32E+01	0.04	1.1E+01	4.4E-01	1.0E+00	5.1E+00	3.91E-02	7.8E-03	N	--	--
Pyrene	129-00-0	7.59E+00	3.80E+01	0.11	3.7E+00	4.1E-01	3.5E+00	1.7E+01	3.17E-02	6.3E-03	N	--	--
Explosives													
2,4-Dinitrotoluene	121-14-2	NV	NV	0.63	8.5E+00	5.3E+00	--	--	**--**	**--**	--	--	--

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soi)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.3-10
BW = Minimum Body Weigth of Receptor (kg)
IR_{food} = Maximum Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)
DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = 100% Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
EPC = Exposure Point Concentration

Meadow Vole Specific Data from Table F.3-9

BW=	0.017	kg
IR_{food} =	0.010	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00024	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration
LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration
EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.3-15
Refined Wildlife Risk Characterization - Meadow Vole
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment						
				Soil						
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics										
Arsenic	7440-38-2	1.20E-01	1.20E+00	6.925	3.8E-02	2.6E-01	9.0E+00	9.0E+01	7.7E-01	7.7E-02
Cadmium	7440-43-9	1.69E+00	1.69E+01	2.047	4.5E-01	9.2E-01	1.7E+01	1.7E+02	1.2E-01	1.2E-02
Chromium	7440-47-3	5.75E+00	5.75E+01	135.7	4.1E-02	5.6E+00	4.1E+02	4.1E+03	3.3E-01	3.3E-02
Copper	7440-50-8	2.67E+01	3.51E+01	144.5	9.6E-02	1.4E+01	1.0E+03	1.4E+03	1.4E-01	1.1E-01
Lead	7439-92-1	1.40E+01	1.40E+02	186.7	2.7E-02	5.0E+00	1.3E+03	1.3E+04	1.5E-01	1.5E-02
Selenium	7782-49-2	3.51E-01	5.79E-01	0.307	4.5E-01	1.4E-01	3.4E+00	5.7E+00	9.0E-02	5.4E-02

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soi)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.3-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Meadow Vole Specific Data from Table F.3-9

BW=	0.037	kg
IR_{food} =	0.008	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	1.00	unitless
IR_{soil} =	0.00019	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.3-16
Preliminary Wildlife Risk Characterization - Short-tailed Shrew
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment – Soil: Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																
Arsenic	7440-38-2	1.50E-01	1.50E+00	11	1.1E+00	1.2E+01	5.2E-01	5.8E+00	Plant	5.1E-01	5.1E+00	**2.2E+01**	**2.2E+00**	**Y**	6.925	**1.4E+01**
Cadmium	7440-43-9	2.11E+00	2.11E+01	2.6	3.3E+00	8.5E+00	4.1E+01	1.1E+02	Invertebrate	2.2E-01	2.2E+00	**1.2E+01**	**1.2E+00**	**Y**	2.047	**9.5E+00**
Chromium	7440-47-3	7.21E+00	7.21E+01	200	8.4E-02	1.7E+01	3.2E+00	6.3E+02	Invertebrate	9.1E+00	9.1E+01	**2.2E+01**	**2.2E+00**	**Y**	135.7	**1.5E+01**
Copper	7440-50-8	3.34E+01	4.40E+01	210	6.3E-01	1.3E+02	1.5E+00	3.2E+02	Invertebrate	8.4E+01	1.1E+02	**2.5E+00**	**1.9E+00**	**Y**	144.5	**1.7E+00**
Lead	7439-92-1	1.76E+01	1.76E+02	315	4.7E-01	1.5E+02	1.5E+00	4.8E+02	Invertebrate	4.4E+01	4.4E+02	**7.1E+00**	7.1E-01	**Y**	186.7	**4.2E+00**
Mercury	7439-97-6	3.77E+01	3.77E+02	3.3	5.0E+00	1.7E+01	2.1E+01	6.8E+01	Invertebrate	7.6E+00	7.6E+01	4.4E-01	4.4E-02	N	--	--
Nickel	7440-02-0	8.79E+01	1.76E+02	53	1.4E+00	7.5E+01	4.7E+00	2.5E+02	Invertebrate	7.5E+01	1.5E+02	7.0E-01	3.5E-01	N	--	--
Selenium	7782-49-2	4.40E-01	7.25E-01	0.47	3.0E+00	1.4E+00	1.3E+00	6.3E-01	Plant	5.8E-01	9.6E-01	8.1E-01	4.9E-01	N	--	--
Silver	7440-22-4	4.88E+01	4.88E+02	0.3	3.7E-02	1.1E-02	1.5E+01	4.6E+00	Invertebrate	1.3E+01	1.3E+02	2.3E-02	2.3E-03	N	--	--
Zinc	7440-66-6	3.52E+02	7.03E+02	150	1.8E+00	2.7E+02	1.3E+01	1.9E+03	Invertebrate	1.1E+02	2.3E+02	**1.3E+00**	6.7E-01	**Y**	113.2	**1.0E+00**
Pesticides/PCBs																
Dieldrin	60-57-1	4.40E-02	4.40E-01	0.011	1.0E+00	1.1E-02	8.0E+01	8.8E-01	Invertebrate	2.3E-03	2.3E-02	**4.8E+00**	4.8E-01	**Y**	0.011	**4.8E+00**
Endrin	72-20-8	1.09E-01	1.09E+00	0.0083	1.0E+00	8.3E-03	3.6E+00	3.0E-02	Invertebrate	1.2E-01	1.2E+00	6.8E-02	6.8E-03	N	--	--
Aroclor 1254	11097-69-1	8.09E-02	8.09E-01	1	6.8E-03	6.8E-03	1.6E+01	1.6E+01	Invertebrate	2.1E-02	2.1E-01	**4.8E+01**	**4.8E+00**	**Y**	0.69	**3.3E+01**
TCL SVOCs																
Fluoranthene	206-44-0	3.64E+01	1.82E+02	0.19	6.0E+00	1.1E+00	3.1E+01	5.9E+00	Invertebrate	4.8E+00	2.4E+01	3.9E-02	7.8E-03	N	--	--
Phenanthrene	85-01-8	8.32E+00	4.16E+01	0.04	1.1E+01	4.4E-01	7.6E+00	3.0E-01	Plant	3.1E+00	1.6E+01	1.3E-02	2.6E-03	N	--	--
Pyrene	129-00-0	9.51E+00	4.76E+01	0.11	3.7E+00	4.1E-01	2.7E+01	3.0E+00	Invertebrate	1.5E+00	7.3E+00	7.5E-02	1.5E-02	N	--	--
Explosives																
2,4-Dinitrotoluene	121-14-2	NV	NV	0.63	8.5E+00	5.3E+00	1.0E+00	6.3E-01	Plant	--	--	**--**	**--**	--	--	--

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.3-10
BW = Minimum Body Weigth of Receptor (kg)
IR_{food} = Maximum Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)
DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = 100% Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
EPC = Exposure Point Concentration

Short-tailed Shrew Specific Data from Table F.3-9

BW=	0.0125	kg
IR_{food} =	0.003	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00039	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Screening Level
LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Screening Level
EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.3-17
Refined Wildlife Risk Characterization - Short-tailed Shrew
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment								
				Soil								
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics												
Arsenic	7440-38-2	1.50E-01	1.50E+00	6.925	3.8E-02	2.6E-01	1.37E-01	9.5E-01	4.7E+00	4.7E+01	**1.5E+00**	1.5E-01
Cadmium	7440-43-9	2.11E+00	2.11E+01	2.047	4.5E-01	9.2E-01	7.15E+00	1.5E+01	2.6E+00	2.6E+01	7.8E-01	7.8E-02
Chromium	7440-47-3	7.21E+00	7.21E+01	135.7	4.1E-02	5.6E+00	3.06E-01	4.2E+01	1.4E+02	1.4E+03	9.5E-01	9.5E-02
Copper	7440-50-8	3.34E+01	4.40E+01	144.5	9.6E-02	1.4E+01	5.15E-01	7.4E+01	4.5E+02	5.9E+02	3.2E-01	2.4E-01
Lead	7439-92-1	1.76E+01	1.76E+02	186.7	2.7E-02	5.0E+00	2.93E-01	5.5E+01	3.6E+02	3.6E+03	5.2E-01	5.2E-02
Zinc	7440-66-6	3.52E+02	7.03E+02	113.2	5.9E-01	6.6E+01	3.56E+00	4.0E+02	8.5E+02	1.7E+03	1.3E-01	6.7E-02
Pesticides/PCBs												
Dieldrin	60-57-1	4.40E-02	4.40E-01	0.011	4.1E-01	4.5E-03	1.25E+01	1.4E-01	3.2E-02	3.2E-01	3.5E-01	3.5E-02
Aroclor 1254	11097-69-1	8.09E-02	8.09E-01	0.69	6.8E-03	4.7E-03	6.67E+00	4.6E+00	1.1E-01	1.1E+00	**6.3E+00**	6.3E-01

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.3-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Short-tailed Shrew Specific Data from Table F.3-9

BW=	0.015	kg
IR_{food} =	0.002	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.14	unitless
DF_{inv} =	0.86	unitless
IR_{soil} =	0.00026	kg dw/day
AF =	0.950	unitless

[a] = The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.3-18
Preliminary Wildlife Risk Characterization - Red Fox
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment														
				Soil														
				Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																		
Arsenic	7440-38-2	3.59E-02	3.59E-01	11	1.1E+00	1.2E+01	5.2E-01	5.8E+00	1.5E-02	1.6E-01	Plant	2.7E-01	2.7E+00	**4.0E+01**	**4.0E+00**	**Y**	6.925	**2.5E+01**
Cadmium	7440-43-9	5.07E-01	5.07E+00	2.6	3.3E+00	8.5E+00	4.1E+01	1.1E+02	4.0E+00	1.0E+01	Invertebrate	1.1E-01	1.1E+00	**2.4E+01**	**2.4E+00**	**Y**	2.047	**1.9E+01**
Chromium	7440-47-3	1.73E+00	1.73E+01	200	8.4E-02	1.7E+01	3.2E+00	6.3E+02	3.3E-01	6.7E+01	Invertebrate	4.7E+00	4.7E+01	**4.3E+01**	**4.3E+00**	**Y**	135.7	**2.9E+01**
Copper	7440-50-8	8.02E+00	1.06E+01	210	6.3E-01	1.3E+02	1.5E+00	3.2E+02	1.0E+00	2.2E+02	Invertebrate	4.4E+01	5.8E+01	**4.7E+00**	**3.6E+00**	**Y**	144.5	**3.3E+00**
Lead	7439-92-1	4.22E+00	4.22E+01	315	4.7E-01	1.5E+02	1.5E+00	4.8E+02	2.9E-01	9.0E+01	Invertebrate	2.3E+01	2.3E+02	**1.3E+01**	**1.3E+00**	**Y**	186.7	**8.0E+00**
Mercury	7439-97-6	9.05E+00	9.05E+01	3.3	5.0E+00	1.7E+01	2.1E+01	6.8E+01	1.9E-01	6.3E-01	Invertebrate	3.8E+00	3.8E+01	8.7E-01	8.7E-02	N	--	--
Nickel	7440-02-0	2.11E+01	4.22E+01	53	1.4E+00	7.5E+01	4.7E+00	2.5E+02	5.9E-01	3.1E+01	Invertebrate	3.8E+01	7.6E+01	**1.4E+00**	6.9E-01	**Y**	48.13	**1.3E+00**
Selenium	7782-49-2	1.05E-01	1.74E-01	0.47	3.0E+00	1.4E+00	1.3E+00	6.3E-01	1.2E+00	5.6E-01	Plant	3.0E-01	4.9E-01	**1.6E+00**	9.5E-01	**Y**	0.307	**1.0E+00**
Silver	7440-22-4	1.17E+01	1.17E+02	0.3	3.7E-02	1.1E-02	1.5E+01	4.6E+00	5.0E-01	1.5E-01	Invertebrate	6.6E+00	6.6E+01	4.6E-02	4.6E-03	N	--	--
Zinc	7440-66-6	8.44E+01	1.69E+02	150	1.8E+00	2.7E+02	1.3E+01	1.9E+03	2.7E+00	4.0E+02	Invertebrate	5.6E+01	1.1E+02	**2.7E+00**	**1.3E+00**	**Y**	113.2	**2.0E+00**
Pesticides/PCBs																		
Dieldrin	60-57-1	1.05E-02	1.05E-01	0.011	1.0E+00	1.1E-02	8.0E+01	8.8E-01	1.0E+00	1.1E-02	Invertebrate	1.1E-03	1.1E-02	**9.6E+00**	9.6E-01	**Y**	0.011	**9.6E+00**
Endrin	72-20-8	2.62E-02	2.62E-01	0.0083	1.0E+00	8.3E-03	3.6E+00	3.0E-02	1.0E+00	8.3E-03	Invertebrate	6.2E-02	6.2E-01	1.3E-01	1.3E-02	N	--	--
Aroclor 1254	11097-69-1	1.94E-02	1.94E-01	1	6.8E-03	6.8E-03	1.6E+01	1.6E+01	1.0E+00	1.0E+00	Invertebrate	1.1E-02	1.1E-01	**9.5E+01**	**9.5E+00**	**Y**	0.69	**6.6E+01**
TCL SVOCs																		
Fluoranthene	206-44-0	8.74E+00	4.37E+01	0.19	6.0E+00	1.1E+00	3.1E+01	5.9E+00	1.0E+00	1.9E-01	Invertebrate	2.4E+00	1.2E+01	7.9E-02	1.6E-02	N	--	--
Phenanthrene	85-01-8	2.00E+00	9.98E+00	0.04	1.1E+01	4.4E-01	7.6E+00	3.0E-01	1.0E+00	4.0E-02	Plant	1.6E+00	7.8E+00	2.6E-02	5.1E-03	N	--	--
Pyrene	129-00-0	2.28E+00	1.14E+01	0.11	3.7E+00	4.1E-01	2.7E+01	3.0E+00	1.0E+00	1.1E-01	Invertebrate	7.3E-01	3.7E+00	1.5E-01	3.0E-02	N	--	--
Explosives																		
2,4-Dinitrotoluene	121-14-2	NV	NV	0.63	8.5E+00	5.3E+00	1.0E+00	6.3E-01	1.0E+00	6.3E-01	Plant	--	--	**--**	**--**	--	--	--

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.3-10

BW = Minimum Body Weigth of Receptor (kg)

IR_{food} = Maximum Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)

DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = 100% Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

EPC = Exposure Point Concentration

Red FoxSpecific Data from Table F.3-9

BW=	2.9500	kg
IR_{food} =	0.342	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00960	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Screening Level

LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Screening Level

EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.3-19
Refined Wildlife Risk Characterization - Red Fox
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment										
				Soil										
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics														
Arsenic	7440-38-2	3.59E-02	3.59E-01	6.925	3.8E-02	2.6E-01	1.4E-01	9.5E-01	5.5E-03	3.8E-02	4.0E+03	4.0E+04	1.8E-03	1.8E-04
Cadmium	7440-43-9	5.07E-01	5.07E+00	2.047	4.5E-01	9.2E-01	7.2E+00	1.5E+01	1.9E-01	4.0E-01	4.5E+03	4.5E+04	4.5E-04	4.5E-05
Chromium	7440-47-3	1.73E+00	1.73E+01	135.7	4.1E-02	5.6E+00	3.1E-01	4.2E+01	6.3E-02	8.5E+00	8.7E+04	8.7E+05	1.6E-03	1.6E-04
Copper	7440-50-8	8.02E+00	1.06E+01	144.5	9.6E-02	1.4E+01	5.2E-01	7.4E+01	1.1E-01	1.6E+01	2.6E+05	3.4E+05	5.6E-04	4.2E-04
Lead	7439-92-1	4.22E+00	4.22E+01	186.7	2.7E-02	5.0E+00	2.9E-01	5.5E+01	5.8E-02	1.1E+01	2.3E+05	2.3E+06	8.2E-04	8.2E-05
Nickel	7440-02-0	2.11E+01	4.22E+01	48.13	4.1E-02	2.0E+00	1.1E+00	5.1E+01	9.9E-02	4.8E+00	6.6E+05	1.3E+06	7.3E-05	3.6E-05
Selenium	7782-49-2	1.05E-01	1.74E-01	0.307	4.5E-01	1.4E-01	1.3E+00	3.9E-01	1.4E+00	4.2E-01	4.1E+02	6.8E+02	7.4E-04	4.5E-04
Zinc	7440-66-6	8.44E+01	1.69E+02	113.2	5.9E-01	6.6E+01	3.6E+00	4.0E+02	9.7E-01	1.1E+02	4.0E+05	8.0E+05	2.8E-04	1.4E-04
Pesticides/PCBs														
Dieldrin	60-57-1	1.05E-02	1.05E-01	0.011	4.1E-01	4.5E-03	1.2E+01	1.4E-01	5.0E-04	5.5E-06	8.6E+01	8.6E+02	1.3E-04	1.3E-05
Aroclor 1254	11097-69-1	1.94E-02	1.94E-01	0.69	6.8E-03	4.7E-03	6.7E+00	4.6E+00	1.0E+00	6.9E-01	8.7E+01	8.7E+02	7.9E-03	7.9E-04

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.3-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Red FoxSpecific Data from Table F.3-9

BW=	4.5300	kg
IR_{food} =	0.238	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.17	unitless
DF_{inv} =	0.04	unitless
DF_{mam} =	0.79	unitless
IR_{soil} =	0.00670	kg dw/day
AF =	0.0039	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.3-20
Preliminary Wildlife Risk Characterization - American Robin
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment												
				Soil												
				Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																
Arsenic	7440-38-2	5.14E+00	1.28E+01	11	1.1E+00	1.2E+01	5.2E-01	5.8E+00	Plant	1.4E+01	3.5E+01	7.8E-01	3.1E-01	N	--	--
Cadmium	7440-43-9	1.45E+00	2.00E+01	2.6	3.3E+00	8.5E+00	4.1E+01	1.1E+02	Invertebrate	1.1E-01	1.6E+00	**2.3E+01**	**1.7E+00**	**Y**	2.047	**1.8E+01**
Chromium	7440-47-3	1.00E+00	5.00E+00	200	8.4E-02	1.7E+01	3.2E+00	6.3E+02	Invertebrate	9.9E-01	4.9E+00	**2.0E+02**	**4.0E+01**	**Y**	135.7	**1.4E+02**
Copper	7440-50-8	4.70E+01	6.17E+01	210	6.3E-01	1.3E+02	1.5E+00	3.2E+02	Invertebrate	9.4E+01	1.2E+02	**2.2E+00**	**1.7E+00**	**Y**	144.5	**1.5E+00**
Lead	7439-92-1	1.13E+00	1.13E+01	315	4.7E-01	1.5E+02	1.5E+00	4.8E+02	Invertebrate	2.3E+00	2.3E+01	**1.4E+02**	**1.4E+01**	**Y**	186.7	**8.2E+01**
Mercury	7439-97-6	4.50E-01	9.00E-01	3.3	5.0E+00	1.7E+01	2.1E+01	6.8E+01	Invertebrate	6.9E-02	1.4E-01	**4.8E+01**	**2.4E+01**	**Y**	2.428	**3.5E+01**
Nickel	7440-02-0	7.74E+01	1.07E+02	53	1.4E+00	7.5E+01	4.7E+00	2.5E+02	Invertebrate	5.1E+01	7.1E+01	**1.0E+00**	7.5E-01	**Y**	48.13	9.4E-01
Selenium	7782-49-2	4.00E-01	8.00E-01	0.47	3.0E+00	1.4E+00	1.3E+00	6.3E-01	Plant	4.1E-01	8.3E-01	**1.1E+00**	5.7E-01	**Y**	0.307	7.4E-01
Silver	7440-22-4	1.66E+01	1.24E+02	0.3	3.7E-02	1.1E-02	1.5E+01	4.6E+00	Invertebrate	3.4E+00	2.6E+01	8.8E-02	1.2E-02	N	--	--
Zinc	7440-66-6	1.45E+01	1.31E+02	150	1.8E+00	2.7E+02	1.3E+01	1.9E+03	Invertebrate	3.6E+00	3.2E+01	**4.2E+01**	**4.7E+00**	**Y**	113.2	**3.2E+01**
Pesticides/PCBs																
Dieldrin	60-57-1	7.70E-02	7.70E-01	0.011	1.0E+00	1.1E-02	8.0E+01	8.8E-01	Invertebrate	3.1E-03	3.1E-02	**3.6E+00**	3.6E-01	**Y**	0.011	**3.6E+00**
Endrin	72-20-8	2.80E-02	1.70E-01	0.0083	1.0E+00	8.3E-03	3.6E+00	3.0E-02	Invertebrate	2.4E-02	1.5E-01	3.4E-01	5.6E-02	N	--	--
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	1	6.8E-03	6.8E-03	1.6E+01	1.6E+01	Invertebrate	8.2E-02	8.2E-01	**1.2E+01**	**1.2E+00**	**Y**	0.69	**8.5E+00**
TCL SVOCs																
Fluoranthene	206-44-0	NV	NV	0.19	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Phenanthrene	85-01-8	1.13E+00	5.65E+00	0.04	1.1E+01	4.4E-01	7.6E+00	3.0E-01	Plant	3.2E-01	1.6E+00	1.2E-01	2.5E-02	N	--	--
Pyrene	129-00-0	NV	NV	0.11	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Explosives																
2,4-Dinitrotoluene	121-14-2	1.00E-01	1.25E+00	0.63	8.5E+00	5.3E+00	1.0E+00	6.3E-01	Plant	3.7E-02	4.7E-01	**1.7E+01**	**1.4E+00**	**Y**	0.63	**1.7E+01**

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.3-10
BW = Minimum Body Weigth of Receptor (kg)
IR_{food} = Maximum Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)
DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = 100% Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
EPC = Exposure Point Concentration

American Robin Specific Data from Table F.3-9

BW=	0.0635	kg
IR_{food} =	0.020	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00100	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration
LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration
EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.3-21
Refined Wildlife Risk Characterization - American Robin
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment								
				Soil								
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics												
Cadmium	7440-43-9	1.45E+00	2.00E+01	2.047	4.5E-01	9.2E-01	7.2E+00	1.5E+01	3.0E+00	4.1E+01	6.9E-01	5.0E-02
Chromium	7440-47-3	1.00E+00	5.00E+00	135.7	4.1E-02	5.6E+00	3.1E-01	4.2E+01	3.3E+01	1.6E+02	**4.1E+00**	8.3E-01
Copper	7440-50-8	4.70E+01	6.17E+01	144.5	9.6E-02	1.4E+01	5.2E-01	7.4E+01	9.7E+02	1.3E+03	1.5E-01	1.1E-01
Lead	7439-92-1	1.13E+00	1.13E+01	186.7	2.7E-02	5.0E+00	2.9E-01	5.5E+01	4.0E+01	4.0E+02	**4.7E+00**	4.7E-01
Mercury	7439-97-6	4.50E-01	9.00E-01	2.428	2.5E-01	6.0E-01	1.7E+00	4.1E+00	3.3E+00	6.7E+00	7.3E-01	3.6E-01
Nickel	7440-02-0	7.74E+01	1.07E+02	48.13	4.1E-02	2.0E+00	1.1E+00	5.1E+01	1.0E+03	1.4E+03	4.7E-02	3.4E-02
Selenium	7782-49-2	4.00E-01	8.00E-01	0.307	4.5E-01	1.4E-01	1.3E+00	3.9E-01	3.1E+00	6.2E+00	9.9E-02	5.0E-02
Zinc	7440-66-6	1.45E+01	1.31E+02	113.2	5.9E-01	6.6E+01	3.6E+00	4.0E+02	5.1E+01	4.6E+02	**2.2E+00**	2.4E-01
Pesticides/PCBs												
Dieldrin	60-57-1	7.70E-02	7.70E-01	0.011	4.1E-01	4.5E-03	1.2E+01	1.4E-01	9.6E-02	9.6E-01	1.2E-01	1.2E-02
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	0.69	6.8E-03	4.7E-03	6.7E+00	4.6E+00	9.9E-01	9.9E+00	6.9E-01	6.9E-02
Explosives												
2,4-Dinitrotoluene	121-14-2	1.00E-01	1.25E+00	0.63	4.2E+00	2.7E+00	1.0E+00	6.3E-01	2.1E-01	2.6E+00	**3.1E+00**	2.5E-01

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.3-10
BW = Average Body Weigth of Receptor (kg)
IR_{food} = Average Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor, specific to prey type and chemical
DF = Dietary fraction
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
BDL = Below Detection Limit
EPC = Exposure Point Concentration

American Robin Specific Data from Table F.3-9

BW=	0.0773	kg
IR_{food} =	0.016	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.62	unitless
DF_{inv} =	0.38	unitless
IR_{soil} =	0.0008	kg dw/day
AF =	0.770	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level
LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.3-22
Preliminary Wildlife Risk Characterization - Red-tailed Hawk
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment									
				Soil									
				Maximum Detected Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics													
Arsenic	7440-38-2	5.14E+00	1.28E+01	11	1.5E-02	1.6E-01	5.2E+03	2.1E+03	2.1E-03	8.4E-04	N	--	--
Cadmium	7440-43-9	1.45E+00	2.00E+01	2.6	4.0E+00	1.0E+01	5.5E+00	4.0E-01	4.7E-01	3.4E-02	N	--	--
Chromium	7440-47-3	1.00E+00	5.00E+00	200	3.3E-01	6.7E+01	4.6E+01	9.1E+00	**4.4E+00**	8.8E-01	**Y**	135.7	**3.0E+00**
Copper	7440-50-8	4.70E+01	6.17E+01	210	1.0E+00	2.2E+02	6.8E+02	5.2E+02	3.1E-01	2.3E-01	N	--	--
Lead	7439-92-1	1.13E+00	1.13E+01	315	2.9E-01	9.0E+01	6.0E+01	6.0E+00	**5.3E+00**	5.3E-01	**Y**	186.7	**3.1E+00**
Mercury	7439-97-6	4.50E-01	9.00E-01	3.3	1.9E-01	6.3E-01	3.6E+01	1.8E+01	9.3E-02	4.6E-02	N	--	--
Nickel	7440-02-0	7.74E+01	1.07E+02	53	5.9E-01	3.1E+01	2.0E+03	1.4E+03	2.7E-02	1.9E-02	N	--	--
Selenium	7782-49-2	4.00E-01	8.00E-01	0.47	1.2E+00	5.6E-01	5.1E+00	2.6E+00	9.2E-02	4.6E-02	N	--	--
Silver	7440-22-4	1.66E+01	1.24E+02	0.3	5.0E-01	1.5E-01	5.0E+02	6.7E+01	6.0E-04	8.0E-05	N	--	--
Zinc	7440-66-6	1.45E+01	1.31E+02	150	2.7E+00	4.0E+02	8.2E+01	9.1E+00	**1.8E+00**	2.0E-01	**Y**	113.2	**1.4E+00**
Pesticides/PCBs													
Dieldrin	60-57-1	7.70E-02	7.70E-01	0.011	1.0E+00	1.1E-02	1.2E+00	1.2E-01	9.4E-03	9.4E-04	N	--	--
Endrin	72-20-8	2.80E-02	1.70E-01	0.0083	1.0E+00	8.3E-03	4.3E-01	7.0E-02	2.0E-02	3.2E-03	N	--	--
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	1	1.0E+00	1.0E+00	6.2E+00	6.2E-01	1.6E-01	1.6E-02	N	--	--
TCL SVOCs													
Fluoranthene	206-44-0	NV	NV	0.19	--	--	--	--	**--**	**--**	--	--	--
Phenanthrene	85-01-8	1.13E+00	5.65E+00	0.04	1.0E+00	4.0E-02	1.7E+01	3.4E+00	2.3E-03	4.7E-04	N	--	--
Pyrene	129-00-0	NV	NV	0.11	--	--	--	--	**--**	**--**	--	--	--
Explosives													
2,4-Dinitrotoluene	121-14-2	1.00E-01	1.25E+00	0.63	1.0E+00	6.3E-01	1.5E+00	1.2E-01	4.1E-01	3.3E-02	N	--	--

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.3-10

BW_i = Minimum Body Weigth of Receptor (kg)

IR_{food} = Maximum Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)

DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = 100% Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

EPC = Exposure Point Concentration

Red-tailed Hawk Specific Data from Table F.3-9

BW=	0.957	kg
IR_{food} =	0.063	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{mam} =	1.00	unitless
IR_{soil} =	0.00	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screenning levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration

LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration

EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.3-23
Refined Wildlife Risk Characterization - Red-tailed Hawk
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment						
				Soil						
				EPC (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Soil Screening Level[a] (mg/kg)	Calculated LOAEL-Based Soil Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics										
Chromium	7440-47-3	1.00E+00	5.00E+00	135.70	6.3E-02	8.5E+00	2.1E+05	1.0E+06	6.6E-04	1.3E-04
Lead	7439-92-1	1.13E+00	1.13E+01	186.70	5.8E-02	1.1E+01	2.5E+05	2.5E+06	7.4E-04	7.4E-05
Zinc	7440-66-6	1.45E+01	1.31E+02	113.20	9.7E-01	1.1E+02	1.9E+05	1.8E+06	5.8E-04	6.4E-05

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.3-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Red-tailed Hawk Specific Data from Table F.3-9

BW=	1.134	kg
IR_{food} =	0.059	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{mam} =	1.00	unitless
IR_{soil} =	0.0	kg dw/day
AF =	0.0015	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.3-24
Wildlife Summary
Screening Level Ecological Risk Assessment - SWMU 37
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS#	Meadow Vole					Short-tailed Shrew					Red Fox					American Robin					Red-tailed Hawk				
		Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ
Inorganics																										
Arsenic	7440-38-2	**6.1E+01**	**6.1E+00**	**3.8E+01**	7.7E-01	7.7E-02	**2.2E+01**	**2.2E+00**	**1.4E+01**	**1.5E+00**	1.5E-01	**4.0E+01**	**4.0E+00**	**2.5E+01**	1.8E-03	1.8E-04	7.8E-01	3.1E-01	NC	NC	NC	2.1E-03	8.4E-04	NC	NC	NC
Cadmium	7440-43-9	**3.0E+00**	3.0E-01	**2.3E+00**	1.2E-01	1.2E-02	**1.2E+01**	**1.2E+00**	**9.5E+00**	7.8E-01	7.8E-02	**2.4E+01**	**2.4E+00**	**1.9E+01**	4.5E-04	4.5E-05	**2.3E+01**	**1.7E+00**	**1.8E+01**	6.9E-01	5.0E-02	4.7E-01	3.4E-02	NC	NC	NC
Chromium	7440-47-3	**2.2E+00**	2.2E-01	**1.5E+00**	3.3E-01	3.3E-02	**2.2E+01**	**2.2E+00**	**1.5E+01**	9.5E-01	9.5E-02	**4.3E+01**	**4.3E+00**	**2.9E+01**	1.6E-03	1.6E-04	**2.0E+02**	**4.0E+01**	**1.4E+02**	**4.1E+00**	8.3E-01	**4.4E+00**	8.8E-01	**3.0E+00**	6.6E-04	1.3E-04
Copper	7440-50-8	**3.0E+00**	**2.3E+00**	**2.1E+00**	1.4E-01	1.1E-01	**2.5E+00**	**1.9E+00**	**1.7E+00**	3.2E-01	2.4E-01	**4.7E+00**	**3.6E+00**	**3.3E+00**	5.6E-04	4.2E-04	**2.2E+00**	**1.7E+00**	**1.5E+00**	1.5E-01	1.1E-01	3.1E-01	2.3E-01	NC	NC	NC
Lead	7439-92-1	**6.5E+00**	6.5E-01	**3.9E+00**	1.5E-01	1.5E-02	**7.1E+00**	7.1E-01	**4.2E+00**	5.2E-01	5.2E-02	**1.3E+01**	**1.3E+00**	**8.0E+00**	8.2E-04	8.2E-05	**1.4E+02**	**1.4E+01**	**8.2E+01**	**4.7E+00**	4.7E-01	**5.3E+00**	5.3E-01	**3.1E+00**	7.4E-04	7.4E-05
Mercury	7439-97-6	3.2E-01	3.2E-02	NC	NC	NC	4.4E-01	4.4E-02	NC	NC	NC	8.7E-01	8.7E-02	NC	NC	NC	**4.8E+01**	**2.4E+01**	**3.5E+01**	7.3E-01	3.6E-01	9.3E-02	4.6E-02	NC	NC	NC
Nickel	7440-02-0	6.4E-01	3.2E-01	NC	NC	NC	7.0E-01	3.5E-01	NC	NC	NC	**1.4E+00**	6.9E-01	**1.3E+00**	7.3E-05	3.6E-05	**1.0E+00**	7.5E-01	9.4E-01	4.7E-02	3.4E-02	2.7E-02	1.9E-02	NC	NC	NC
Selenium	7782-49-2	**2.4E+00**	**1.5E+00**	**1.6E+00**	9.0E-02	5.4E-02	8.1E-01	4.9E-01	NC	NC	NC	**1.6E+00**	9.5E-01	**1.0E+00**	7.4E-04	4.5E-04	**1.1E+00**	5.7E-01	7.4E-01	9.9E-02	5.0E-02	9.2E-02	4.6E-02	NC	NC	NC
Silver	7440-22-4	2.8E-04	2.8E-05	NC	NC	NC	2.3E-02	2.3E-03	NC	NC	NC	4.6E-02	4.6E-03	NC	NC	NC	8.8E-02	1.2E-02	NC	NC	NC	6.0E-04	8.0E-05	NC	NC	NC
Zinc	7440-66-6	5.8E-01	2.9E-01	NC	NC	NC	**1.3E+00**	6.7E-01	**1.0E+00**	1.3E-01	6.7E-02	**2.7E+00**	**1.3E+00**	**2.0E+00**	2.8E-04	1.4E-04	**4.2E+01**	**4.7E+00**	**3.2E+01**	**2.2E+00**	2.4E-01	**1.8E+00**	2.0E-01	**1.4E+00**	5.8E-04	6.4E-05
Pesticides/PCBs																										
Dieldrin	60-57-1	1.9E-01	1.9E-02	NC	NC	NC	**4.8E+00**	4.8E-01	**4.8E+00**	3.5E-01	3.5E-02	**9.6E+00**	9.6E-01	**9.6E+00**	1.3E-04	1.3E-05	**3.6E+00**	3.6E-01	**3.6E+00**	1.2E-01	1.2E-02	9.4E-03	9.4E-04	NC	NC	NC
Endrin	72-20-8	5.7E-02	5.7E-03	NC	NC	NC	6.8E-02	6.8E-03	NC	NC	NC	1.3E-01	1.3E-02	NC	NC	NC	3.4E-01	5.6E-02	NC	NC	NC	2.0E-02	3.2E-03	NC	NC	NC
Aroclor 1254	11097-69-1	2.8E-01	2.8E-02	NC	NC	NC	**4.8E+01**	**4.8E+00**	**3.3E+01**	**6.3E+00**	6.3E-01	**9.5E+01**	**9.5E+00**	**6.6E+01**	7.9E-03	7.9E-04	**1.2E+01**	**1.2E+00**	**8.5E+00**	6.9E-01	6.9E-02	1.6E-01	1.6E-02	NC	NC	NC
TCL SVOCs																										
Fluoranthene	206-44-0	2.3E-02	4.6E-03	NC	NC	NC	3.9E-02	7.8E-03	NC	NC	NC	7.9E-02	1.6E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	85-01-8	3.9E-02	7.8E-03	NC	NC	NC	1.3E-02	2.6E-03	NC	NC	NC	2.6E-02	5.1E-03	NC	NC	NC	1.2E-01	2.5E-02	NC	NC	NC	2.3E-03	4.7E-04	NC	NC	NC
Pyrene	129-00-0	3.2E-02	6.3E-03	NC	NC	NC	7.5E-02	1.5E-02	NC	NC	NC	1.5E-01	3.0E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Explosives																										
2,4-Dinitrotoluene	121-14-2	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	**1.7E+01**	**1.4E+00**	**1.7E+01**	**3.1E+00**	2.5E-01	4.1E-01	3.3E-02	NC	NC	NC

Notes:
CAS = Chemical Abstract Services
NC = Not Calculated
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
HQ = Hazard Quotient
EPC = Exposure Point Concentration

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APPENDIX F.4

SWMU 38 AND AOC Q SLERA

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Table F.4-1
SLERA Occurence/Distribution - SWMU 38 and AOC Q Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening
TAL Metals							
Aluminum	7429-90-5	7,820	26,400	mg/kg	38SB3A	13/13	26,400
Antimony	7440-36-0	0.0355	0.39	mg/kg	38SB10A	12/13	0.39
Arsenic	7440-38-2	0.635	5.1	mg/kg	38SB10A	13/13	5.1
Barium	7440-39-3	87	160	mg/kg	38SB9A	13/13	160
Beryllium	7440-41-7	0.465	0.91	mg/kg	38SB3A	13/13	0.91
Cadmium	7440-43-9	0.95	1.9	mg/kg	38SB3A	13/13	1.9
Calcium	7440-70-2	943	27,600	mg/kg	38SB1A	13/13	27,600
Chromium	7440-47-3	12	82	mg/kg	38SB3A	13/13	82
Cobalt	7440-48-4	5.9	12	mg/kg	38SB9A	13/13	12
Copper	7440-50-8	6	85	mg/kg	38SB3A	13/13	85
Iron	7439-89-6	12,700	30,700	mg/kg	38SB3A	13/13	30,700
Lead	7439-92-1	7.2	52	mg/kg	38SB1A	13/13	52
Magnesium	7439-95-4	2,220	5,590	mg/kg	38SB3A	13/13	5,590
Manganese	7439-96-5	319	600	mg/kg	38SB5A	13/13	600
Mercury	7439-97-6	0.01	0.27	mg/kg	38SB10A	12/13	0.27
Nickel	7440-02-0	8.5	35	mg/kg	38SB3A	13/13	35
Potassium	7440-09-7	1,050	2,410	mg/kg	38SB3A	13/13	2,410
Selenium	7782-49-2	0.11	0.67	mg/kg	QSB3A	13/13	0.67
Silver	7440-22-4	0.035	0.14	mg/kg	38SB3A	13/13	0.14
Sodium	7440-23-5	27	68	mg/kg	38SB8A	13/13	68
Thallium	7440-28-0	0.1	0.24	mg/kg	38SB8A	13/13	0.24
Vanadium	7440-62-2	15	43	mg/kg	38SB8A	13/13	43
Zinc	7440-66-6	45.5	120	mg/kg	38SB5A	13/13	120
Pesticides/PCBs							
Endosulfan I	959-98-8	2.6E-03	2.6E-03	mg/kg	38SB7A DUP AVG	1/10	2.6E-03
Endrin	72-20-8	1.1E-03	3.5E-03	mg/kg	38SB7A DUP AVG	4/10	3.5E-03
Aroclor 1254	11097-69-1	1.7E-02	5.7E-01	mg/kg	38SB1A	9/10	5.7E-01
TCL VOCs							
2-Butanone (MEK)	78-93-3	2.3E-02	2.6E-02	mg/kg	38SB2A	3/6	2.6E-02
Acetone	67-64-1	4.2E-02	2.0E-01	mg/kg	38SB2A	6/6	2.0E-01
Cyclohexane	110-82-7	5.6E-04	5.6E-04	mg/kg	QSB1A DUP AVG	1/6	5.6E-04
Ethylbenzene	100-41-4	5.2E-04	5.2E-04	mg/kg	QSB1A DUP AVG	1/6	5.2E-04
Methylcyclohexane	108-87-2	2.4E-03	2.4E-03	mg/kg	QSB1A DUP AVG	1/6	2.4E-03
Methylene chloride	75-09-2	4.5E-03	6.8E-03	mg/kg	QSB3A	3/6	6.8E-03
Toluene	108-88-3	3.0E-03	3.0E-03	mg/kg	38SB2A	1/6	3.0E-03
Xylenes	1330-20-7	2.2E-03	2.2E-03	mg/kg	QSB1A DUP AVG	1/6	2.2E-03
TCL SVOCs							
4-Chloro-3-Methylphenol	59-50-7	1.1E-02	2.5E-02	mg/kg	38SB2A	3/6	2.5E-02
Bis(2-ethylhexyl) Phthalate	117-81-7	4.6E-02	1.3E+00	mg/kg	38SB3A	6/6	1.3E+00
Butyl Benzyl Phthalate	85-68-7	4.4E-02	5.2E-02	mg/kg	38SB2A	2/6	5.2E-02
Di-n-butylphthalate	84-74-2	2.6E-02	1.4E+01	mg/kg	38SB1A	6/6	1.4E+01
Diethylphthalate	84-66-2	4.0E-03	1.9E-02	mg/kg	QSB1A DUP AVG	4/6	1.9E-02
Fluoranthene	206-44-0	2.8E-03	1.7E-01	mg/kg	38SB3A	4/6	1.7E-01
N-Nitrosodiphenylamine	86-30-6	1.9E-02	1.6E-01	mg/kg	38SB3A	4/6	1.6E-01
Phenanthrene	85-01-8	3.0E-03	1.1E-01	mg/kg	38SB3A	3/6	1.1E-01
Pyrene	129-00-0	2.5E-03	9.0E-02	mg/kg	38SB3A	4/6	9.0E-02
TCL Explosives							
2,4-Dinitrotoluene	121-14-2	2.6E-01	2.6E-01	mg/kg	QSB1A DUP AVG	1/14	2.6E-01
Dinitrotoluene Mix	--	2.6E-01	2.6E-01	mg/kg	QSB1A DUP AVG	1/14	2.6E-01

Notes:
CAS = Chemical Abstracts Service
COPEC = Chemical of Potential Ecological Concern
mg/kg = Milligram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semivolatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

Table F.4-2
Non-detected Chemicals MDL Screening for SWMU 38 - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
TAL Metals																		
Antimony	7440-36-0	mg/kg	1	13	0.0518	0.0518	5	F	N	78	A	N	--	--	NS	0.27	A	N
Mercury	7439-97-6	mg/kg	1	13	0.0077	0.0077	0.3	F	N	0.1	B	N	--	--	NS	--	--	NS
Pesticides/PCBs																		
4,4'-DDD	72-54-8	ug/kg	10	10	0.333	1.7	100	G	N	100	C	N	--	--	NS	--	--	NS
4,4'-DDE	72-55-9	ug/kg	10	10	0.245	1.4	100	G	N	100	C	N	--	--	NS	--	--	NS
4,4'-DDT	50-29-3	ug/kg	10	10	0.252	1.6	100	G	N	100	C	N	93	A	N	21	A	N
Aldrin	309-00-2	ug/kg	10	10	0.426	0.84	100	G	N	100	C	N	--	--	NS	--	--	NS
alpha-BHC	319-84-6	ug/kg	10	10	0.4	0.54	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
alpha-Chlordane	5103-71-9	ug/kg	10	10	0.608	1	100	G	N	100	C	N	--	--	NS	--	--	NS
beta-BHC	319-85-7	ug/kg	10	10	0.76	1.58	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
delta-BHC	319-86-8	ug/kg	10	10	1.1	1.4	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
Dieldrin	60-57-1	ug/kg	10	10	0.433	0.71	100	G	N	100	C	N	22	A	N	4.9	A	N
Endosulfan I	959-98-8	ug/kg	9	10	1	1.3	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endosulfan II	33213-65-9	ug/kg	10	10	0.3	1.3	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endosulfan Sulfate	1031-07-8	ug/kg	10	10	0.704	1.5	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Endrin	72-20-8	ug/kg	6	10	0.417	0.67	100	G	N	100	C	N	--	--	NS	--	--	NS
Endrin Aldehyde	7421-93-4	ug/kg	10	10	1.2	1.6	100	G	N	100	C	N	--	--	NS	--	--	NS
Endrin Ketone	53494-70-5	ug/kg	10	10	0.385	1.6	100	G	N	100	C	N	--	--	NS	--	--	NS
gamma-BHC (Lindane)	58-89-9	ug/kg	10	10	0.272	0.99	100	G	N	100	C	N	--	--	NS	--	--	NS
gamma-Chlordane	5103-74-2	ug/kg	10	10	0.53	0.984	100	G	N	100	C	N	--	--	NS	--	--	NS
Heptachlor	76-44-8	ug/kg	10	10	0.987	1.9	100	G	N	100	C	N	--	--	NS	--	--	NS
Heptachlor Epoxide	1024-57-3	ug/kg	10	10	0.47	0.64	100	G	N	100	C	N	--	--	NS	--	--	NS
Methoxychlor	72-43-5	ug/kg	10	10	0.392	2	100	G	N	100	C	N	--	--	NS	--	--	NS
Toxaphene	8001-35-2	ug/kg	10	10	25	35	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Aroclor 1016	12674-11-2	ug/kg	10	10	4.7	22.4	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1221	11104-28-2	ug/kg	10	10	2.8	11	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1232	11141-16-5	ug/kg	10	10	7	13	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1242	53469-21-9	ug/kg	10	10	4.2	25	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1248	12672-29-6	ug/kg	10	10	6	8.2	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1254	11097-69-1	ug/kg	1	10	5.1	5.1	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1260	11096-82-5	ug/kg	10	10	9.8	25	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1262	37324-23-5	ug/kg	8	8	5.9	8	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Aroclor 1268	11100-14-4	ug/kg	8	8	5	6.8	40,000	F	N	--	--	NS	--	--	NS	--	--	NS
Herbicides																		
2,4,5-T	93-76-5	ug/kg	2	2	2.8	28	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4,5-TP (Silvex)	93-72-1	ug/kg	2	2	5.6	56	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4-D	94-75-7	ug/kg	2	2	22.4	224	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4-DB	94-82-6	ug/kg	2	2	86.8	868	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dalapon	75-99-0	ug/kg	2	2	79.8	798	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dicamba	1918-00-9	ug/kg	2	2	2.8	28	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dichlorprop	120-36-5	ug/kg	2	2	23.8	238	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dinoseb	88-85-7	ug/kg	2	2	29.4	29.4	--	--	NS	--	--	NS	--	--	NS	--	--	NS
MCPA	94-74-6	ug/kg	2	2	1,950	19,500	--	--	NS	--	--	NS	--	--	NS	--	--	NS
MCPP	93-65-2	ug/kg	2	2	7,080	70,800	--	--	NS	--	--	NS	--	--	NS	--	--	NS
TCL VOCs																		
1,1,1-Trichloroethane	71-55-6	ug/kg	6	6	0.494	0.758	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg	6	6	0.757	1.16	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	ug/kg	6	6	0.88	1.35	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,1,2-Trichloroethane	79-00-5	ug/kg	6	6	0.688	1.06	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1-Dichloroethane	75-34-3	ug/kg	6	6	0.84	1.29	300	G	N	300	C	N	--	--	NS	--	--	NS
1,1-Dichloroethene	75-35-4	ug/kg	6	6	0.85	1.3	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,3-Trichlorobenzene	87-61-6	ug/kg	6	6	0.631	0.968	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,4-Trichlorobenzene	120-82-1	ug/kg	6	6	0.476	0.73	100	G	N	100	C	N	--	--	NS	--	--	NS
1,2-Dibromo-3-chloropropane	96-12-8	ug/kg	6	6	2.41	3.7	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2-Dibromoethane	106-93-4	ug/kg	6	6	0.795	1.22	--	--	NS	5,000	C	N	--	--	NS	--	--	NS
1,2-Dichlorobenzene	95-50-1	ug/kg	6	6	0.561	0.862	100	G	N	100	C	N	--	--	NS	--	--	NS
1,2-Dichloroethane	107-06-2	ug/kg	6	6	0.5	0.767	870,000	G	N	--	--	NS	--	--	NS	--	--	NS
1,2-Dichloropropane	78-87-5	ug/kg	6	6	0.68	1.04	300	G	N	300	C	N	--	--	NS	--	--	NS
1,3-Dichlorobenzene	541-73-1	ug/kg	6	6	0.311	0.477	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,4-Dichlorobenzene	106-46-7	ug/kg	6	6	0.824	1.26	100	G	N	20,000	B	N	--	--	NS	--	--	NS

Table F.4-2
Non-detected Chemicals MDL Screening for SWMU 38 - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
2-Butanone	78-93-3	ug/kg	3	6	5.9	8.9	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Hexanone	591-78-6	ug/kg	6	6	2.62	4.02	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Methyl-2-pentanone	108-10-1	ug/kg	6	6	1.69	2.6	100,000	G	N	--	--	NS	--	--	NS	--	--	NS
Benzene	71-43-2	ug/kg	6	6	0.611	0.938	100	G	N	100	C	N	--	--	NS	--	--	NS
Bromochloromethane	74-97-5	ug/kg	6	6	0.883	1.35	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bromodichloromethane	75-27-4	ug/kg	6	6	0.581	0.892	450,000	G	N	--	--	NS	--	--	NS	--	--	NS
Bromoform	75-25-2	ug/kg	6	6	0.67	1.03	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bromomethane	74-83-9	ug/kg	6	6	1.74	2.67	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbon Disulfide	75-15-0	ug/kg	6	6	1.68	2.58	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbon Tetrachloride	56-23-5	ug/kg	6	6	0.541	0.829	300	G	N	300	C	N	--	--	NS	--	--	NS
Chlorobenzene	108-90-7	ug/kg	6	6	0.767	1.18	100	G	N	40,000	B	N	--	--	NS	--	--	NS
Chloroethane	75-00-3	ug/kg	6	6	1.57	2.4	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Chloroform	67-66-3	ug/kg	6	6	0.517	0.794	300	G	N	300	C	N	--	--	NS	--	--	NS
Chloromethane	74-87-3	ug/kg	6	6	0.967	1.48	--	--	NS	--	--	NS	--	--	NS	--	--	NS
cis-1,2-Dichloroethene	156-59-2	ug/kg	6	6	0.824	1.26	300	G	N	300	C	N	--	--	NS	--	--	NS
cis-1,3-Dichloropropene	10061-01-5	ug/kg	6	6	0.57	0.874	300	G	N	300	C	N	--	--	NS	--	--	NS
Cyclohexane	110-82-7	ug/kg	5	6	0.367	0.562	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dibromochloromethane	124-48-1	ug/kg	6	6	0.6	0.92	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dichlorodifluoromethane	75-71-8	ug/kg	6	6	0.775	1.19	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Ethylbenzene	100-41-4	ug/kg	5	6	0.491	0.753	100	G	N	100	C	N	--	--	NS	--	--	NS
Isopropylbenzene	98-82-8	ug/kg	6	6	0.633	0.972	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methyl Acetate	79-20-9	ug/kg	6	6	4.03	6.18	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methyl tert-Butyl Ether	1634-04-4	ug/kg	6	6	0.744	1.14	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methylcyclohexane	108-87-2	ug/kg	5	6	0.98	1.5	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Methylene Chloride	75-09-2	ug/kg	3	6	3.26	5	300	G	N	300	C	N	--	--	NS	--	--	NS
Styrene	100-42-5	ug/kg	6	6	0.513	0.787	300,000	F	N	100	C	N	--	--	NS	--	--	NS
Tetrachloroethene	127-18-4	ug/kg	6	6	0.711	1.09	300	G	N	300	C	N	--	--	NS	--	--	NS
Toluene	108-88-3	ug/kg	5	6	0.548	0.826	200,000	F	N	100	C	N	--	--	NS	--	--	NS
trans-1,2-Dichloroethene	156-60-5	ug/kg	6	6	0.815	1.25	300	G	N	300	C	N	--	--	NS	--	--	NS
trans-1,3-Dichloropropene	10061-02-6	ug/kg	6	6	0.604	0.927	300	G	N	300	C	N	--	--	NS	--	--	NS
Trichloroethene	79-01-6	ug/kg	6	6	0.785	1.21	300	G	N	300	C	N	--	--	NS	--	--	NS
Trichlorofluoromethane	75-69-4	ug/kg	6	6	0.862	1.32	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Vinyl Chloride	75-01-4	ug/kg	6	6	0.429	0.659	300	G	N	300	C	N	--	--	NS	--	--	NS
Xylenes	1330-20-7	ug/kg	5	6	0.488	0.749	100	G	N	--	--	NS	--	--	NS	--	--	NS
TCL SVOCs																		
1,1'-Biphenyl	92-52-4	ug/kg	6	6	2.95	44.3	--	--	NS	--	--	NS	--	--	NS	--	--	NS
1,2,4,5-Tetrachlorobenzene	95-94-3	ug/kg	6	6	34.4	517	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,2'-oxybis(1-Chloropropane)	108-60-1	ug/kg	6	6	1.58	23.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4,5-Trichlorophenol	95-95-4	ug/kg	6	6	4.01	60.1	4,000	F	N	9,000	B	N	--	--	NS	--	--	NS
2,4,6-Trichlorophenol	88-06-2	ug/kg	6	6	3.14	47.2	100	G	N	10,000	B	N	--	--	NS	--	--	NS
2,4-Dichlorophenol	120-83-2	ug/kg	6	6	4.22	63.4	100	G	N	100	C	N	--	--	NS	--	--	NS
2,4-Dimethylphenol	105-67-9	ug/kg	6	6	9.53	143	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
2,4-Dinitrophenol	51-28-5	ug/kg	6	6	3.84	57.6	20,000	F	N	100	C	N	--	--	NS	--	--	NS
2,4-Dinitrotoluene	121-14-2	ug/kg	3	6	3.78	56.7	--	--	NS	--	-	NS	--	--	NS	--	--	NS
2,6-Dinitrotoluene	606-20-2	ug/kg	6	6	33.2	499	--	--	NS	--	-	NS	--	--	NS	--	--	NS
2-Chloronaphthalene	91-58-7	ug/kg	6	6	2.76	41.4	--	--	NS	--	-	NS	--	--	NS	--	--	NS
2-Chlorophenol	95-57-8	ug/kg	6	6	2.41	36.2	7,000	F	N	10,000	B	N	--	--	NS	--	--	NS
2-Methylnaphthalene	91-57-6	ug/kg	6	6	3.29	49.3	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Methylphenol	95-48-7	ug/kg	6	6	5.81	87.1	100	G	N	100	C	N	--	--	NS	--	--	NS
2-Nitroaniline	88-74-4	ug/kg	6	6	5.52	82.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2-Nitrophenol	88-75-5	ug/kg	6	6	2.04	30.6	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3,3'-Dichlorobenzidine	91-94-1	ug/kg	6	6	80	1,200	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3-Nitroaniline	99-09-2	ug/kg	6	6	40	599	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4,6-Dinitro-2-methylphenol	534-52-1	ug/kg	6	6	5.41	81.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Bromophenyl-PhenylEther	101-55-3	ug/kg	6	6	4.06	60.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Chloro-3-methylphenol	59-50-7	ug/kg	3	6	6.77	93.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Chloroaniline	106-47-8	ug/kg	6	6	1.51	22.7	20,000	F	N	--	--	NS	--	--	NS	--	--	NS
4-Chlorophenyl-PhenylEther	7005-72-3	ug/kg	6	6	3.92	58.9	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Methylphenol	106-44-5	ug/kg	6	6	7.64	115	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
4-Nitroaniline	100-01-6	ug/kg	6	6	8.7	131	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Nitrophenol	100-02-7	ug/kg	6	6	3.4	50.9	100	G	N	7,000	B	N	--	--	NS	--	--	NS

Table F.4-2
Non-detected Chemicals MDL Screening for SWMU 38 - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
Acenaphthene	83-32-9	ug/kg	6	6	2.06	31	100	G	N	100	C	N	--	--	NS	--	--	NS
Acenaphthylene	208-96-8	ug/kg	6	6	1.8	27	100	G	N	100	C	N	--	--	NS	--	--	NS
Acetophenone	98-86-2	ug/kg	6	6	2.28	34.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Anthracene	120-12-7	ug/kg	6	6	5.54	83.2	100	G	N	100	C	N	--	--	NS	--	--	NS
Atrazine	1912-24-9	ug/kg	6	6	8.26	124	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Benzaldehyde	100-52-7	ug/kg	6	6	4.86	72.9	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Benzo(a)anthracene	56-55-3	ug/kg	6	6	16	239	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Benzo(a)pyrene	50-32-8	ug/kg	6	6	6.85	508	100	G	**Y**	--	--	NS	--	--	NS	--	--	NS
Benzo(b)fluoranthene	205-99-2	ug/kg	6	6	11.7	869	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Benzo(g,h,i)perylene	191-24-2	ug/kg	6	6	10.5	776	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Benzo(k)fluoranthene	207-08-9	ug/kg	6	6	16.1	1,190	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Bis(2-chloroethoxy)methane	111-91-1	ug/kg	6	6	3.77	56.5	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Bis(2-chloroethyl)Ether	111-44-4	ug/kg	6	6	2.08	31.1	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Butylbenzylphthalate	85-68-7	ug/kg	4	6	5.38	80.6	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Caprolactam	105-60-2	ug/kg	6	6	7.66	115	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Carbazole	86-74-8	ug/kg	6	6	7.32	110	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Chrysene	218-01-9	ug/kg	6	6	12.2	184	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Di-n-octylphthalate	117-84-0	ug/kg	6	6	3.72	55.8	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dibenz(a,h)anthracene	53-70-3	ug/kg	6	6	7.08	525	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Dibenzofuran	132-64-9	ug/kg	6	6	3.79	56.9	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Diethylphthalate	84-66-2	ug/kg	2	6	26.6	34.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Dimethylphthalate	131-11-3	ug/kg	6	6	3.97	59.6	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Fluoranthene	206-44-0	ug/kg	2	6	2.82	2.82	100	G	N	100	C	N	--	--	NS	--	--	NS
Fluorene	86-73-7	ug/kg	6	6	2.02	30.2	100	G	N	100	C	N	--	--	NS	--	--	NS
Hexachlorobenzene	118-74-1	ug/kg	6	6	3.01	45.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachlorobutadiene	87-68-3	ug/kg	6	6	4.64	69.7	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachlorocyclopentadiene	77-47-4	ug/kg	6	6	2.38	35.6	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Hexachloroethane	67-72-1	ug/kg	6	6	2.8	42	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	6	6	4.7	349	100	G	**Y**	100	C	**Y**	--	--	NS	--	--	NS
Isophorone	78-59-1	ug/kg	6	6	2.08	31.1	--	--	NS	--	--	NS	--	--	NS	--	--	NS
N-Nitrosodi-n-propylamine	621-64-7	ug/kg	6	6	3.95	59.2	--	--	NS	--	--	NS	--	--	NS	--	--	NS
N-Nitrosodiphenylamine	86-30-6	ug/kg	2	6	5.7	5.7	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Naphthalene	91-20-3	ug/kg	6	6	3.3	49.5	100	G	N	100	C	N	--	--	NS	--	--	NS
Nitrobenzene	98-95-3	ug/kg	6	6	3.84	57.6	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Pentachlorophenol	87-86-5	ug/kg	6	6	5.27	79	5,000	A	N	31,000	A	N	2,100	A	N	2,800	A	N
Phenanthrene	85-01-8	ug/kg	3	6	2.76	3.22	100	G	N	100	C	N	--	--	NS	--	--	NS
Phenol	108-95-2	ug/kg	6	6	4.75	71.3	100	G	N	30,000	B	N	--	--	NS	--	--	NS
Pyrene	129-00-0	ug/kg	2	6	1.78	1.78	100	G	N	100	C	N	--	--	NS	--	--	NS
PAHs																		
Acenaphthene	83-32-9	ug/kg	6	6	11.3	16.9	100	G	N	100	C	N	--	--	NS	--	--	NS
Acenaphthylene	208-96-8	ug/kg	6	6	13.9	20.9	100	G	N	100	C	N	--	--	NS	--	--	NS
Anthracene	120-12-7	ug/kg	4	6	0.84	0.98	100	G	N	100	C	N	--	--	NS	--	--	NS
Benzo(a)anthracene	56-55-3	ug/kg	5	6	0.96	1.12	100	G	N	100	C	N	--	--	NS	--	--	NS
Benzo(a)pyrene	50-32-8	ug/kg	6	6	1.2	1.8	100	G	N	--	--	NS	--	--	NS	--	--	NS
Benzo(b)fluoranthene	205-99-2	ug/kg	4	6	1.56	1.82	100	G	N	100	C	N	--	--	NS	--	--	NS
Benzo(g,h,i)perylene	191-24-2	ug/kg	6	6	15	22.5	100	G	N	100	C	N	--	--	NS	--	--	NS
Benzo(k)fluoranthene	207-08-9	ug/kg	5	6	1.2	1.4	100	G	N	100	C	N	--	--	NS	--	--	NS
Chrysene	218-01-9	ug/kg	4	6	1.44	1.68	100	G	N	100	C	N	--	--	NS	--	--	NS
Dibenz(a,h)anthracene	53-70-3	ug/kg	6	6	1.68	2.52	100	G	N	100	C	N	--	--	NS	--	--	NS
Fluoranthene	206-44-0	ug/kg	2	6	2.04	2.04	100	G	N	100	C	N	--	--	NS	--	--	NS
Fluorene	86-73-7	ug/kg	4	6	1.56	1.82	100	G	N	100	C	N	--	--	NS	--	--	NS
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg	6	6	0.84	1.26	100	G	N	100	C	N	--	--	NS	--	--	NS
Naphthalene	91-20-3	ug/kg	6	6	9.48	14.2	100	G	N	100	C	N	--	--	NS	--	--	NS
Phenanthrene	85-01-8	ug/kg	3	6	0.72	0.78	100	G	N	100	C	N	--	--	NS	--	--	NS
Pyrene	129-00-0	ug/kg	2	6	1.08	1.08	100	G	N	100	C	N	--	--	NS	--	--	NS
Explosives																		
1,3,5-Trinitrobenzene	99-35-4	mg/kg	14	14	0.074	0.14	8.6	I	N	18.1	I	N	--	--	NS	--	--	NS
1,3-Dinitrobenzene	99-65-0	mg/kg	14	14	0.076	0.159	--	--	NS	--	--	NS	--	--	NS	--	--	NS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	14	14	0.15	0.167	2.4	H	N	1.2	H	N	--	--	NS	--	--	NS
2,4-Dinitrotoluene	121-14-2	mg/kg	13	14	0.1	0.142	5.3	I	N	19.8	I	N	--	--	NS	--	--	NS
2,6-Dinitrotoluene	606-20-2	mg/kg	14	14	0.2	0.25	4.5	I	N	6.9	I	N	--	--	NS	--	--	NS

Table F.4-2
Non-detected Chemicals MDL Screening for SWMU 38 - Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Parameter Name	CAS #	Units	Number of Non-Detects	Number of Samples	Minimum MDL	Maximum MDL	Plant SL	Source	Maximum MDL Exceeds SL	Inverte-brate SL	Source	Maximum MDL Exceeds SL	Avian ECO SSL	Source	Maximum MDL Exceeds SL	Mammalian ECO SSL	Source	Maximum MDL Exceeds SL
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	14	14	0.151	0.22	80	J	N	--	--	NS	--	--	NS	--	--	NS
2-Nitrotoluene	88-72-2	mg/kg	14	14	0.17	0.266	--	--	NS	--	--	NS	--	--	NS	--	--	NS
3-Nitrotoluene	99-08-1	mg/kg	14	14	0.184	0.21	--	--	NS	--	--	NS	--	--	NS	--	--	NS
4-Amino-2,6-dinitrotoluene	1946-51-0	mg/kg	14	14	0.162	0.3	80	J	N	--	--	NS	--	--	NS	--	--	NS
4-Nitrotoluene	99-99-0	mg/kg	14	14	0.2	0.251	--	--	NS	--	--	NS	--	--	NS	--	--	NS
HMX	2691-41-0	mg/kg	14	14	0.066	0.229	--	--	NS	6.3	I	N	--	--	NS	--	--	NS
Nitrobenzene	98-95-3	mg/kg	14	14	0.03	0.102	--	--	NS	--	--	NS	--	--	NS	--	--	NS
RDX	121-82-4	mg/kg	14	14	0.048	0.131	100	K	N	98.6	I	N	--	--	NS	--	--	NS
Tetryl	479-45-8	mg/kg	14	14	0.065	0.169	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Nitroglycerin/PETN																		
Nitroglycerin	55-63-0	mg/kg	14	14	0.188	0.39	--	--	NS	--	--	NS	--	--	NS	--	--	NS
PETN	78-11-5	mg/kg	14	14	0.23	0.332	--	--	NS	--	--	NS	--	--	NS	--	--	NS
Cyanide																		
Cyanide	57-12-5	mg/kg	2	6	0.0356	0.0356	--	--	NS	0.9	D	N	--	--	NS	--	--	NS

Notes:

CAS = Chemical Abstracts Service
mg/kg = Milligram Per Kilogram
ug/kg = Microgram Per Kilogram
TAL = Target Analyte List
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
PETN = Pentaerythritol Tetranitrate
MDL = Method Detection Limit
SL = Screening Level
Eco SSL = Ecological Soil Screening Level

Sources:
A = USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
B = ORNL - Earthworms - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
C = BTAG - Fauna - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
D = CCME, 2006
E = ORNL - Microbial Processes - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
F = ORNL - Plants - Toxilogical Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision Efroymson et al.)
G = BTAG - Flora - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
H = Best, E.P.H., H.E. Tatem, K.N. Geter, M.L. Wells and B.K. Lane. 2004. Toxicity and Metabolites of 2,4,6 Trinitrotoluene (TNT) in Plants and Worms from Exposure to Aged Soil.
I = Kuperman. R. 2003. Development of Ecological Toxicity and Biomagnification Data for Explosives Contaminants in Soil.
J = Pennington, Judith C. 1988. Plant Uptake of 2,4,6-Trinitrotoluene, 4-Amino-2,6-Dinitrotoluene, and 2-Amino-4,6-Dinitrotoluene Using 14C-Labeled and Unlabeled Compounds.
K = Simini, M., R.S. Wentsel, R.T. Checkai, C.T. Phillips, N.A. Chester, M.A. Major, and J.C. Amos. 1995. Evaluation of Soil Toxicity at Joliet Army Ammunition Plant.

Y = MDL exceeds screening level
N = MDL does not exceed screening level
NS = No screening level available

Table F.4-3a
Summary of Total PCBs at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date Sample Depth (ft bgs)	CAS #	38SB1A 10/3/2003 0-1		38SB4A DUP AVG 11/16/2007 0-1		38SB5A 11/16/2007 0-1		38SB6A 11/16/2007 0-1		38SB7A DUP AVG 11/15/2007 0-1	
		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
PCBs (ug/kg)											
Aroclor 1254	11097-69-1	570		<38	U	17	J	120		385	,J,f
Total PCBs	--	570		ND		17		120		385	

Notes:
CAS = Chemical Abstract Service
ug/kg = Microgram per kilogram
ND = Not Detected
PBC = PolyChlorinated Biphenyl
See Table 4-1 for flag definitions

Table F.4-3a
Summary of Total PCBs at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date Sample Depth (ft bgs)	CAS #	38SB8A 11/15/2007 0-1		38SB9A 11/15/2007 0-1		38SB10A 11/15/2007 0-1		QSB1A DUP AVG 10/2/2003 0-1		QSB4A 11/16/2007 0-1	
		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
PCBs (ug/kg)											
Aroclor 1254	11097-69-1	26	J	56		130	,L,s	52		400	
Total PCBs	--	26		56		130		52		400	

Notes:
CAS = Chemical Abstract Service
ug/kg = Microgram per kilogram
ND = Not Detected
PBC = PolyChlorinated Biphenyl
See Table 4-1 for flag definitions

Table F.4-3b
Summary of Low and High Molecular Weight PAHs at SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID Sample Date Sample Depth (ft bgs)	CAS #	38SB1A 10/3/2003 0-1		38SB2A 10/3/2003 0-1		38SB3A 10/3/2003 0-1		QSB1A DUP AVG 10/2/2003 0-1		QSB2A 10/2/2003 0-1		QSB3A 10/2/2003 0-1	
		Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r	Result	LQ, VQ, r
TCL PAHs (ug/kg)													
Phenanthrene	85-01-8	40	J	<200	U	110	J	<230	U	<200	U	3	J
Low Molecular Weight PAHs	--	40		ND		110		ND		ND		3	
Fluoranthene	206-44-0	80	J	<200	U,UJ,l	170	J	2.8225	J	<200	U	8	J
Pyrene	129-00-0	50	J	<200	U	90	J	2.5	J	<200	U	4	J
High Molecular Weight PAHs	--	130		ND		260		5.3		ND		12	

Notes:
CAS = Chemical Abstract Service
ug/kg = Microgram per kilogram
ND = Not Detected
TCL = Target Compound List
PAH = Polynuclear Aromatic Hydrocarbon
See Table 4-1 for flag definitions

Table F.4-4
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
Exposure to Contaminants in SWMU 38 Surface Soil
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean of Detects	UCL	Maximum Concentration	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Surface Soil	Aluminum	mg/kg	16,217	19,542	26,400	19,542	mg/kg	95% Student's t UCL	ProUCL 4.0
	Arsenic	mg/kg	2.029	2.961	5.1	2.961	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Cadmium	mg/kg	1.453	1.613	1.9	1.613	mg/kg	95% Student's t UCL	ProUCL 4.0
	Calcium	mg/kg	8,675	16,482	27,600	16,482	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Chromium	mg/kg	36.12	58.76	82	58.76	mg/kg	95% H-UCL	ProUCL 4.0
	Copper	mg/kg	27.51	46.01	85	46.01	mg/kg	95% Approximate Gamma UCL	ProUCL 4.0
	Iron	mg/kg	21,873	24,942	30,700	24,942	mg/kg	95% Student's t UCL	ProUCL 4.0
	Lead	mg/kg	26.61	34.47	52	34.47	mg/kg	95% Student's t UCL	ProUCL 4.0
	Manganese	mg/kg	450	490.2	600	490.2	mg/kg	95% Student's t UCL	ProUCL 4.0
	Mercury	mg/kg	0.0745	0.163	0.27	0.163	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.0
	Selenium	mg/kg	0.346	0.622	0.67	0.622	mg/kg	95% Chebyshev (Mean,Sd) UCL	ProUCL 4.0
	Vanadium	mg/kg	29.27	34.56	43	34.56	mg/kg	95% Student's t UCL	ProUCL 4.0
	Zinc	mg/kg	76.5	86.85	120	86.85	mg/kg	95% Student's t UCL	ProUCL 4.0
	Aroclor 1254	mg/kg	0.195	0.454	0.57	0.454	mg/kg	95% KM (Chebyshev) UCL	ProUCL 4.0
	2,4-Dinitrotoluene	mg/kg	--	--	0.255	0.255	mg/kg	Maximum Detected Concentration	--

Notes:
UCL = Upper Confidence Limit
mg/kg = Milligram Per Kilogram
* Due to the low frequency of detection, a mean and UCL were not calculated.

Table F.4-5
Plant Screening Level Sources - Soil
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Screening Level (mg/kg)	Source
TAL Metals			
Aluminum	7429-90-5	50	ORNL-Plants
Antimony	7440-36-0	5	ORNL-Plants
Arsenic	7440-38-2	18	ECO SSL
Barium	7440-39-3	500	ORNL-Plants
Beryllium	7440-41-7	10	ORNL-Plants
Cadmium	7440-43-9	32	ECO SSL
Calcium	7440-70-2	4	ORNL-Plants
Chromium	7440-47-3	1	ORNL-Plants
Cobalt	7440-48-4	13	ECO SSL
Copper	7440-50-8	70	ECO SSL
Iron	7439-89-6	NV	--
Lead	7439-92-1	120	ECO SSL
Magnesium	7439-95-4	NV	--
Manganese	7439-96-5	220	ECO SSL
Mercury	7439-97-6	0.3	ORNL-Plants
Nickel	7440-02-0	38	ECO SSL
Potassium	7440-09-7	NV	--
Selenium	7782-49-2	0.52	ECO SSL
Silver	7440-22-4	560	ECO SSL
Sodium	7440-23-5	NV	--
Thallium	7440-28-0	1	ORNL-Plants
Vanadium	7440-62-2	2	ORNL-Plants
Zinc	7440-66-6	160	ECO SSL
Cyanide			
Cyanide	57-12-5	NV	--
Pesticides/PCBs			
Endosulfan I	959-98-8	NV	--
Endrin	72-20-8	0.1	BTAG - Flora
Aroclor 1254	11097-69-1	NV	--
TCL VOCs			
2-Butanone (MEK)	78-93-3	NV	--
Acetone	67-64-1	NV	--
Cyclohexane	110-82-7	NV	--
Ethylbenzene	100-41-4	0.1	BTAG - Flora
Methylcyclohexane	108-87-2	NV	--
Methylene chloride	75-09-2	0.3	BTAG - Flora
Toluene	108-88-3	200	ORNL-Plants
Xylenes	1330-20-7	0.1	BTAG - Flora
TCL SVOCs			
4-Chloro-3-Methylphenol	59-50-7	NV	--
Bis(2-ethylhexyl) Phthalate	117-81-7	NV	--
Butyl Benzyl Phthalate	85-68-7	NV	--
Di-n-butylphthalate	84-74-2	200	ORNL-Plants
Diethylphthalate	84-66-2	NV	--
Fluoranthene	206-44-0	0.1	BTAG - Flora
N-Nitrosodiphenylamine	86-30-6	NV	--
Phenanthrene	85-01-8	0.1	BTAG - Flora
Pyrene	129-00-0	0.1	BTAG - Flora
Low Molecular Weight PAHs	--	NV	--
High Molecular Weight PAHs	--	NV	--
Explosives			
2,4-Dinitrotoluene	121-14-2	5.3	Kuperman 2003
Dinitrotoluene Mix	--	NV	--

Table F.4-5
Plant Screening Level Sources - Soil
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:
CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
NV = No Value Available
TAL = Target Analyte List
TCL = Target Compound List
USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
ORNL - Plants - (Toxilogical Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision Efroymson et al.)
BTAG - Flora - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

Table F.4-6
Plant Screening - Soil
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Constituent of Potential Ecological Concern	CAS #	Maximum Soil Concentration (mg/kg)	Screening Level (mg/kg)	Hazard Quotient (unitless)	EPC (mg/kg)	EPC Hazard Quotient (unitless)
Inorganics						
Aluminum	7429-90-5	26,400	50	**5.3E+02**	19,542	**3.9E+02**
Antimony	7440-36-0	0.39	5	7.8E-02	NC	NC
Arsenic	7440-38-2	5.1	18	2.8E-01	NC	NC
Barium	7440-39-3	160	500	3.2E-01	NC	NC
Beryllium	7440-41-7	0.91	10	9.1E-02	NC	NC
Cadmium	7440-43-9	1.9	32	5.9E-02	NC	NC
Calcium	7440-70-2	27,600	4	**6.9E+03**	16,482	**4.1E+03**
Chromium	7440-47-3	82	1	**8.2E+01**	58.76	**5.9E+01**
Cobalt	7440-48-4	12	13	9.2E-01	NC	NC
Copper	7440-50-8	85	70	**1.2E+00**	46.01	6.6E-01
Iron	7439-89-6	30,700	NV	NC	NC	NC
Lead	7439-92-1	52	120	4.3E-01	NC	NC
Magnesium	7439-95-4	5,590	NV	NC	NC	NC
Manganese	7439-96-5	600	220	**2.7E+00**	490	**2.2E+00**
Mercury	7439-97-6	0.27	0.3	9.0E-01	NC	NC
Nickel	7440-02-0	35	38	9.2E-01	NC	NC
Potassium	7440-09-7	2,410	NV	NC	NC	NC
Selenium	7782-49-2	0.67	0.52	**1.3E+00**	0.622	**1.2E+00**
Silver	7440-22-4	0.14	560	2.5E-04	NC	NC
Sodium	7440-23-5	68	NV	NC	NC	NC
Thallium	7440-28-0	0.24	1	2.4E-01	NC	NC
Vanadium	7440-62-2	43	2	**2.2E+01**	34.56	**1.7E+01**
Zinc	7440-66-6	120	160	7.5E-01	NC	NC
Pesticides/PCBs						
Endosulfan I	959-98-8	0.0026	NV	NC	NC	NC
Endrin	72-20-8	0.00345	0.1	3.5E-02	NC	NC
Aroclor 1254	11097-69-1	0.57	NV	NC	NC	NC
TCL VOCs						
2-Butanone (MEK)	78-93-3	0.026	NV	NC	NC	NC
Acetone	67-64-1	0.2	NV	NC	NC	NC
Cyclohexane	110-82-7	0.00055675	NV	NC	NC	NC
Ethylbenzene	100-41-4	0.00051775	0.1	5.2E-03	NC	NC
Methylcyclohexane	108-87-2	0.002385	NV	NC	NC	NC
Methylene chloride	75-09-2	0.0068	0.3	2.3E-02	NC	NC
Toluene	108-88-3	0.003	200	1.5E-05	NC	NC
Xylenes	1330-20-7	0.002192	0.1	2.2E-02	NC	NC
TCL SVOCs						
4-Chloro-3-Methylphenol	59-50-7	0.025	NV	NC	NC	NC
Bis(2-ethylhexyl) Phthalate	117-81-7	1.3	NV	NC	NC	NC
Butyl Benzyl Phthalate	85-68-7	0.052	NV	NC	NC	NC
Di-n-butylphthalate	84-74-2	14	200	7.0E-02	NC	NC
Diethylphthalate	84-66-2	0.0185	NV	NC	NC	NC
N-Nitrosodiphenylamine	86-30-6	0.16	NV	NC	NC	NC
Low Molecular Weight PAHs	--	0.11	NV	NC	NC	NC
High Molecular Weight PAHs	--	0.26	NV	NC	NC	NC
Explosives						
2,4-Dinitrotoluene	121-14-2	0.255	5.3	4.8E-02	NC	NC
Dinitrotoluene Mix	--	0.255	NV	NC	NC	NC

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
NV = No Value Available
NC = Not Calculated
Hazard Quotient = Soil Concentration/Screening Level
EPC = Exposure Point Concentration
See Table F.4-3a for Total PCBs
See Table F.4-3b for Total Low and High Molecular Weight PAHs

Table F.4-7
Invertebrate and Microbial Screening Level Sources - Soil
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS #	Screening Level (mg/kg)	Source
TAL Metals			
Aluminum	7429-90-5	NV	--
Antimony	7440-36-0	78	ECO SSL
Arsenic	7440-38-2	60	ORNL-Earthworm
Barium	7440-39-3	330	ECO SSL
Beryllium	7440-41-7	40	ECO SSL
Cadmium	7440-43-9	140	ECO SSL
Calcium	7440-70-2	NV	--
Chromium	7440-47-3	0.4	ORNL-Earthworm
Cobalt	7440-48-4	200	BTAG - Fauna
Copper	7440-50-8	80	ECO SSL
Iron	7439-89-6	200	ORNL - Microbial
Lead	7439-92-1	1,700	ECO SSL
Magnesium	7439-95-4	NV	--
Manganese	7439-96-5	450	ECO SSL
Mercury	7439-97-6	0.1	ORNL-Earthworm
Nickel	7440-02-0	280	ECO SSL
Potassium	7440-09-7	NV	--
Selenium	7782-49-2	4.1	ECO SSL
Silver	7440-22-4	50	ORNL - Microbial
Sodium	7440-23-5	NV	--
Thallium	7440-28-0	NV	--
Vanadium	7440-62-2	20	ORNL - Microbial
Zinc	7440-66-6	120	Eco SSL
Cyanide			
Cyanide	57-12-5	0.9	CCME-2006
Pesticides/PCBs			
Endosulfan I	959-98-8	NV	--
Endrin	72-20-8	0.1	BTAG - Fauna
Aroclor 1254	11097-69-1	NV	--
TCL VOCs			
2-Butanone (MEK)	78-93-3	NV	--
Acetone	67-64-1	NV	--
Cyclohexane	110-82-7	NV	--
Ethylbenzene	100-41-4	0.1	BTAG - Fauna
Methylcyclohexane	108-87-2	NV	--
Methylene chloride	75-09-2	0.3	BTAG - Fauna
Toluene	108-88-3	0.1	BTAG - Fauna
Xylenes	1330-20-7	NV	--
TCL SVOCs			
4-Chloro-3-Methylphenol	59-50-7	NV	--
Bis(2-ethylhexyl) Phthalate	117-81-7	NV	--
Butyl Benzyl Phthalate	85-68-7	NV	--
Di-n-butylphthalate	84-74-2	NV	--
Diethylphthalate	84-66-2	NV	--
Fluoranthene	206-44-0	0.1	BTAG - Fauna
N-Nitrosodiphenylamine	86-30-6	NV	--
Phenanthrene	85-01-8	0.1	BTAG - Fauna
Pyrene	129-00-0	0.1	BTAG - Fauna
Low Molecular Weight PAHs	--	29	ECO SSL
High Molecular Weight PAHs	--	18	ECO SSL
Explosives			
2,4-Dinitrotoluene	121-14-2	19.8	Kuperman 2003
Dinitrotoluene Mix	--	NV	--

Table F.4-7
Invertebrate and Microbial Screening Level Sources - Soil
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Notes:
CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
NV = No Value Available
TAL = Target Analyte List
TCL = Target Compound List
USEPA Eco SSL - Soil Invertebrates, Plants, Avian, Mammalian (http://www.epa.gov/ecotox/ecossl)
ORNL - Earthworms - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
ORNL - Microbial Processes - (Toxilogical Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision, Efroymson et al.)
BTAG - Fauna - (Region III Biological Technical Assistance Group - Draft Screening Levels - 1995)

PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon

Table F.4-8
Invertebrate and Microbial Screening - Soil
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Constituent of Potential Ecological Concern	CAS #	Maximum Soil Concentration (mg/kg)	Screening Level (mg/kg)	Hazard Quotient (unitless)	EPC (mg/kg)	EPC Hazard Quotient (unitless)
Inorganics						
Aluminum	7429-90-5	26,400	NV	NC	NC	NC
Antimony	7440-36-0	0.39	78	5.0E-03	NC	NC
Arsenic	7440-38-2	5.1	60	8.5E-02	NC	NC
Barium	7440-39-3	160	330	4.8E-01	NC	NC
Beryllium	7440-41-7	0.91	40	2.3E-02	NC	NC
Cadmium	7440-43-9	1.9	140	1.4E-02	NC	NC
Calcium	7440-70-2	27,600	NV	NC	NC	NC
Chromium	7440-47-3	82	0.4	**2.1E+02**	58.76	**1.5E+02**
Cobalt	7440-48-4	12	200	6.0E-02	NC	NC
Copper	7440-50-8	85	80	**1.1E+00**	46.01	5.8E-01
Iron	7439-89-6	30,700	200	**1.5E+02**	24,942	**1.2E+02**
Lead	7439-92-1	52	1,700	3.1E-02	NC	NC
Magnesium	7439-95-4	5,590	NV	NC	NC	NC
Manganese	7439-96-5	600	450	**1.3E+00**	490	**1.1E+00**
Mercury	7439-97-6	0.27	0.1	**2.7E+00**	0.163	**1.6E+00**
Nickel	7440-02-0	35	280	1.3E-01	NC	NC
Potassium	7440-09-7	2,410	NV	NC	NC	NC
Selenium	7782-49-2	0.67	4	1.6E-01	NC	NC
Silver	7440-22-4	0.14	50	2.8E-03	NC	NC
Sodium	7440-23-5	68	NV	NC	NC	NC
Thallium	7440-28-0	0.24	NV	NC	NC	NC
Vanadium	7440-62-2	43	20	**2.2E+00**	34.56	**1.7E+00**
Zinc	7440-66-6	120	120	1.0E+00	NC	NC
Pesticides/PCBs						
Endosulfan I	959-98-8	0.0026	NV	NC	NC	NC
Endrin	72-20-8	0.00345	0.1	3.5E-02	NC	NC
Aroclor 1254	11097-69-1	0.57	NV	NC	NC	NC
TCL VOCs						
2-Butanone (MEK)	78-93-3	0.026	NV	NC	NC	NC
Acetone	67-64-1	0.2	NV	NC	NC	NC
Cyclohexane	110-82-7	0.00055675	NV	NC	NC	NC
Ethylbenzene	100-41-4	0.00051775	0.1	5.2E-03	NC	NC
Methylcyclohexane	108-87-2	0.002385	NV	NC	NC	NC
Methylene chloride	75-09-2	0.0068	0.3	2.3E-02	NC	NC
Toluene	108-88-3	0.003	0.1	3.0E-02	NC	NC
Xylenes	1330-20-7	0.002192	NV	NC	NC	NC
TCL SVOCs						
4-Chloro-3-Methylphenol	59-50-7	0.025	NV	NC	NC	NC
Bis(2-ethylhexyl) Phthalate	117-81-7	1.3	NV	NC	NC	NC
Butyl Benzyl Phthalate	85-68-7	0.052	NV	NC	NC	NC
Di-n-butylphthalate	84-74-2	14	NV	NC	NC	NC
Diethylphthalate	84-66-2	0.0185	NV	NC	NC	NC
N-Nitrosodiphenylamine	86-30-6	0.16	NV	NC	NC	NC
Low Molecular Weight PAHs	--	0.11	29	3.8E-03	NC	NC
High Molecular Weight PAHs	--	0.26	18	1.4E-02	NC	NC
Explosives						
2,4-Dinitrotoluene	121-14-2	0.255	19.8	1.3E-02	NC	NC
Dinitrotoluene Mix	--	0.255	NV	NC	NC	NC

Notes:

CAS = Chemical Abstract Service
mg/kg = Milligram per Kilogram
TCL = Target Compound List
PCB = Polychlorinated Biphenyl
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
PAH = Polynuclear Aromatic Hydrocarbon
NV = No Value Available
NC = Not Calculated
Hazard Quotient = Soil Concentration/Screening Level
EPC = Exposure Point Concentration
See Table F.4-3b for Total Low and High Molecular Weight PAHs

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Table F.4-9
Wildlife Profiles
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

							Preliminary Assessment					Refined Assessment					
Representative Species			Composition of Diet [1] (%)				Minimum Body Weight [1]	Maximum Body Weight [1]	Maximum Food Ingestion Rate[2]	Maximum Substrate Ingestion Rate [3]		Average Body Weight [1]	Average Food Ingestion Rate [2]	Average Substrate Ingestion Rate [3]	Home Range (ha)	Proportion of Year Species Active	AUFs
Food-web Classification	Common Name	Scientific Name	Plants (incl. fungi)	Inverte-brates	Small mammals	Fish	kg	kg	kg dw/day	% of dry intake	kg dry wt./day	kg	kg dw/day	kg dry wt./day			Study Area (0.37) hectares
Birds																	
soil-probing invertivore	American robin	*Turdus migratorius*	62%	38%			0.0635	0.103	0.02	5%	0.001	0.077	0.016	0.0008	0.48	1	0.77
large carnivore	Red-tailed hawk	*Buteo jamaicensis*			100%		0.957	1.235	0.063	0%	0	1.134	0.059	0	250	1	0.00148
Mammals																	
small herbivore	Meadow vole	*Microtus pennsylvanicus*	100%				0.017	0.0524	0.01	2.4%	0.00024	0.037	0.008	0.00019	0.037	1	1
medium carnivore	Red fox	*Vulpes vulpes*	17%	4%	79%		2.95	7.04	0.342	2.8%	0.0096	4.53	0.238	0.0067	96	1	0.0039
small invertivore	Short-tailed shrew	*Blarina brevicauda*	14%	86%			0.0125	0.0225	0.003	13%	0.00039	0.015	0.002	0.00026	0.39	1	0.95

Notes:
kg = Kilogram
kg dw/day = Kilogram Dry-weight per Day
L/day = Liter per Day

[1]Wildlife Exposure Factors Handbook. U.S. Environmental Protection Agency (EPA). 1993. Office of Research and Development. 2 Volumes. EPA/600/R93/187a&b. December.
[2] Estimated food intake rate (kg [dw]/day) calculated as follows:
FI ((kg/day) = 0.0687 $Wt.^{0.882}$ for mammals (red fox and short-tailed shrew)
FI ((g/day) = 0.577 $Wt.^{0.727}$ for herbivores (meadow vole)
FI ((g/day) = 0.301 $Wt.^{0.751}$ for non-passerine birds (red-tailed hawk)
FI ((g/day) = 0.398 $Wt.^{0.850}$ for passerine birds (american robin)
[3]Estimating Exposure to Terrestrial Wildlife to Contaminants. Sample and Sutter. 1994. ES/ER/TM-125.
The soil ingestion rate for the american robin set equal to 38% of the american woodcock value (0.34*10.4%=4%), based on a robin diet of 38% invertbrates.

Table F.4-10
Wildlife TRVs
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

	CAS #	AVIAN TEST SPECIES				MAMMALIAN TEST SPECIES					AVIAN RECEPTORS				MAMMALIAN RECEPTORS					
											American Robin		Red-tailed Hawk		Meadow Vole		Red Fox		Short-tailed Shrew	
		Chronic LOAEL	Chronic NOAEL	Test Animal	Source	Chronic LOAEL	Chronic NOAEL	Test Animal	Test Animal Body Weight (kg)	Source	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL	Chronic LOAEL	Chronic NOAEL
		(mg/kg-bw/d)				(mg/kg-bw/d)					(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)		(mg/kg-bw/d)	
Arsenic	7440-38-2	1.28E+01	5.14E+00	mallard duck	ORNL 1996	1.26	0.126	mouse	0.03	ORNL 1996	1.28E+01	5.14E+00	1.28E+01	5.14E+00	1.20E+00	1.20E-01	3.59E-01	3.59E-02	1.50E+00	1.50E-01
Cadmium	7440-43-9	2.00E+01	1.45E+00	mallard duck	ORNL 1996	10	1	rat	0.3	ORNL 1996	2.00E+01	1.45E+00	2.00E+01	1.45E+00	1.69E+01	1.69E+00	5.07E+00	5.07E-01	2.11E+01	2.11E+00
Chromium	7440-47-3	5.00E+00	1.00E+00	black duck	ORNL 1996	32.8	3.28	rat	0.35	ORNL 1996	5.00E+00	1.00E+00	5.00E+00	1.00E+00	5.75E+01	5.75E+00	1.73E+01	1.73E+00	7.21E+01	7.21E+00
Copper	7440-50-8	6.17E+01	4.70E+01	1 day old chicks	ORNL 1996	15.4	11.7	mink	1	ORNL 1996	6.17E+01	4.70E+01	6.17E+01	4.70E+01	3.51E+01	2.67E+01	1.06E+01	8.02E+00	4.40E+01	3.34E+01
Lead	7439-92-1	1.13E+01	1.13E+00	Japanese quail	ORNL 1996	80	8	rat	0.35	ORNL 1996	1.13E+01	1.13E+00	1.13E+01	1.13E+00	1.40E+02	1.40E+01	4.22E+01	4.22E+00	1.76E+02	1.76E+01
Mercury	7439-97-6	9.00E-01	4.50E-01	Japanese Quail	ORNL 1996	132	13.2	mink	1	ORNL 1996	9.00E-01	4.50E-01	9.00E-01	4.50E-01	3.01E+02	3.01E+01	9.05E+01	9.05E+00	3.77E+02	3.77E+01
Nickel	7440-02-0	1.07E+02	7.74E+01	mallard duckling	ORNL 1996	80	40	rat	0.35	ORNL 1996	1.07E+02	7.74E+01	1.07E+02	7.74E+01	1.40E+02	7.01E+01	4.22E+01	2.11E+01	1.76E+02	8.79E+01
Selenium	7782-49-2	8.00E-01	4.00E-01	mallard duck	ORNL 1996	0.33	0.2	rat	0.35	ORNL 1996	8.00E-01	4.00E-01	8.00E-01	4.00E-01	5.79E-01	3.51E-01	1.74E-01	1.05E-01	7.25E-01	4.40E-01
Silver	7440-22-4	1.24E+02	1.66E+01	turkey	Matuk et al. 1981	222	22.2	rat	0.35	Matuk et al. 1981	1.24E+02	1.66E+01	1.24E+02	1.66E+01	3.89E+02	3.89E+01	1.17E+02	1.17E+01	4.88E+02	4.88E+01
Zinc	7440-66-6	1.31E+02	1.45E+01	white leghorn hen	ORNL 1996	320	160	rat	0.35	ORNL 1996	1.31E+02	1.45E+01	1.31E+02	1.45E+01	5.61E+02	2.81E+02	1.69E+02	8.44E+01	7.03E+02	3.52E+02
PAHs																				
Fluoranthene	206-44-0	--	--	--	USACE 1998	100	20	rodents	0.165	USACE 1998	NV	NV	NV	NV	1.45E+02	2.91E+01	4.37E+01	8.74E+00	1.82E+02	3.64E+01
Phenanthrene	85-01-8	5.65E+00	1.13E+00	red-winged blackbird	USACE 1998	35	7	mouse	0.03	USACE 1998	5.65E+00	1.13E+00	5.65E+00	1.13E+00	3.32E+01	6.64E+00	9.98E+00	2.00E+00	4.16E+01	8.32E+00
Pyrene	129-00-0	--	--	--	USACE 1998	40	8	mouse	0.03	USACE 1998	NV	NV	NV	NV	3.80E+01	7.59E+00	1.14E+01	2.28E+00	4.76E+01	9.51E+00
Pesticides																				
Endosulfan I	959-98-8	1.00E+02	1.00E+01	gray partridge	ORNL 1996	1.5	0.15	rat	0.35	ORNL 1996	1.00E+02	1.00E+01	1.00E+02	1.00E+01	2.63E+00	2.63E-01	7.91E-01	7.91E-02	3.30E+00	3.30E-01
Endrin	72-20-8	1.70E-01	2.80E-02	mallard duck	ORNL 1996	0.92	0.092	mouse	0.03	ORNL 1996	1.70E-01	2.80E-02	1.70E-01	2.80E-02	8.73E-01	8.73E-02	2.62E-01	2.62E-02	1.09E+00	1.09E-01
PCBs																				
Aroclor 1254	11097-69-1	1.80E+00	1.80E-01	ring-necked pheasant	ORNL 1996	3.43	1.37	mink	1	Aroclor 1016 Value	1.80E+00	1.80E-01	1.80E+00	1.80E-01	7.82E+00	3.12E+00	2.35E+00	9.39E-01	9.80E+00	3.91E+00
Explosives																				
2,4-Dinitrotoluene[1]	121-14-2	1.25	0.1	Northern Bobwhite	Johnson et al. 2005a	--	--	--	--	--	1.25E+00	1.00E-01	1.25E+00	1.00E-01	NV	NV	NV	NV	NV	NV

Notes:
CAS = Chemical Abstract Service
TRV = Toxic Reference Value
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw/d = Body Weight Per Day
kg = kilogram
PAH = Polynuclear Aromatic Hydrocarbon
PCB = Polychlorinated Biphenyl
USACE = U.S. Army Corps of Engineers
ORNL = Oak Ridge National Laboratory
NOAEL and LOAEL values were derived from acute values by applying an uncertainty factor of 150.
LD_{50} = Lethal Dose for 50% of test organisms

Sources:

Johnson et al 2005a. Johnson, M.S., M.W. Michie, M.A. Bazar, and R.M. Gogal Jr. 2005a. Influence of Oral 2,4-Dinitrotoluene Exposure to the Northern Bobwhite (*Colinus virginianus*). Intern. J. of Tox. 24:265-274.
Matuk et al. 1981. Matuk, Y., M. Gosh and C. McCulloch. 1981. Distribution of silver in the eyes and plasma proteins of the albino rat. Can. J. Ophthalmol. 16: 145-150. (Cited in ATSDR, 1990)
ORNL 1996. Sample, B.E., D.M. Opresko and G.W. Suter II. 1996. Toxicological Benchmarks for Wildlife: 1996 Revision. ES/ER/TM-86/R3. Oak Ridge National Laboratory, Oak Ridge, Tennessee.
USACE 1998. U.S. Army Corps of Engineers (USACE). 1998. Final Ecological Risk Assessment, RCRA Facility Investigation, for Sunflower Army Ammunition Plant, De Soto, Kansas. USACE Kansas City District.
U.S. EPA 1993. Wildlife Exposure Factors Handbook. EPA/600/P-93/187a.
U.S. EPA 1988. Recommendations for and documentation of biological values for use in risk assessment. Environmental Criteria and Assessment Office. Cincinnati, OH. EPA/600/6-87/008.

[1] - Avian TRVs derived from subchronic NOAEL value of 1 and subchronic LOAEL value of 5 from a northern bobwhite and applying an uncertainty factor of 10 and 4 to derive NOAEL-based and LOAEL-based TRVs

Table F.4-11
Soil Biocaccumulation/Bioconcentration Factors- Soil to Plant Pathway
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

					Preliminary Assessment		Refined Assessment			
Chemical	**CAS**	**Log K_{ow} Range**	**Selected K_{ow}**	**Source**	**BAF**	**Basis**	**C_s EPC (mg/kg)**	**BAF[1]**	**Basis**	**Source**
Inorganics										
ARSENIC	7440-38-2	-- - --	--	--	1.103	90th percentile	2.96	0.0375	Median	Bechtel Jacobs 1998
CADMIUM	7440-43-9	-- - --	--	--	3.25	90th percentile	1.61	0.5005	$C_p = e^{(0.546*ln(Cs) - 0.475)}$	Bechtel Jacobs 1998
CHROMIUM	7440-47-3	-- - --	--	--	0.084	90th percentile	58.76	0.0410	Median	Bechtel Jacobs 1998
COPPER	7440-50-8	-- - --	--	--	0.625	90th percentile	46.01	0.1916	$C_p = e^{(0.394*ln(Cs) + 0.668)}$	Bechtel Jacobs 1998
LEAD	7439-92-1	-- - --	--	--	0.468	90th percentile	34.47	0.0560	$C_p = e^{(0.561*ln(Cs) - 1.328)}$	Bechtel Jacobs 1998
MERCURY	7439-97-6	-- - --	--	--	5.0	90th percentile	0.16	0.8455	$C_p = e^{(0.544*ln(Cs) - 0.995)}$	Bechtel Jacobs 1998
NICKEL	7440-02-0	-- - --	--	--	1.411	90th percentile	NC	NC	$C_p = e^{(0.748*ln(Cs) + 2.223)}$	Bechtel Jacobs 1998
SELENIUM	7782-49-2	-- - --	--	--	3.012	90th percentile	0.62	0.4837	$C_p = e^{(1.104*ln(Cs) - 0.677)}$	Bechtel Jacobs 1998
SILVER	7440-22-4	-- - --	--	--	0.037	90th percentile	NC	0.0140	Median	Bechtel Jacobs 1998
ZINC	7440-66-6	-- - --	--	--	1.82	90th percentile	86.85	0.6597	$C_p = e^{(0.554*ln(Cs) + 1.575)}$	Bechtel Jacobs 1998
Pesticides										
ENDOSULFAN I	959-98-8	3.55 - 3.85	3.83	USEPA 1995	1	Default Value	NC	0.2367	K_{ow} Regression Eq.	Travis and Arms 1988
ENDRIN	72-20-8	2.92 - 5.2	5.06	USEPA 1995	1	Default Value	NC	0.0461	K_{ow} Regression Eq.	Travis and Arms 1988
PCBs										
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	0.0068	K_{ow} Regression Eq.	0.45	0.0068	K_{ow} Regression Eq.	Travis and Arms 1988
VOCs and SVOCs										
FLUORANTHENE	206-44-0	4.84 - 5.39	5.12	USEPA 1995	6.0	Maximum	NC	0.50	Median BAF	USEPA 2005
PHENANTHRENE	85-01-8	4.37 - 4.57	4.55	USEPA 1995	11	Maximum	NC	NC	$C_p = e^{(0.620*ln(Cs) - 0.167)}$	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	5.11	USEPA 1995	3.7	Maximum	NC	0.72	Median BAF	USEPA 2005
Explosives										
2,4-DNT	121-14-2	-- - --	1.6	SRC	8.46	TNT as surrogate	0.255	4.23	TNT as surrogate	USEPA 2005

Notes:
CAS = Chemical Abstract Services
BAF = Bioaccumulation Factor
K_{ow} = Chemical octanol-water coefficient
NC = Not Calculated
C_s = Chemical Concentration in Soil
C_p = Chemical Concentration in Plant Matter (dry weight)
[1] = BAFs for chemical using Cp regression equation calculated by as follows: BAF = C_p/C_s

Source(s):

USEPA 1995: United States Environmental Protection Agency. 1995. Karickhoff, S.W. , and J.M. Long. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.
Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision
Bechtel Jacobs 1998: Bechtel Jacobs Company. September 1998. Emperical Models for the Uptake of Inorganic Chemical from Soil by Plants.
USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.
Travis and Arms 1988: Travis and Arms. 1988. Bioconcentration of Organics in Beef, Milk, and Vegetation. BAF values calculated for Tier I using lowest Kow value and for Tier II using the selected Kow value.
K_{ow} Regression Equation: BAF =10^((-0.578*K_{ow})+1.588))

Table F.4-12
Soil Biocaccumulation/Bioconcentration Factors - Soil to Invertebrate Pathway
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

							Preliminary Assessment		Refined Assessment			
Chemical	**CAS**	**Log K_{ow} Range**	**Selected Log K_{ow}**	**Reference**	**K_{oc}**	**Reference**	**Value**	**Basis**	**C_s EPC (mg/kg)**	**BAF[1]**	**Basis**	**Source**
Inorganics												
ARSENIC	7440-38-2	-- - --	--	--	--	--	0.52	90th percentile	2.961	0.1755	$C_e = e^{(0.706*ln(Cs) - 1.421)}$	Sample et al. 1998
CADMIUM	7440-43-9	-- - --	--	--	--	--	40.7	90th percentile	1.613	7.5082	$C_e = e^{(0.795*ln(Cs) + 2.114)}$	Sample et al. 1998
CHROMIUM	7440-47-3	-- - --	--	--	--	--	3.16	90th percentile	58.76	0.31	Median	Sample et al. 1998
COPPER	7440-50-8	-- - --	--	--	--	--	1.53	90th percentile	46.01	0.52	Median	Sample et al. 1998
LEAD	7439-92-1	-- - --	--	--	--	--	1.52	90th percentile	34.47	0.4061	$C_e = e^{(0.807*ln(Cs) - 0.218)}$	Sample et al. 1998
MERCURY	7439-97-6	-- - --	--	--	--	--	20.6	90th percentile	0.163	1.69	Median	Sample et al. 1998
NICKEL	7440-02-0	-- - --	--	--	--	--	4.73	90th percentile	NC	1.06	Median	Sample et al. 1998
SELENIUM	7782-49-2	-- - --	--	--	--	--	1.34	90th percentile	0.622	1.0531	$C_e = e^{(0.733*ln(Cs) - 0.075)}$	Sample et al. 1998
SILVER	7440-22-4	-- - --	--	--	--	--	15.3	90th percentile	NC	2.05	Median	Sample et al. 1998
ZINC	7440-66-6	-- - --	--	--	--	--	12.9	90th percentile	86.85	4.2591	$C_e = e^{(0.328*ln(Cs) + 4.449)}$	Sample et al. 1998
Pesticides												
ENDOSULFAN I	959-98-8	3.55 - 3.85	3.83	USEPA 1995	6.32E+03	SRC, CF	9.41	Jager Model	NC	9.04	Jager Model	USEPA 2005
ENDRIN	72-20-8	2.92 - 5.2	5.06	USEPA 1995	1.14E+04	SRC, CF	3.60	Not Specified	NC	3.60	Not Specified	Edwards and Bohlen 1992
PCBs												
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	--	--	15.9	90th percentile	0.454	6.67	Median	Sample et al. 1998
VOCs and SVOCs												
FLUORANTHENE	206-44-0	4.84 - 5.39	4.95	USEPA 1995	4.17E+04	USEPA 2005	31.19	Jager Model	NC	12.92	Jager Model	USEPA 2005
PHENANTHRENE	85-01-8	4.37 - 4.57	4.55	USEPA 1995	3.30E+04	USEPA 2005	7.62	Jager Model	NC	7.32	Jager Model	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	4.88	USEPA 1995	6.27E+04	USEPA 2005	26.91	Jager Model	NC	7.47	Jager Model	USEPA 2005
Explosives												
2,4-DNT	121-14-2	-- - --	--	--	--	--	1	Default Value	0.255	1	Default Value	--

Notes:
CAS = Chemical Abstract Services
C_s = Chemical Concentration in Soil
C_e = Chemical Concentration in Earthworm (dry weight)
K_{ow} = Chemical octanol-water coefficient
K_{oc} = Chemical water to soil partitioning coefficient
K_{ww} = Chemical worm to soil partitioning coefficient
foc = mean fraction organic content in soil (0.00235 mean from physical samples - see Appendix C.1)
[1] = BAFs for chemical using Ce regression equation calculated by as follows: BAF = C_e/C_s

Source(s):
USEPA 1995: United States Environmental Protection Agency. Karickhoff, S.W. , and J.M. Long. 1995. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.
Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision
Sample et al. 1998: Sample, B.E., Beauchamp, J.J., Efroymson, R.A., Sutter, G.W., Ashwood, T.L., February 1998. Development and Validation of Bioaccumulation Models for Earthworms.
Jager Model: As presented in USEPA 2005, Guidance for Developing Ecological Screening Levels, Appendix 4-1, Table 5.
BAF = K_{ww}(L/kg worl dw)/K_d (L/kg soil dw)
K_{ww} (dry weight) = 10^(0.87*logK_{ow} - 2.0) / 0.16
Wet weight to dry weight assuming 16% solids
$K_d = f_{oc} * K_{oc}$
foc = 0.00235 from site specific physical soil data
Note: The maximum Kow utilized for the preliminary calculation and the Selected Kow utilized for the refined calculation.
Edwards and Bohlen 1992: Edwards, C.A. and Bohlen, P.J. 1992. The effects of toxic chemicals on earthworms. Reviews of Environmental Contamination and Toxicology, 125: 23-99.
USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.
SRC/CF: Syracuse Research Corporation (SRC). Physical Properties Database. http://www.syrres.com/esc/physdemo.htm

Table F.4-13
Soil Bioaccumulation/Bioconcentration Factors - Soil to Mammal Pathway
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS	Log K_{ow} Range	Selected K_{ow}	Reference	Preliminary Assessment		Refined Assessment			Source
					Value	Basis	C_s (mg/kg)	BAF[1]	Basis	
Inorganics										
ARSENIC	7440-38-2	-- - --	--	--	0.0149	90th percentile	2.961	0.0064	$C_m = e^{(0.819*\ln(Cs) - 4.847)}$	Sample et al. 1998
CADMIUM	7440-43-9	-- - --	--	--	3.991	90th percentile	1.613	0.2210	$C_m = e^{(0.472*\ln(Cs) - 1.257)}$	Sample et al. 1998
CHROMIUM	7440-47-3	-- - --	--	--	0.333	90th percentile	58.76	0.0785	$C_m = e^{(0.734*\ln(Cs) - 1.46)}$	Sample et al. 1998
COPPER	7440-50-8	-- - --	--	--	1.045	90th percentile	46.01	0.2911	$C_m = e^{(0.144*\ln(Cs) + 2.042)}$	Sample et al. 1998
LEAD	7439-92-1	-- - --	--	--	0.286	90th percentile	34.47	0.1498	$C_m = e^{(0.442*\ln(Cs) + 0.0761)}$	Sample et al. 1998
MERCURY	7439-97-6	-- - --	--	--	0.192	90th percentile	0.163	0.0543	Median	Sample et al. 1998
NICKEL	7440-02-0	-- - --	--	--	0.589	90th percentile	NC	NC	$C_m = e^{(0.466*\ln(Cs) - 0.246)}$	Sample et al. 1998
SELENIUM	7782-49-2	-- - --	--	--	1.187	90th percentile	0.622	0.8872	$C_m = e^{(0.376*\ln(Cs) - 0.416)}$	Sample et al. 1998
SILVER	7440-22-4	-- - --	--	--	0.501	90th percentile	NC	0.004	Median	Sample et al. 1998
ZINC	7440-66-6	-- - --	--	--	2.69	90th percentile	86.85	1.2389	$C_m = e^{(0.071*\ln(Cs) + 4.363)}$	Sample et al. 1998
Pesticides										
ENDOSULFAN I	959-98-8	3.55 - 3.85	3.83	USEPA 1995	1	Default Value	NC	1	Default Value	--
ENDRIN	72-20-8	2.92 - 5.2	5.06	USEPA 1995	1	Default Value	NC	1	Default Value	--
PCBs										
AROCLOR-1254	11097-69-1	-- - --	6.5	Jones et al. 1997	1	Default Value	0.454	1	Default Value	--
VOCs and SVOCs										
FLUORANTHENE	206-44-0	4.84 - 5.39	5.12	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
PHENANTHRENE	85-01-8	4.37 - 4.57	4.55	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
PYRENE	129-00-0	4.76 - 5.52	5.11	USEPA 1995	1	Default Value	NC	0	--	USEPA 2005
Explosives										
2,4-DNT	121-14-2	-- - --	--	--	1	Default Value	0.255	0	TNT as surrogate	USEPA 2005

Notes:
CAS = Chemical Abstract Services
C_s = Chemical Concentration in Soil
C_d = Chemical Concentration in Prey (assumed to be 100% earthworms (dry weight))
C_m = Chemical Concentration in Mammal (dry weight)
K_{ow} = Chemical octanol to water partitioning coefficient
[1] = BAFs for chemical using Ce regression equation calculated by as follows: $BAF = C_m/C_s$

Source(s):

USEPA 1995: United States Environmental Protection Agency. Karickhoff, S.W. , and J.M. Long. 1995. Summary of Measured, Calculated, and Recommended Log K_{ow} Values. Environmental Research Laboratory. Athens, Georgia.
Sample et al. 1998: Sample et al. 1998. Development and Validation of Bioaccumulation Models for Small Mammals.
Jones et al. 1997: Jones et al. 1997. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision
USEPA 2005: United States Environmental Protection Agency (USEPA). February 2005. Guidance for Developing Ecological Soil Screening Levels.

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Table F.4-14
Preliminary Wildlife Risk Characterization - Meadow Vole
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment									
				Soil									
				Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics													
Arsenic	7440-38-2	1.20E-01	1.20E+00	5.1	1.1E+00	5.6E+00	1.8E-01	1.8E+00	**2.83E+01**	**2.8E+00**	**Y**	2.961	**1.6E+01**
Cadmium	7440-43-9	1.69E+00	1.69E+01	1.9	3.3E+00	6.2E+00	8.8E-01	8.8E+00	**2.17E+00**	2.2E-01	**Y**	1.613	**1.8E+00**
Chromium	7440-47-3	5.75E+00	5.75E+01	82	8.4E-02	6.9E+00	9.1E+01	9.1E+02	9.06E-01	9.1E-02	N	--	--
Copper	7440-50-8	2.67E+01	3.51E+01	85	6.3E-01	5.3E+01	7.0E+01	9.2E+01	**1.22E+00**	9.2E-01	**Y**	46.01	6.6E-01
Lead	7439-92-1	1.40E+01	1.40E+02	52	4.7E-01	2.4E+01	4.8E+01	4.8E+02	**1.07E+00**	1.1E-01	**Y**	34.47	7.1E-01
Mercury	7439-97-6	3.01E+01	3.01E+02	0.27	5.0E+00	1.4E+00	1.0E+01	1.0E+02	2.65E-02	2.7E-03	N	--	--
Nickel	7440-02-0	7.01E+01	1.40E+02	35	1.4E+00	4.9E+01	8.3E+01	1.7E+02	4.21E-01	2.1E-01	N	--	--
Selenium	7782-49-2	3.51E-01	5.79E-01	0.67	3.0E+00	2.0E+00	2.0E-01	3.2E-01	**3.41E+00**	**2.1E+00**	**Y**	0.622	**3.2E+00**
Silver	7440-22-4	3.89E+01	3.89E+02	0.14	3.7E-02	5.2E-03	1.1E+03	1.1E+04	1.29E-04	1.3E-05	N	--	--
Zinc	7440-66-6	2.81E+02	5.61E+02	120	1.8E+00	2.2E+02	2.6E+02	5.2E+02	4.64E-01	2.3E-01	N	--	--
Pesticides/PCBs													
Endosulfan I	959-98-8	2.63E-01	2.63E+00	0.0026	1.0E+00	2.6E-03	4.4E-01	4.4E+00	5.95E-03	6.0E-04	N	--	--
Endrin	72-20-8	8.73E-02	8.73E-01	0.00345	1.0E+00	3.5E-03	1.4E-01	1.4E+00	2.38E-02	2.4E-03	N	--	--
Aroclor 1254	11097-69-1	6.45E-02	6.45E-01	0.57	6.8E-03	3.9E-03	3.6E+00	3.6E+01	1.60E-01	1.6E-02	N	--	--
TCL SVOCs													
Fluoranthene	206-44-0	2.91E+01	1.45E+02	0.17	6.0E+00	1.0E+00	8.2E+00	4.1E+01	2.07E-02	4.1E-03	N	--	--
Phenanthrene	85-01-8	6.64E+00	3.32E+01	0.11	1.1E+01	1.2E+00	1.0E+00	5.1E+00	1.07E-01	2.1E-02	N	--	--
Pyrene	129-00-0	7.59E+00	3.80E+01	0.09	3.7E+00	3.3E-01	3.5E+00	1.7E+01	2.60E-02	5.2E-03	N	--	--
Explosives													
2,4-Dinitrotoluene	121-14-2	NV	NV	0.255	8.5E+00	2.2E+00	--	--	**--**	**--**	--	--	--

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soi)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.4-10

BW = Minimum Body Weigth of Receptor (kg)

IR_{food} = Maximum Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)

DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = 100% Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

EPC = Exposure Point Concentration

Meadow Vole Specific Data from Table F.4-9

BW=	0.017	kg
IR_{food} =	0.010	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00024	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration

LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration

EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.4-15
Refined Wildlife Risk Characterization - Meadow Vole
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment						
				Soil						
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics										
Arsenic	7440-38-2	1.20E-01	1.20E+00	2.961	3.8E-02	1.1E-01	9.0E+00	9.0E+01	3.3E-01	3.3E-02
Cadmium	7440-43-9	1.69E+00	1.69E+01	1.613	5.0E-01	8.1E-01	1.5E+01	1.5E+02	1.1E-01	1.1E-02
Copper	7440-50-8	2.67E+01	3.51E+01	46.01	1.9E-01	8.8E+00	5.7E+02	7.5E+02	8.0E-02	6.1E-02
Lead	7439-92-1	1.40E+01	1.40E+02	34.47	5.6E-02	1.9E+00	8.1E+02	8.1E+03	4.2E-02	4.2E-03
Selenium	7782-49-2	3.51E-01	5.79E-01	0.622	4.8E-01	3.0E-01	3.2E+00	5.3E+00	1.9E-01	1.2E-01

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soi)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.4-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Meadow Vole Specific Data from Table F.4-9

BW=	0.037	kg
IR_{food} =	0.008	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	1.00	unitless
IR_{soil} =	0.00019	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.4-16
Preliminary Wildlife Risk Characterization - Short-tailed Shrew
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment – Soil: Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																
Arsenic	7440-38-2	1.50E-01	1.50E+00	5.1	1.1E+00	5.6E+00	5.2E-01	2.7E+00	Plant	5.1E-01	5.1E+00	**1.0E+01**	1.0E+00	**Y**	2.961	**5.8E+00**
Cadmium	7440-43-9	2.11E+00	2.11E+01	1.9	3.3E+00	6.2E+00	4.1E+01	7.7E+01	Invertebrate	2.2E-01	2.2E+00	**8.8E+00**	8.8E-01	**Y**	1.613	**7.5E+00**
Chromium	7440-47-3	7.21E+00	7.21E+01	82	8.4E-02	6.9E+00	3.2E+00	2.6E+02	Invertebrate	9.1E+00	9.1E+01	**9.0E+00**	9.0E-01	**Y**	58.76	**6.4E+00**
Copper	7440-50-8	3.34E+01	4.40E+01	85	6.3E-01	5.3E+01	1.5E+00	1.3E+02	Invertebrate	8.4E+01	1.1E+02	**1.0E+00**	7.7E-01	**Y**	46.01	5.5E-01
Lead	7439-92-1	1.76E+01	1.76E+02	52	4.7E-01	2.4E+01	1.5E+00	7.9E+01	Invertebrate	4.4E+01	4.4E+02	**1.2E+00**	1.2E-01	**Y**	34.47	7.8E-01
Mercury	7439-97-6	3.77E+01	3.77E+02	0.27	5.0E+00	1.4E+00	2.1E+01	5.6E+00	Invertebrate	7.6E+00	7.6E+01	3.6E-02	3.6E-03	N	--	--
Nickel	7440-02-0	8.79E+01	1.76E+02	35	1.4E+00	4.9E+01	4.7E+00	1.7E+02	Invertebrate	7.5E+01	1.5E+02	4.6E-01	2.3E-01	N	--	--
Selenium	7782-49-2	4.40E-01	7.25E-01	0.67	3.0E+00	2.0E+00	1.3E+00	9.0E-01	Plant	5.8E-01	9.6E-01	**1.1E+00**	7.0E-01	**Y**	0.622	**1.1E+00**
Silver	7440-22-4	4.88E+01	4.88E+02	0.14	3.7E-02	5.2E-03	1.5E+01	2.1E+00	Invertebrate	1.3E+01	1.3E+02	1.1E-02	1.1E-03	N	--	--
Zinc	7440-66-6	3.52E+02	7.03E+02	120	1.8E+00	2.2E+02	1.3E+01	1.5E+03	Invertebrate	1.1E+02	2.3E+02	**1.1E+00**	5.3E-01	**Y**	86.85	7.7E-01
Pesticides/PCBs																
Endosulfan I	959-98-8	3.30E-01	3.30E+00	0.0026	1.0E+00	2.6E-03	9.4E+00	2.4E-02	Invertebrate	1.4E-01	1.4E+00	1.8E-02	1.8E-03	N	--	--
Endrin	72-20-8	1.09E-01	1.09E+00	0.00345	1.0E+00	3.5E-03	3.6E+00	1.2E-02	Invertebrate	1.2E-01	1.2E+00	2.8E-02	2.8E-03	N	--	--
Aroclor 1254	11097-69-1	8.09E-02	8.09E-01	0.57	6.8E-03	3.9E-03	1.6E+01	9.1E+00	Invertebrate	2.1E-02	2.1E-01	**2.7E+01**	**2.7E+00**	**Y**	0.454	**2.2E+01**
TCL SVOCs																
Fluoranthene	206-44-0	3.64E+01	1.82E+02	0.17	6.0E+00	1.0E+00	3.1E+01	5.3E+00	Invertebrate	4.8E+00	2.4E+01	3.5E-02	7.0E-03	N	--	--
Phenanthrene	85-01-8	8.32E+00	4.16E+01	0.11	1.1E+01	1.2E+00	7.6E+00	8.4E-01	Plant	3.1E+00	1.6E+01	3.5E-02	7.1E-03	N	--	--
Pyrene	129-00-0	9.51E+00	4.76E+01	0.09	3.7E+00	3.3E-01	2.7E+01	2.4E+00	Invertebrate	1.5E+00	7.3E+00	6.1E-02	1.2E-02	N	--	--
Explosives																
2,4-Dinitrotoluene	121-14-2	NV	NV	0.255	8.5E+00	2.2E+00	1.0E+00	2.6E-01	Plant	--	--	**--**	**--**	--	--	--

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.4-10

BW = Minimum Body Weigth of Receptor (kg)

IR_{food} = Maximum Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)

DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = 100% Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

EPC = Exposure Point Concentration

Short-tailed Shrew Specific Data from Table F.4-9

BW=	0.0125	kg
IR_{food} =	0.003	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00039	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Screening Level

LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Screening Level

EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.4-17
Refined Wildlife Risk Characterization - Short-tailed Shrew
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment								
				Soil								
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics												
Arsenic	7440-38-2	1.50E-01	1.50E+00	2.961	3.8E-02	1.1E-01	1.75E-01	5.2E-01	4.1E+00	4.1E+01	7.2E-01	7.2E-02
Cadmium	7440-43-9	2.11E+00	2.11E+01	1.613	5.0E-01	8.1E-01	7.51E+00	1.2E+01	2.5E+00	2.5E+01	6.4E-01	6.4E-02
Chromium	7440-47-3	7.21E+00	7.21E+01	58.76	4.1E-02	2.4E+00	3.06E-01	1.8E+01	1.4E+02	1.4E+03	4.1E-01	4.1E-02
Copper	7440-50-8	3.34E+01	4.40E+01	46.01	1.9E-01	8.8E+00	5.15E-01	2.4E+01	4.4E+02	5.8E+02	1.0E-01	7.9E-02
Lead	7439-92-1	1.76E+01	1.76E+02	34.47	5.6E-02	1.9E+00	4.06E-01	1.4E+01	2.8E+02	2.8E+03	1.2E-01	1.2E-02
Selenium	7782-49-2	4.40E-01	7.25E-01	0.622	4.8E-01	3.0E-01	1.05E+00	6.6E-01	3.1E+00	5.2E+00	2.0E-01	1.2E-01
Zinc	7440-66-6	3.52E+02	7.03E+02	86.85	6.6E-01	5.7E+01	4.26E+00	3.7E+02	7.1E+02	1.4E+03	1.2E-01	6.1E-02
Pesticides/PCBs												
Aroclor 1254	11097-69-1	8.09E-02	8.09E-01	0.454	6.8E-03	3.1E-03	6.67E+00	3.0E+00	1.1E-01	1.1E+00	**4.2E+00**	4.2E-01

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.4-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Short-tailed Shrew Specific Data from Table F.4-9

BW=	0.015	kg
IR_{food} =	0.002	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.14	unitless
DF_{inv} =	0.86	unitless
IR_{soil} =	0.00026	kg dw/day
AF =	0.950	unitless

[a] = The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_S)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.4-18
Preliminary Wildlife Risk Characterization - Red Fox
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment													
				Soil													
				Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																	
Arsenic	7440-38-2	3.59E-02	3.59E-01	5.1	1.1E+00	5.6E+00	5.2E-01	2.7E+00	1.5E-02	7.6E-02	Plant	2.7E-01	2.7E+00	**1.9E+01**	**1.9E+00**	**Y**	2.961	**1.1E+01**
Cadmium	7440-43-9	5.07E-01	5.07E+00	1.9	3.3E+00	6.2E+00	4.1E+01	7.7E+01	4.0E+00	7.6E+00	Invertebrate	1.1E-01	1.1E+00	**1.8E+01**	**1.8E+00**	**Y**	1.613	**1.5E+01**
Chromium	7440-47-3	1.73E+00	1.73E+01	82	8.4E-02	6.9E+00	3.2E+00	2.6E+02	3.3E-01	2.7E+01	Invertebrate	4.7E+00	4.7E+01	**1.8E+01**	**1.8E+00**	**Y**	58.76	**1.3E+01**
Copper	7440-50-8	8.02E+00	1.06E+01	85	6.3E-01	5.3E+01	1.5E+00	1.3E+02	1.0E+00	8.9E+01	Invertebrate	4.4E+01	5.8E+01	**1.9E+00**	**1.5E+00**	**Y**	46.01	**1.0E+00**
Lead	7439-92-1	4.22E+00	4.22E+01	52	4.7E-01	2.4E+01	1.5E+00	7.9E+01	2.9E-01	1.5E+01	Invertebrate	2.3E+01	2.3E+02	**2.2E+00**	2.2E-01	**Y**	34.47	**1.5E+00**
Mercury	7439-97-6	9.05E+00	9.05E+01	0.27	5.0E+00	1.4E+00	2.1E+01	5.6E+00	1.9E-01	5.2E-02	Invertebrate	3.8E+00	3.8E+01	7.1E-02	7.1E-03	N	--	--
Nickel	7440-02-0	2.11E+01	4.22E+01	35	1.4E+00	4.9E+01	4.7E+00	1.7E+02	5.9E-01	2.1E+01	Invertebrate	3.8E+01	7.6E+01	9.2E-01	4.6E-01	N	--	--
Selenium	7782-49-2	1.05E-01	1.74E-01	0.67	3.0E+00	2.0E+00	1.3E+00	9.0E-01	1.2E+00	8.0E-01	Plant	3.0E-01	4.9E-01	**2.2E+00**	**1.4E+00**	**Y**	0.622	**2.1E+00**
Silver	7440-22-4	1.17E+01	1.17E+02	0.14	3.7E-02	5.2E-03	1.5E+01	2.1E+00	5.0E-01	7.0E-02	Invertebrate	6.6E+00	6.6E+01	2.1E-02	2.1E-03	N	--	--
Zinc	7440-66-6	8.44E+01	1.69E+02	120	1.8E+00	2.2E+02	1.3E+01	1.5E+03	2.7E+00	3.2E+02	Invertebrate	5.6E+01	1.1E+02	**2.1E+00**	**1.1E+00**	**Y**	86.85	**1.5E+00**
Pesticides/PCBs																	
Endosulfan I	959-98-8	7.91E-02	7.91E-01	0.0026	1.0E+00	2.6E-03	9.4E+00	2.4E-02	1.0E+00	2.6E-03	Invertebrate	7.2E-02	7.2E-01	3.6E-02	3.6E-03	N	--	--
Endrin	72-20-8	2.62E-02	2.62E-01	0.00345	1.0E+00	3.5E-03	3.6E+00	1.2E-02	1.0E+00	3.5E-03	Invertebrate	6.2E-02	6.2E-01	5.5E-02	5.5E-03	N	--	--
Aroclor 1254	11097-69-1	1.94E-02	1.94E-01	0.57	6.8E-03	3.9E-03	1.6E+01	9.1E+00	1.0E+00	5.7E-01	Invertebrate	1.1E-02	1.1E-01	**5.4E+01**	**5.4E+00**	**Y**	0.454	**4.3E+01**
TCL SVOCs																	
Fluoranthene	206-44-0	8.74E+00	4.37E+01	0.17	6.0E+00	1.0E+00	3.1E+01	5.3E+00	1.0E+00	1.7E-01	Invertebrate	2.4E+00	1.2E+01	7.0E-02	1.4E-02	N	--	--
Phenanthrene	85-01-8	2.00E+00	9.98E+00	0.11	1.1E+01	1.2E+00	7.6E+00	8.4E-01	1.0E+00	1.1E-01	Plant	1.6E+00	7.8E+00	7.0E-02	1.4E-02	N	--	--
Pyrene	129-00-0	2.28E+00	1.14E+01	0.09	3.7E+00	3.3E-01	2.7E+01	2.4E+00	1.0E+00	9.0E-02	Invertebrate	7.3E-01	3.7E+00	1.2E-01	2.5E-02	N	--	--
Explosives																	
2,4-Dinitrotoluene	121-14-2	NV	NV	0.255	8.5E+00	2.2E+00	1.0E+00	2.6E-01	1.0E+00	2.6E-01	Plant	--	--	**--**	**--**	--	--	--

Notes:
CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.4-10
BW = Minimum Body Weigth of Receptor (kg)
IR_{food} = Maximum Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)
DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = 100% Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
EPC = Exposure Point Concentration

Red FoxSpecific Data from Table F.4-9

BW=	2.9500	kg
IR_{food} =	0.342	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00960	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Screening Level
LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Screening Level
EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.4-19
Refined Wildlife Risk Characterization - Red Fox
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment										
				Soil										
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics														
Arsenic	7440-38-2	3.59E-02	3.59E-01	2.961	3.8E-02	1.1E-01	1.8E-01	5.2E-01	6.4E-03	1.9E-02	3.8E+03	3.8E+04	7.9E-04	7.9E-05
Cadmium	7440-43-9	5.07E-01	5.07E+00	1.613	5.0E-01	8.1E-01	7.5E+00	1.2E+01	2.2E-01	3.6E-01	4.2E+03	4.2E+04	3.8E-04	3.8E-05
Chromium	7440-47-3	1.73E+00	1.73E+01	58.76	4.1E-02	2.4E+00	3.1E-01	1.8E+01	7.9E-02	4.6E+00	7.7E+04	7.7E+05	7.6E-04	7.6E-05
Copper	7440-50-8	8.02E+00	1.06E+01	46.01	1.9E-01	8.8E+00	5.2E-01	2.4E+01	2.9E-01	1.3E+01	1.3E+05	1.7E+05	3.7E-04	2.8E-04
Lead	7439-92-1	4.22E+00	4.22E+01	34.47	5.6E-02	1.9E+00	4.1E-01	1.4E+01	1.5E-01	5.2E+00	1.2E+05	1.2E+06	2.9E-04	2.9E-05
Selenium	7782-49-2	1.05E-01	1.74E-01	0.622	4.8E-01	3.0E-01	1.1E+00	6.6E-01	8.9E-01	5.5E-01	6.0E+02	1.0E+03	1.0E-03	6.3E-04
Zinc	7440-66-6	8.44E+01	1.69E+02	86.85	6.6E-01	5.7E+01	4.3E+00	3.7E+02	1.2E+00	1.1E+02	3.2E+05	6.4E+05	2.7E-04	1.4E-04
Pesticides/PCBs														
Aroclor 1254	11097-69-1	1.94E-02	1.94E-01	0.454	6.8E-03	3.1E-03	6.7E+00	3.0E+00	1.0E+00	4.5E-01	8.7E+01	8.7E+02	5.2E-03	5.2E-04

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.4-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Red FoxSpecific Data from Table F.4-9

BW=	4.5300	kg
IR_{food} =	0.238	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.17	unitless
DF_{inv} =	0.04	unitless
DF_{mam} =	0.79	unitless
IR_{soil} =	0.00670	kg dw/day
AF =	0.0039	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.4-20
Preliminary Wildlife Risk Characterization - American Robin
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment – Soil: Maximum Detected Concentration (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Most Contaminated Dietary Component	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics																
Arsenic	7440-38-2	5.14E+00	1.28E+01	5.1	1.1E+00	5.6E+00	5.2E-01	2.7E+00	Plant	1.4E+01	3.5E+01	3.6E-01	1.4E-01	N	--	--
Cadmium	7440-43-9	1.45E+00	2.00E+01	1.9	3.3E+00	6.2E+00	4.1E+01	7.7E+01	Invertebrate	1.1E-01	1.6E+00	**1.7E+01**	**1.2E+00**	**Y**	1.613	**1.4E+01**
Chromium	7440-47-3	1.00E+00	5.00E+00	82	8.4E-02	6.9E+00	3.2E+00	2.6E+02	Invertebrate	9.9E-01	4.9E+00	**8.3E+01**	**1.7E+01**	**Y**	58.76	**5.9E+01**
Copper	7440-50-8	4.70E+01	6.17E+01	85	6.3E-01	5.3E+01	1.5E+00	1.3E+02	Invertebrate	9.4E+01	1.2E+02	9.0E-01	6.9E-01	N	--	--
Lead	7439-92-1	1.13E+00	1.13E+01	52	4.7E-01	2.4E+01	1.5E+00	7.9E+01	Invertebrate	2.3E+00	2.3E+01	**2.3E+01**	**2.3E+00**	**Y**	34.47	**1.5E+01**
Mercury	7439-97-6	4.50E-01	9.00E-01	0.27	5.0E+00	1.4E+00	2.1E+01	5.6E+00	Invertebrate	6.9E-02	1.4E-01	**3.9E+00**	**2.0E+00**	**Y**	0.163	**2.4E+00**
Nickel	7440-02-0	7.74E+01	1.07E+02	35	1.4E+00	4.9E+01	4.7E+00	1.7E+02	Invertebrate	5.1E+01	7.1E+01	6.8E-01	4.9E-01	N	--	--
Selenium	7782-49-2	4.00E-01	8.00E-01	0.67	3.0E+00	2.0E+00	1.3E+00	9.0E-01	Plant	4.1E-01	8.3E-01	**1.6E+00**	8.1E-01	**Y**	0.622	**1.5E+00**
Silver	7440-22-4	1.66E+01	1.24E+02	0.14	3.7E-02	5.2E-03	1.5E+01	2.1E+00	Invertebrate	3.4E+00	2.6E+01	4.1E-02	5.4E-03	N	--	--
Zinc	7440-66-6	1.45E+01	1.31E+02	120	1.8E+00	2.2E+02	1.3E+01	1.5E+03	Invertebrate	3.6E+00	3.2E+01	**3.4E+01**	**3.7E+00**	**Y**	86.85	**2.4E+01**
Pesticides/PCBs																
Endosulfan I	959-98-8	1.00E+01	1.00E+02	0.0026	1.0E+00	2.6E-03	9.4E+00	2.4E-02	Invertebrate	3.4E+00	3.4E+01	7.7E-04	7.7E-05	N	--	--
Endrin	72-20-8	2.80E-02	1.70E-01	0.00345	1.0E+00	3.5E-03	3.6E+00	1.2E-02	Invertebrate	2.4E-02	1.5E-01	1.4E-01	2.3E-02	N	--	--
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	0.57	6.8E-03	3.9E-03	1.6E+01	9.1E+00	Invertebrate	8.2E-02	8.2E-01	**7.0E+00**	7.0E-01	**Y**	0.454	**5.6E+00**
TCL SVOCs																
Fluoranthene	206-44-0	NV	NV	0.17	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Phenanthrene	85-01-8	1.13E+00	5.65E+00	0.11	1.1E+01	1.2E+00	7.6E+00	8.4E-01	Plant	3.2E-01	1.6E+00	3.4E-01	6.8E-02	N	--	--
Pyrene	129-00-0	NV	NV	0.09	--	--	--	--	--	--	--	**--**	**--**	--	--	--
Explosives																
2,4-Dinitrotoluene	121-14-2	1.00E-01	1.25E+00	0.255	8.5E+00	2.2E+00	1.0E+00	2.6E-01	Plant	3.7E-02	4.7E-01	**6.8E+00**	5.5E-01	**Y**	0.255	**6.8E+00**

Notes:

CAS = Chemical Abstract Services
C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)
ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.4-10
BW = Minimum Body Weigth of Receptor (kg)
IR_{food} = Maximum Ingestion Rate for Food
BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)
DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)
IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)
AF = 100% Area Use Factor
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
mg/kg = Milligram Per Kilogram
bw - day = Body Weight - Day
HQ = Hazard Quotient
TRV = Toxicity Reference Value
EPC = Exposure Point Concentration

American Robin Specific Data from Table F.4-9

BW=	0.0635	kg
IR_{food} =	0.020	kg dw/day
BAF_{food}=	Chem Specific	unitless
IR_{soil} =	0.00100	kg dw/day
AF =	1	unitless

[a]= The following equation was used to calculate soil screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration
LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration
EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.4-21
Refined Wildlife Risk Characterization - American Robin
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment								
				Soil								
				EPC (mg/kg)	Plant BAF (unitless)	Plant Concentration (mg/kg)	Invertebrate BAF (unitless)	Invertebrate Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics												
Cadmium	7440-43-9	1.45E+00	2.00E+01	1.613	5.0E-01	8.1E-01	7.5E+00	1.2E+01	2.8E+00	3.9E+01	5.7E-01	4.1E-02
Chromium	7440-47-3	1.00E+00	5.00E+00	58.76	4.1E-02	2.4E+00	3.1E-01	1.8E+01	3.3E+01	1.6E+02	**1.8E+00**	3.6E-01
Lead	7439-92-1	1.13E+00	1.13E+01	34.47	5.6E-02	1.9E+00	4.1E-01	1.4E+01	3.0E+01	3.0E+02	**1.2E+00**	1.2E-01
Mercury	7439-97-6	4.50E-01	9.00E-01	0.163	8.5E-01	1.4E-01	1.7E+00	2.8E-01	2.3E+00	4.6E+00	7.0E-02	3.5E-02
Selenium	7782-49-2	4.00E-01	8.00E-01	0.622	4.8E-01	3.0E-01	1.1E+00	6.6E-01	3.3E+00	6.7E+00	1.9E-01	9.3E-02
Zinc	7440-66-6	1.45E+01	1.31E+02	86.85	6.6E-01	5.7E+01	4.3E+00	3.7E+02	4.4E+01	4.0E+02	**2.0E+00**	2.2E-01
Pesticides/PCBs												
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	0.454	6.8E-03	3.1E-03	6.7E+00	3.0E+00	9.9E-01	9.9E+00	4.6E-01	4.6E-02
Explosives												
2,4-Dinitrotoluene	121-14-2	1.00E-01	1.25E+00	0.255	4.2E+00	1.1E+00	1.0E+00	2.6E-01	2.1E-01	2.6E+00	**1.2E+00**	9.9E-02

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.4-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

American Robin Specific Data from Table F.4-9

BW=	0.0773	kg
IR_{food} =	0.016	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{plants} =	0.62	unitless
DF_{inv} =	0.38	unitless
IR_{soil} =	0.0008	kg dw/day
AF =	0.770	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.4-22
Preliminary Wildlife Risk Characterization - Red-tailed Hawk
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Preliminary Assessment									
				Soil									
				Maximum Detected Concentration (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Screening Level[a] (mg/kg)	Calculated LOAEL-Based Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)	NOAEL HQ >1 (Y/N)	EPC (mg/kg)	EPC NOAEL HQ (unitless)
Inorganics													
Arsenic	7440-38-2	5.14E+00	1.28E+01	5.1	1.5E-02	7.6E-02	5.2E+03	2.1E+03	9.7E-04	3.9E-04	N	--	--
Cadmium	7440-43-9	1.45E+00	2.00E+01	1.9	4.0E+00	7.6E+00	5.5E+00	4.0E-01	3.4E-01	2.5E-02	N	--	--
Chromium	7440-47-3	1.00E+00	5.00E+00	82	3.3E-01	2.7E+01	4.6E+01	9.1E+00	**1.8E+00**	3.6E-01	**Y**	58.76	**1.3E+00**
Copper	7440-50-8	4.70E+01	6.17E+01	85	1.0E+00	8.9E+01	6.8E+02	5.2E+02	1.2E-01	9.5E-02	N	--	--
Lead	7439-92-1	1.13E+00	1.13E+01	52	2.9E-01	1.5E+01	6.0E+01	6.0E+00	8.7E-01	8.7E-02	N	--	--
Mercury	7439-97-6	4.50E-01	9.00E-01	0.27	1.9E-01	5.2E-02	3.6E+01	1.8E+01	7.6E-03	3.8E-03	N	--	--
Nickel	7440-02-0	7.74E+01	1.07E+02	35	5.9E-01	2.1E+01	2.0E+03	1.4E+03	1.8E-02	1.3E-02	N	--	--
Selenium	7782-49-2	4.00E-01	8.00E-01	0.67	1.2E+00	8.0E-01	5.1E+00	2.6E+00	1.3E-01	6.5E-02	N	--	--
Silver	7440-22-4	1.66E+01	1.24E+02	0.14	5.0E-01	7.0E-02	5.0E+02	6.7E+01	2.8E-04	3.7E-05	N	--	--
Zinc	7440-66-6	1.45E+01	1.31E+02	120	2.7E+00	3.2E+02	8.2E+01	9.1E+00	**1.5E+00**	1.6E-01	**Y**	86.85	**1.1E+00**
Pesticides/PCBs													
Endosulfan I	959-98-8	1.00E+01	1.00E+02	0.0026	1.0E+00	2.6E-03	1.5E+02	1.5E+01	1.7E-05	1.7E-06	N	--	--
Endrin	72-20-8	2.80E-02	1.70E-01	0.00345	1.0E+00	3.5E-03	4.3E-01	7.0E-02	8.1E-03	1.3E-03	N	--	--
Aroclor 1254	11097-69-1	4.10E-01	4.10E+00	0.57	1.0E+00	5.7E-01	6.2E+00	6.2E-01	9.2E-02	9.2E-03	N	--	--
TCL SVOCs													
Fluoranthene	206-44-0	NV	NV	0.17	--	--	--	--	**--**	**--**	--	--	--
Phenanthrene	85-01-8	1.13E+00	5.65E+00	0.11	1.0E+00	1.1E-01	1.7E+01	3.4E+00	6.4E-03	1.3E-03	N	--	--
Pyrene	129-00-0	NV	NV	0.09	--	--	--	--	**--**	**--**	--	--	--
Explosives													
2,4-Dinitrotoluene	121-14-2	1.00E-01	1.25E+00	0.255	1.0E+00	2.6E-01	1.5E+00	1.2E-01	1.7E-01	1.3E-02	N	--	--

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.4-10

BW_i = Minimum Body Weigth of Receptor (kg)

IR_{food} = Maximum Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor (Most contaminated dietary component BSAF used)

DF = Dietary fraction (Most contaminated dietary component assumed to be 100% of diet)

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = 100% Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

EPC = Exposure Point Concentration

Red-tailed Hawk Specific Data from Table F.4-9

BW=	0.957	kg
IR_{food} =	0.063	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{mam} =	1.00	unitless
IR_{soil} =	0.00	kg dw/day
AF =	1	unitless

[a] = The following equation was used to calculate screenning levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food}(BAF_{food} \cdot DF) + IR_s)AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = Maximum Detected Concentration/Calculated NOAEL-Based Concentration

LOAEL HQ = Maximum Detected Concentration/Calculated LOAEL-Based Concentration

EPC NOAEL HQ = NOAEL HQ * (EPC/Maximum Detected Concentration)

Table F.4-23
Refined Wildlife Risk Characterization - Red-tailed Hawk
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

PARAMETER	CAS #	NOAEL (mg/kg bw-day)	LOAEL (mg/kg bw-day)	Refined Assessment						
				Soil						
				EPC (mg/kg)	Mammal BAF (unitless)	Mammal Concentration (mg/kg)	Calculated NOAEL-Based Soil Screening Level[a] (mg/kg)	Calculated LOAEL-Based Soil Screening Level[a] (mg/kg)	NOAEL HQ (unitless)	LOAEL HQ (unitless)
Inorganics										
Chromium	7440-47-3	1.00E+00	5.00E+00	58.76	7.9E-02	4.6E+00	1.7E+05	8.3E+05	3.6E-04	7.1E-05
Zinc	7440-66-6	1.45E+01	1.31E+02	86.85	1.2E+00	1.1E+02	1.5E+05	1.4E+06	5.7E-04	6.3E-05

Notes:

CAS = Chemical Abstract Services

C_{TRV}= NOAEL-based screening level (mg chemical/kg soil)

ADD = NOAEL or LOAEL (mg chemical/kg body weight-day) from Table F.4-10

BW = Average Body Weigth of Receptor (kg)

IR_{food} = Average Ingestion Rate for Food

BAF_{food} = Bioaccumulation factor, specific to prey type and chemical

DF = Dietary fraction

IRs = Incidental Ingestion Rate of soil (kg soil ingested per day, dry weight)

AF = Area Use Factor

NOAEL = No observable adverse effects level

LOAEL = Lowest observable adverse effects level

mg/kg = Milligram Per Kilogram

bw - day = Body Weight - Day

HQ = Hazard Quotient

TRV = Toxicity Reference Value

BDL = Below Detection Limit

EPC = Exposure Point Concentration

Red-tailed Hawk Specific Data from Table F.4-9

BW=	1.134	kg
IR_{food} =	0.059	kg dw/day
BAF_{food}=	Chem Specific	unitless
DF_{mam} =	1.00	unitless
IR_{soil} =	0.0	kg dw/day
AF =	0.0015	unitless

[a] = The following equation was used to calculate screening levels:

$$C_{TRV} = \frac{ADD \cdot BW}{(IR_{food} \sum (BAF_{food} \cdot DF) + (IR_s)) \cdot AF}$$

See Appendix F.1 for an example C_{TRV} calculation.

NOAEL HQ = EPC/Calculated NOAEL-Based Screening Level

LOAEL HQ = EPC/Calculated LOAEL-Based Screening Level

Table F.4-24
Wildlife Summary
Screening Level Ecological Risk Assessment - SWMU 38 and AOC Q
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Chemical	CAS#	Meadow Vole					Short-tailed Shrew					Red Fox					American Robin					Red-tailed Hawk				
		Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ	Preliminary NOAEL-based HQ	Preliminary LOAEL-based HQ	Preliminary EPC NOAEL HQ	Refined NOAEL-based HQ	Refined LOAEL-based HQ
Inorganics																										
Arsenic	7440-38-2	**2.8E+01**	**2.8E+00**	**1.6E+01**	3.3E-01	3.3E-02	**1.0E+01**	1.0E+00	**5.8E+00**	7.2E-01	7.2E-02	**1.9E+01**	**1.9E+00**	**1.1E+01**	7.9E-04	7.9E-05	3.6E-01	1.4E-01	NC	NC	NC	9.7E-04	3.9E-04	NC	NC	NC
Cadmium	7440-43-9	**2.2E+00**	2.2E-01	**1.8E+00**	1.1E-01	1.1E-02	**8.8E+00**	8.8E-01	**7.5E+00**	6.4E-01	6.4E-02	**1.8E+01**	**1.8E+00**	**1.5E+01**	3.8E-04	3.8E-05	**1.7E+01**	**1.2E+00**	**1.4E+01**	5.7E-01	4.1E-02	3.4E-01	2.5E-02	NC	NC	NC
Chromium	7440-47-3	9.1E-01	9.1E-02	NC	NC	NC	**9.0E+00**	9.0E-01	**6.4E+00**	4.1E-01	4.1E-02	**1.8E+01**	**1.8E+00**	**1.3E+01**	7.6E-04	7.6E-05	**8.3E+01**	**1.7E+01**	**5.9E+01**	**1.8E+00**	3.6E-01	**1.8E+00**	3.6E-01	**1.3E+00**	3.6E-04	7.1E-05
Copper	7440-50-8	**1.2E+00**	9.2E-01	6.6E-01	8.0E-02	6.1E-02	**1.0E+00**	7.7E-01	5.5E-01	1.0E-01	7.9E-02	**1.9E+00**	**1.5E+00**	**1.0E+00**	3.7E-04	2.8E-04	9.0E-01	6.9E-01	NC	NC	NC	1.2E-01	9.5E-02	NC	NC	NC
Lead	7439-92-1	**1.1E+00**	1.1E-01	7.1E-01	4.2E-02	4.2E-03	**1.2E+00**	1.2E-01	7.8E-01	1.2E-01	1.2E-02	**2.2E+00**	2.2E-01	**1.5E+00**	2.9E-04	2.9E-05	**2.3E+01**	**2.3E+00**	**1.5E+01**	**1.2E+00**	1.2E-01	8.7E-01	8.7E-02	NC	NC	NC
Mercury	7439-97-6	2.7E-02	2.7E-03	NC	NC	NC	3.6E-02	3.6E-03	NC	NC	NC	7.1E-02	7.1E-03	NC	NC	NC	**3.9E+00**	**2.0E+00**	**2.4E+00**	7.0E-02	3.5E-02	7.6E-03	3.8E-03	NC	NC	NC
Nickel	7440-02-0	4.2E-01	2.1E-01	NC	NC	NC	4.6E-01	2.3E-01	NC	NC	NC	9.2E-01	4.6E-01	NC	NC	NC	6.8E-01	4.9E-01	NC	NC	NC	1.8E-02	1.3E-02	NC	NC	NC
Selenium	7782-49-2	**3.4E+00**	**2.1E+00**	**3.2E+00**	1.9E-01	1.2E-01	**1.1E+00**	7.0E-01	**1.1E+00**	2.0E-01	1.2E-01	**2.2E+00**	**1.4E+00**	**2.1E+00**	1.0E-03	6.3E-04	**1.6E+00**	8.1E-01	**1.5E+00**	1.9E-01	9.3E-02	1.3E-01	6.5E-02	NC	NC	NC
Silver	7440-22-4	1.3E-04	1.3E-05	NC	NC	NC	1.1E-02	1.1E-03	NC	NC	NC	2.1E-02	2.1E-03	NC	NC	NC	4.1E-02	5.4E-03	NC	NC	NC	2.8E-04	3.7E-05	NC	NC	NC
Zinc	7440-66-6	4.6E-01	2.3E-01	NC	NC	NC	**1.1E+00**	5.3E-01	7.7E-01	1.2E-01	6.1E-02	**2.1E+00**	**1.1E+00**	**1.5E+00**	2.7E-04	1.4E-04	**3.4E+01**	**3.7E+00**	**2.4E+01**	**2.0E+00**	2.2E-01	**1.5E+00**	1.6E-01	**1.1E+00**	5.7E-04	6.3E-05
Pesticides/PCBs																										
Endosulfan I	959-98-8	6.0E-03	6.0E-04	NC	NC	NC	1.8E-02	1.8E-03	NC	NC	NC	3.6E-02	3.6E-03	NC	NC	NC	7.7E-04	7.7E-05	NC	NC	NC	1.7E-05	1.7E-06	NC	NC	NC
Endrin	72-20-8	2.4E-02	2.4E-03	NC	NC	NC	2.8E-02	2.8E-03	NC	NC	NC	5.5E-02	5.5E-03	NC	NC	NC	1.4E-01	2.3E-02	NC	NC	NC	8.1E-03	1.3E-03	NC	NC	NC
Aroclor 1254	11097-69-1	1.6E-01	1.6E-02	NC	NC	NC	**2.7E+01**	**2.7E+00**	**2.2E+01**	**4.2E+00**	4.2E-01	**5.4E+01**	**5.4E+00**	**4.3E+01**	5.2E-03	5.2E-04	**7.0E+00**	7.0E-01	**5.6E+00**	4.6E-01	4.6E-02	9.2E-02	9.2E-03	NC	NC	NC
TCL SVOCs																										
Fluoranthene	206-44-0	2.1E-02	4.1E-03	NC	NC	NC	3.5E-02	7.0E-03	NC	NC	NC	7.0E-02	1.4E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	85-01-8	1.1E-01	2.1E-02	NC	NC	NC	3.5E-02	7.1E-03	NC	NC	NC	7.0E-02	1.4E-02	NC	NC	NC	3.4E-01	6.8E-02	NC	NC	NC	6.4E-03	1.3E-03	NC	NC	NC
Pyrene	129-00-0	2.6E-02	5.2E-03	NC	NC	NC	6.1E-02	1.2E-02	NC	NC	NC	1.2E-01	2.5E-02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Explosives																										
2,4-Dinitrotoluene	121-14-2	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	**6.8E+00**	5.5E-01	**6.8E+00**	**1.2E+00**	9.9E-02	1.7E-01	1.3E-02	NC	NC	NC

Notes:
CAS = Chemical Abstract Services
NC = Not Calculated
NOAEL = No observable adverse effects level
LOAEL = Lowest observable adverse effects level
HQ = Hazard Quotient
EPC = Exposure Point Concentration

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APPENDIX F.5

THREATENED AND ENDANGERED SPECIES CORRESPONDENCE

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URS

April 13, 2004

Ms. René Hypes, Project Review Coordinator
Division of Natural Heritage
Virginia Department of Conservation and Recreation
217 Governor Street
Richmond, VA 23219

Subject: Natural Heritage Project Review

Dear Ms. Hypes:

I am writing to request information concerning threatened and endangered species potentially inhabiting the area in the vicinity of an industrial site located near the town of Radford, VA. URS is performing an ecological risk assessment of the site. This information is needed to update information we received from a prior request (Invoice Number: H-3243, 4/10/03).

The site is located in the Valley and Ridge Province in western Montgomery County and eastern Pulaski County, VA. Land use surrounding the site is largely undeveloped due to steep terrain, although less rugged areas are primarily used for agriculture.

A portion of a topographic map (Radford North,VA quad) is attached which specifies the location of the site. Please perform a search of the area within a one-mile radius of this location and notify us of any threatened or endangered species and/or critical or protected habitats known to occur in this vicinity.

If you should have any questions concerning this request, please contact me at 215-542-3800. I thank you for your assistance in this matter.

Sincerely,

Doreen LaPorta

Doreen LaPorta
Biologist

Enclosures(2)

URS Corporation
1400 Union Meeting Road, Suite 202
Blue Bell, PA 19422-1972
Tel: 215.542.3800
Fax: 215.542.3888

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street
Richmond, Virginia 23219-2010
Telephone (804) 786-7951 FAX (804) 371-2674 TDD (804) 786-2121

Doreen LaPorta
URS
1400 Union Meeting Road, Suite 202
Blue Bell, PA 19422-1972

May 17, 2004

Re: Industrial Site, Valley and Ridge in western Montgomery County

Dear Ms. LaPorta:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the topographic map, this project either overlies or is adjacent to a karst landscape characterized by sinkholes, caves, disappearing streams, and large springs. The project has been sent to the Virginia Karst Program and to the Virginia Speleological Survey for review for documented sensitive karst features and caves. A significant cave has been documented in the project vicinity. Please coordinate with the Virginia Karst Program at 540-831-4056 (worndorff@dcr.state.va.us) to avoid, minimize, or mitigate impacts.

Our files also do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

A fee of $ 95.00 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, Department of Conservation and Recreation, 203 Governor Street, Suite 414, Richmond, VA 23219, ATTN: Cashier. Payment is due within thirty days of the invoice date.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,

S. René Hypes

S. René Hypes
Project Review Coordinator

CC: Wil Orndorff, DCR

URS

April 13, 2004

Ms. Roberta Hylton
Project Leader, Southwest Virginia Field Office
U.S. Fish and Wildlife Service
330 Cummings Street
Abingdon, VA 24210

Subject: Threatened and Endangered Species Review

Dear Ms. Hylton:

I am writing to request information concerning threatened and endangered species potentially inhabiting the area in the vicinity of an industrial site located near the town of Radford, VA. URS is performing an ecological risk assessment of the site. This information is needed to update information we received from a prior request (Project #2918, 4/21/03).

The site is located in the Valley and Ridge Province in western Montgomery County and eastern Pulaski County, VA. Land use surrounding the site is largely undeveloped due to steep terrain, although less rugged areas are primarily used for agriculture.

A portion of a topographic map (Radford North,VA quad) is attached which specifies the location of the site. Please perform a search of the area within a one-mile radius of this location and notify us of any threatened or endangered species and/or critical or protected habitats known to occur in this vicinity.

If you should have any questions concerning this request, please contact me at 215-542-3800. I thank you for your assistance in this matter.

Sincerely,

Doreen LaPorta

Doreen LaPorta
Biologist

Enclosure

URS Corporation
1400 Union Meeting Road, Suite 202
Blue Bell, PA 19422-1972
Tel: 215.542.3800
Fax: 215.542.3888

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, VA 23061

May 10, 2004

Ms. Doreen LaPorta
URS Corporation
1400 Union Meeting Road, Suite 202
Blue Bell, Pennsylvania 19422

Re: Project #3348

Greetings:

The U.S. Fish and Wildlife Service (Service) has received your request to review the attached project for potential impacts to federally listed or proposed endangered and threatened species and designated critical habitat in Virginia pursuant to the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). Attached is a list of species with Federal status and species of concern that have been documented or may occur in the county where your project is located. This list was prepared by this office and is based on information obtained from previous surveys for rare and endangered species.

In order to ensure coordination with the State agencies, we consistently recommend that individuals contact the Virginia Department of Conservation and Recreation, Division of Natural Heritage **and** the Virginia Department of Game and Inland Fisheries, since each agency maintains a different database and has differing expertise and/or regulatory responsibility. You can contact these agencies at the following addresses:

Virginia Department of Game and Inland Fisheries
Environmental Services Section
P.O. Box 11104
Richmond, VA 23230
(804) 367-1000

Virginia Department of Conservation and Recreation
Division of Natural Heritage
217 Governor Street, 2nd Floor
Richmond, VA 23219
(804) 786-7951

If either of these agencies determines that your project may impact a federally listed, proposed, or candidate species OR federally designated critical habitat, please contact this office and provide a copy of the response letter from each agency and the above referenced project number; otherwise, further contact with this office is not necessary.

If you have any questions or need further assistance, please contact Ms. Jolie Harrison at (804) 693-6694, extension 208.

Sincerely,

Karen L. Mayne

Karen L. Mayne
Supervisor
Virginia Field Office

Enclosures

PULASKI COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
INVERTEBRATES		
Polygyriscus virginianus	Virginia fringed mountain snail	LE
MAMMALS		
Corynorhinus townsendii virginianus[1]	Virginia big-eared bat	LE
Myotis sodalis[1]	Indiana bat	LE
VASCULAR PLANTS		
Echinacea laevigata	Smooth coneflower	LE

Species of Concern

FISH		
Ethcostoma osburni	Candy darter	G3
INVERTEBRATES		
Caecidotea henroti	Henrot's cave isopod	G2
Glyphyalinia raderi	Maryland glyph	G2
Lasmigona subviridis	Green floater	G3
Pseudanophthalmus sp. 7	A cave beetle	G1
Pyrgus wyandot	Appalachian grizzled skipper	G2
Rhagidia varia	A cave mite	G3
Speyeria diana	Diana fritillary	G3
Speyeria idalia	Regal fritillary	G3
Stygobromus abditus	James cave amphipod	G1
VASCULAR PLANTS		
Buckleya distichophylla	Piratebush	G2
Cardamine flagellifera	A bittercress	G3
Carex schweinitzii[1]	Schweinitz's sedge	G3
Clematis coactilis	Virginia white-haired leatherflower	G3
Delphinium exaltatum	Tall larkspur	G3
Paxistima canbyi	Canby's mountain-lover	G2
Phlox beckleyi	Sword-leaved phlox	G2
Poa paludigena[1]	Bog bluegrass	G3

[1]This species has been documented in an adjacent county and may occur in this county.

June 25, 2002
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

MONTGOMERY COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
FISH		
Percina rex	Roanoke logperch	LE
MAMMALS		
Corynorhinus townsendii virginianus[1]	Virginia big-eared bat	LE
Myotis sodalis[1]	Indiana bat	LE
VASCULAR PLANTS		
Echinacea laevigata	Smooth coneflower	LE

Species of Concern

FISH		
Noturus gilberti	Orangefin madtom	G2
Phenacobius teretulus	Kanawha minnow	G3
Scartomyzon ariommus	Bigeye jumprock	G2
INVERTEBRATES		
Allocapnia simmonsi	Simmons' slender winter stonefly	G2
Atrytone arogos arogos	Arogos skipper	G3G4T1T2
Caecidotea vandeli	Vandel's cave isopod	G2
Catocala dulciola	Sweet underwing	G3
Catocala herodias gerhardi	Herodias underwing	G3T3
Lasmigona holstonia	Tennessee heelsplitter	G2G3
Lasmigona subviridis	Green floater	G3
Pseudanophthalmus pusio	A cave beetle	G3
Pyrgus wyandot	Appalachian grizzled skipper	G2
Speyeria diana	Diana fritillary	G3
Speyeria idalia	Regal fritillary	G3
Stygobromus fergusoni	Montgomery County cave amphipod	G1
VASCULAR PLANTS		
Bucklcya distichophylla	Piratebush	G2
Carex schweinitzii	Schweinitz's sedge	G3
Clematis addisonii	Addison's leatherflower	G2
Clematis coactilis	Virginia white-haired leatherflower	G3

June 25, 2002
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

SCIENTIFIC NAME	COMMON NAME	STATUS
Delphinium exaltatum	Tall larkspur	G3
Monotropsis odorata	Sweet pine sap	G3
Paxistima canbyi	Canby's mountain-lover	G2
Phlox buckleyi	Sword-leaved phlox	G2
Poa paludigena[1]	Bog bluegrass	G3

[1]This species has been documented in an adjacent county and may occur in this county.

June 25, 2002
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

PULASKI COUNTY, VIRGINIA
Federally Listed, Proposed, and Candidate Species

SCIENTIFIC NAME	COMMON NAME	STATUS
INVERTEBRATES		
Polygyriscus virginianus	Virginia fringed mountain snail	LE
MAMMALS		
Corynorhinus townsendii virginianus[1]	Virginia big-eared bat	LE
Myotis sodalis[1]	Indiana bat	LE
VASCULAR PLANTS		
Echinacea laevigata	Smooth coneflower	LE

Species of Concern

FISH			
Etheostoma osburni	Candy darter	G3	
INVERTEBRATES			
Caecidotea henroti	Henrot's cave isopod	G2	
Glyphyalinia raderi	Maryland glyph	G2	
Lasmigona subviridis	Green floater	G3	
Pseudanophthalmus sp. 7	A cave beetle	G1	
Pyrgus wyandot	Appalachian grizzled skipper	G2	
Rhagidia varia	A cave mite		G3
Speyeria diana	Diana fritillary		G3
Speyeria idalia	Regal fritillary		G3
Stygobromus abditus	James cave amphipod		G1
VASCULAR PLANTS			
Buckleya distichophylla	Piratebush	G2	
Cardamine flagellifera	A bittercress		G3
Carex schweinitzii[1]	Schweinitz's sedge	G3	
Clematis coactilis	Virginia white-haired leatherflower	G3	
Delphinium exaltatum	Tall larkspur		G3
Paxistima canbyi	Canby's mountain-lover	G2	
Phlox beckleyi	Sword-leaved phlox		G2
Poa paludigena[1]	Bog bluegrass	G3	

[1]This species has been documented in an adjacent county and may occur in this county.

June 25, 2002
Prepared by U.S. Fish and Wildlife Service, Virginia Field Office

APPENDIX G

ANALYTICAL DATA EVALUATION

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APPENDIX G.1

DATA QUALITY OBJECTIVES

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TABLE G.1-1
DATA USABILITY WORKSHEET
SITE: SWMUs 35, 37, 38, and AOC Q
MEDIUM: Soil

Activity	Comment
Field Sampling	
Discuss sampling problems and field conditions that affect data usability.	There were no problems identified during field sampling that affected data usability.
Are samples representative of receptor exposure for this medium (e.g., sample depth, grab vs. composite, filtered vs. unfiltered, low flow, etc.)?	Yes. Samples are representative of receptor exposure. Surface soil samples and subsurface soil samples were collected from discrete intervals.
Assess the effect of field QC results on data usability.	Field duplicate samples were collected at the rate of 1 per 10 soil samples. The average concentration of the soil sample and its duplicate sample were used in the risk assessments. Equipment rinsate blank samples were collected at the rate of 1 per 20 soil samples. Low-level detections at concentrations below the laboratory reporting limit were reported in one or more of the equipment blank samples for selected metals, VOCs, and SVOCs. No significant impact on data usability resulted from these detections. Matrix spike (MS)/matrix spike duplicate (MSD) samples were at the rate of 1 per 20 soil samples. No significant impact on data usability was identified based on the matrix spike results.
Summarize the effect of field sampling issues on the risk assessment, if applicable.	No significant sampling issues were noted. See Sections 6.0 and 7.0 of the RFI/CMS Report discuss the uncertainty analysis for the human health and ecological risk assessments for sampling and analysis.
Analytical Techniques	
Were the analytical methods appropriate for quantitative risk assessment?	Yes. Low-level SW-846 analytical methods were used for soil analysis in accordance with the MWP and WPA 020. Soil samples were analyzed for VOCs by SW-846 Method 8260B, SVOCs by SW-846 Method 8270C, PAHs by SW-846 Method 8310, explosives by SW-846 Methods 8330 and 8332, pesticides by SW-846 Method 8081A, PCBs by SW-846 Method 8082, herbicides by SW-846 Method 8151, and metals by SW-846 6010B, 6020, 7471A, and 9012A.
Were detection limits adequate?	Low-level SW-846 Methods were used. The detection limits were adequate for screening against adjusted RBCs except as noted in Tables E.1-2.3, E.2-2.3, and E.3-2.3. As discussed in the uncertainties in Sections 6.0 and 7.0, the lack of sensitivity could lead to an underestimation of risk at the site.

TABLE G.1-1
DATA USABILITY WORKSHEET
SITE: SWMUs 35, 37, 38, and AOC Q
MEDIUM: Soil

Activity	Comment
Summarize the effect of analytical technique issues on risk assessment, if applicable.	There were no analytical technical issues which significantly affected the risk assessments. Sections 6.0 and 7.0 of the RFI/CMS Report discuss the uncertainty analysis for the human health and ecological risk assessments for sampling and analysis.
Data Quality Objectives	
Precision – How were duplicates handled?	Field duplicate samples were collected at the rate of 1 per 10 soil samples. The average concentration of the soil sample and its duplicate sample were used in the risk assessments.
Accuracy – How were split samples handled?	Split samples were not collected.
Representativeness – Indicate any problems associated with data representativeness (e.g., trip blank or rinsate blank contamination, COC problems, etc.).	No significant issues regarding data representativeness were noted.
Completeness – Indicate any problems associated with data completeness (e.g., incorrect sample analysis, incomplete sample records, problems with field procedures, etc.).	No significant issues regarding completeness of the data were noted. The overall completeness goal of 90±2% for field activities was exceeded for analytical analysis and field data collection.
Comparability – Indicate any problems associated with data comparability.	No significant issues regarding comparability of the data were noted.
Were the DQOs specified in the QAPP satisfied?	Yes, the DQOs specified in the QAPP were satisfied.
Summarize the effect of DQO issues on the risk assessment, if applicable.	Not applicable.
Data Validation and Interpretation	
What are the data validation requirements for this region?	EPA Region III modifications to the National Functional Guidelines for Data Validation.
What method or guidance was used to validate the data?	EPA Region III National Functional Guidelines for Data Validation.
Was the data validation method consistent with regional guidance? Discuss any discrepancies.	Yes, there were no discrepancies.
Were all data qualifiers defined? Discuss those which were not.	Yes, they were defined in the guidance document, data validation reports included in Appendix H.2 of the RFI/CMS Report, and in the data tables included in Section 4.0 of the RFI/CMS Report.
Which qualifiers represent usable data?	B, E, J, K, L, U, UJ, UL
Which qualifiers represent unusable data?	R

TABLE G.1-1
DATA USABILITY WORKSHEET
SITE: SWMUs 35, 37, 38, and AOC Q
MEDIUM: Soil

How are tentatively identified compounds handled?	Detected tentatively identified compounds are qualified NJ. These compounds are not used in the risk assessments.
Summarize the effect of data validation and interpretation issues on the risk assessment, if applicable.	Section 6.0 of the RFI/CMS Report discusses uncertainties associated with qualified data.
Additional notes:	None.

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Table G.1-1
Detected Analytes in Soil Field Blanks
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS #	EQBK-1 11/13/2007		MDL	RL	EQBK-2 11/14/2007		MDL	RL	EQBK-3 11/15/2007		MDL	RL	EQBK-4 11/16/2007		MDL	RL	Trip Blank 1 11/13/2007		MDL	RL	Trip Blank 2 11/14/2007		MDL	RL
		Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (ug/L)																									
Barium	7440-39-3	<2	U	0.52	2	<2	U	0.52	2	0.6	J	0.52	2	<2	U	0.52	2	NT				NT			
Calcium	7440-70-2	130	J	40	500	270	J	40	500	48	J	40	500	120	J	40	500	NT				NT			
Copper	7440-50-8	<1	U	0.33	1	<1	U	0.33	1	0.51	J	0.33	1	<1	U	0.33	1	NT				NT			
Iron	7439-89-6	9.8	J	5.7	20	9	J	5.7	20	11	J	5.7	20	28		5.7	20	NT				NT			
Lead	7439-92-1	0.98	J	0.33	1	<1	U	0.33	1	<1	U	0.33	1	<1	U	0.33	1	NT				NT			
Manganese	7439-96-5	0.66	J	0.43	3	1.4	J	0.43	3	1.6	J	0.43	3	1.7	J	0.43	3	NT				NT			
Mercury	7439-97-6	<0.2	U	0.046	0.2	<0.2	U	0.046	0.2	<0.2	U	0.046	0.2	0.052	J	0.046	0.2	NT				NT			
Nickel	7440-02-0	0.32	J	0.28	2	<2	U	0.28	2	0.41	J	0.28	2	<2	U	0.28	2	NT				NT			
Vanadium	7440-62-2	<5	U	0.83	5	<5	U	0.83	5	<5	U	0.83	5	1.3	J,B,p	0.83	5	NT				NT			
Zinc	7440-66-6	5.3	J,B,p	0.84	10	11		0.84	10	9.6	J,B,p	0.84	10	3.8	J	0.84	10	NT				NT			
TCL Pesticides (ug/L)																									
Endosulfan I	959-98-8	<0.1	U	0.0023	0.1	0.0062	J,J,g	0.0023	0.1	<0.1	U	0.0023	0.1	<0.1	U	0.0023	0.1	NT				NT			
TCL VOCs (ug/L)																									
Acetone	67-64-1	1.9	J	1.2	20	<20	U	1.2	20	NT				NT				<20	U	1.2	20	<20	U	1.2	20
TCL SVOCs (ug/L)																									
Acetophenone	98-86-2	0.066	J,B,z	0.043	5	<5	U	0.043	5	NT				NT				NT				NT			
Benzaldehyde	100-52-7	<5	U	0.051	5	0.61	J	0.051	5	NT				NT				NT				NT			
Bis(2-ethylhexyl) Phthalate	117-81-7	<5	U	0.41	5	0.42	JB,B,z	0.41	5	NT				NT				NT				NT			
Butyl Benzyl Phthalate	85-68-7	0.038	J	0.029	5	<5	U	0.029	5	NT				NT				NT				NT			
Diethyl Phthalate	84-66-2	0.038	J	0.034	5	0.047	J	0.034	5	NT				NT				NT				NT			
Di-n-butyl Phthalate	84-74-2	2.5	JB,B,z	0.38	5	1.3	JB,B,z	0.38	5	NT				NT				NT				NT			
Naphthalene	91-20-3	0.028	J	0.023	0.5	<0.5	U	0.023	0.5	NT				NT				NT				NT			

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested

Data Qualifiers

B	Analyte found in associated blank as well as in the sample.
J	Estimated value.
,J	Analyte present. Reported value may not be accurate or precise.
U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
g	Dual column confirmation imprecision
p	Preparation blank contamination
z	Method blank and/or storage blank contamination

Note: 1. Source of Data Qualifier Codes: United States Environmental Protection Agency (USEPA) Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, April 1993.
2. Source of Data Qualifier Codes: United States Environmental Protection Agency (USEPA) Region III Modifications to National Functional Guidelines for Organic Data Review Multimedia, Multi-Concentration (OLMO1.0-OLMO1.9), September 1994.

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TABLE G.1-2
DATA USABILITY WORKSHEET
SITE: SWMUs 35, 37, 38, and AOC Q
MEDIUM: Groundwater

Activity	Comment
Field Sampling	
Discuss sampling problems and field conditions that affect data usability.	There were no problems identified during field sampling that affected data usability.
Are samples representative of receptor exposure for this medium (e.g., sample depth, grab vs. composite, filtered vs. unfiltered, low flow, etc.)?	Yes. Both filtered and unfiltered samples were collected for metals. Filtered metals samples were used in the risk assessment and are considered representative of dissolved concentrations in groundwater. Low-flow groundwater sampling techniques were used to collect the samples representative of groundwater quality.
Assess the effect of field QC results on data usability.	Field duplicate samples were collected at the rate of 1 per 10 groundwater samples. The average concentration of the groundwater sample and its duplicate sample were used in the risk assessments. Equipment rinsate blank samples were collected at the rate of 1 per 20 groundwater samples. Low-level detections at concentrations below the laboratory reporting limit were reported in one or more of the equipment blank samples for selected metals, VOCs, and SVOCs. No significant impact on data usability resulted from these detections. Matrix spike (MS)/matrix spike duplicate (MSD) samples were at the rate of 1 per 20 groundwater samples. No significant impact on data usability was identified based on the matrix spike results.
Summarize the effect of field sampling issues on the risk assessment, if applicable.	No significant sampling issues were noted. Section 6.0 of the RFI/CMS Report discusses the uncertainty analysis for the human health risk assessment for sampling and analysis.
Analytical Techniques	
Were the analytical methods appropriate for quantitative risk assessment?	Yes. Low-level SW-846 and EPA analytical methods were used for groundwater analysis in accordance with the MWP and WPA 020. Groundwater samples were analyzed for VOCs by SW-846 by Method 8260B, SVOCs by SW-846 Method 8270C, explosives by SW-846 Methods 8330 and 8332, pesticides by SW-846 Method 8081A, PCBs by SW-846 Method 8082, metals by SW-846 Methods 6010B, 6020, and 7470A, and perchlorate by Method SW-846 Method 6850.

TABLE G.1-2
DATA USABILITY WORKSHEET
SITE: SWMUs 35, 37, 38, and AOC Q
MEDIUM: Groundwater

Activity	Comment
Were detection limits adequate?	Yes. Low-level SW-846 Methods were used. The detection limits were adequate for screening against adjusted RBCs except as noted in Tables E.1-2.5, E.2-2.5, and E.3-2.5. As discussed in the uncertainties in Section 6.0, the lack of sensitivity could lead to an underestimation of risk at the site.
Summarize the effect of analytical technique issues on risk assessment, if applicable.	There were no analytical technical issues which significantly affected the risk assessments. Section 6.0 of the RFI/CMS Report discusses the uncertainty analysis for the human health for sampling and analysis.
Data Quality Objectives	
Precision – How were duplicates handled?	Field duplicate samples were collected at the rate of 1 per 10 groundwater samples. The average concentration of the groundwater sample and its duplicate sample were used in the risk assessment.
Accuracy – How were split samples handled?	Split samples were not collected.
Representativeness – Indicate any problems associated with data representativeness (e.g., trip blank or rinsate blank contamination, COC problems, etc.).	No significant issues regarding data representativeness were noted.
Completeness – Indicate any problems associated with data completeness (e.g., incorrect sample analysis, incomplete sample records, problems with field procedures, etc.).	No significant issues regarding completeness of the data were noted. The overall completeness goal of 90±2% for field activities was exceeded for analytical analysis and field data collection.
Comparability – Indicate any problems associated with data comparability.	No significant issues regarding comparability of the data were noted.
Were the DQOs specified in the QAPP satisfied?	Yes, the DQOs specified in the QAPP were satisfied.
Summarize the effect of DQO issues on the risk assessment, if applicable.	Not applicable.
Data Validation and Interpretation	
What are the data validation requirements for this region?	EPA Region III modifications to the National Functional Guidelines for Data Validation.
What method or guidance was used to validate the data?	EPA Region III National Functional Guidelines for Data Validation.
Was the data validation method consistent with regional guidance? Discuss any discrepancies.	Yes, there were no discrepancies.

TABLE G.1-2
DATA USABILITY WORKSHEET
SITE: SWMUs 35, 37, 38, and AOC Q
MEDIUM: Groundwater

Activity	Comment
Were all data qualifiers defined? Discuss those which were not.	Yes, they were defined in the guidance document, data validation reports included in Appendix H.2 of the RFI/CMS Report, and in the data tables included in Section 4.0 of the RFI/CMS Report.
Which qualifiers represent usable data?	B, J, L, U
Which qualifiers represent unusable data?	R
How are tentatively identified compounds handled?	Detected tentatively identified compounds are qualified NJ. These compounds are not used in the risk assessment.
Summarize the effect of data validation and interpretation issues on the risk assessment, if applicable.	Section 6.0 of the RFI/CMS Report discusses uncertainties associated with qualified data.
Additional notes:	None.

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Table G.1-2
Detected Analytes in Groundwater Field Blanks
SWMUs 35, 37, 38, and AOC Q RFI Report
Radford Army Ammunition Plant, Radford, Virginia

Sample ID / Sample Date	CAS #	EQBK-5 2/8/2008		MDL	RL	Trip Blank 1 2/7/2008		MDL	RL	Trip Blank 2 2/8/2008		MDL	RL	Trip Blank 3 2/11/2008		MDL	RL	Trip Blank 4 2/12/2008		MDL	RL	Trip Blank 5 6/16/2010		MDL	RL
		Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r			Result	LQ, VQ, r		
TAL Metals (µg/L)																									
Antimony, Total	7440-36-0	0.84	J,B,o	0.44	3	NT				NT				NT				NT				NT			
Chromium, Total	7440-47-3	0.61	J	0.31	2	NT				NT				NT				NT				NT			
Nickel, Total	7440-02-0	0.41	J	0.28	2	NT				NT				NT				NT				NT			
Zinc, Total	7440-66-6	4	J,B,p	0.84	10	NT				NT				NT				NT				NT			
TCLVOCs (µg/L)																									
Acetone	67-64-1	<20	U	1.2	20	2.1	J,B,z	1.2	20	1.6	J,B,z	1.2	20	1.9	J,B,z	1.2	20	1.7	J,B,z	1.2	20	<20	U,UJ,c	2.1	20
Chloromethane	74-87-3	<1	U	0.06	1	0.27	J,L,h	0.06	1	<1	U	0.06	1	<1	U	0.06	1	<1	U	0.06	1	<1	U	0.16	1
Toluene	108-88-3	0.08	J,B,z	0.072	1	<1	U,UL,h	0.072	1	0.09	J,B,z	0.072	1	0.11	J,B,z	0.072	1	0.13	J,B,z	0.072	1	<1	U	0.16	1
TCL SVOCs (µg/L)																									
Bis(2-ethylhexyl) Phthalate	117-81-7	0.72	J	0.41	5	NT				NT				NT				NT				NT			
Butyl Benzyl Phthalate	85-68-7	0.26	J	0.029	5	NT				NT				NT				NT				NT			
Isophorone	78-59-1	0.057	J	0.031	5	NT				NT				NT				NT				NT			
Naphthalene	91-20-3	0.047	J	0.023	0.5	NT				NT				NT				NT				NT			

Notes:

CAS = Chemical Abstracts Service
µg/L = Microgram Per Liter
TAL = Target Analyte List
TCL = Target Compound List
VOC = Volatile Organic Compound
SVOC = Semi-volatile Organic Compound
MDL = Method Detection Limit
RL = Reporting Limit
LQ = Laboratory Qualifier
VQ = Validation Qualifier
r = Reason Code
NT = Not Tested

Data Qualifiers

B	Analyte found in associated blank as well as in the sample.
J	Estimated value.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
U	The compound was analyzed for but not detected. The reporting limit will be adjusted to reflect any dilution, and for soil, the percent moisture.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
c	Calibration failure; poor or unstable response
h	Holding time violation
o	Calibration blank contamination
p	Preparation blank contamination
z	Method blank and/or storage blank contamination

Note: 1. Source of Data Qualifier Codes: United States Environmental Protection Agency (USEPA) Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, April 1993.
2. Source of Data Qualifier Codes: United States Environmental Protection Agency (USEPA) Region III Modifications to National Functional Guidelines for Organic Data Review Multimedia, Multi-Concentration (OLMO1.0-OLMO1.9), September 1994.

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APPENDIX G.2

LABORATORY ANALYTICAL DATA (FORM 1s)

APPENDIX G.2.1
SITE SCREENING PROCESS SAMPLING DATA VALIDATION REPORTS
2003

APPENDIX G.2.2
RCRA FACILITY INVESTIGATION SAMPLING DATA VALIDATION REPORTS
2007-2008

APPENDIX G.2.3
SWMU 37 MONITORING WELL 4 SAMPLING DATA VALIDATION REPORT
2010

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APPENDIX G.2.1
SITE SCREENING PROCESS SAMPLING DATA VALIDATION REPORTS
2003

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DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-1 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford SSP

Reviewer: AS **Date:** December 30, 2003 (Revision 2)

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: For the VOC analyses, the method blank for batch 90044-113 contained acetone at 0.00770 mg/Kg. The method blank for batch 90044-213 contained acetone at 0.00940 mg/Kg and methylene chloride at 0.00330 mg/Kg. The method blank for batch 90044-114 contained acetone at 0.0100 mg/Kg. The method blank for batch 90037-115 contained acetone at 0.660 mg/Kg and methylene chloride at 0.0200 mg/Kg. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The associated equipment blank EQB1 submitted with sample delivery group 36440-2 displayed positive detections for acetone at 2.9 ug/L and methylene chloride at 0.60 ug/L. The equipment blank detections for methylene chloride and acetone were previously qualified due to method blank detections. No further data qualifying action was required.

The continuing calibration analyzed on 10/13/03 at 1105 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for chloroethane at 28.4%, acetone at 34.2%, methylene chloride at 27.6%, and methyl acetate at 33.3%. The continuing calibration analyzed on 10/13/03 at 2159 displayed percent differences greater than the control limit with a negative bias for acetone at 25.9% and methyl acetate at 26.0% and with a positive bias for methyl-tert-butyl ether at 29.6%, 1,1-dichloroethane at 22.9%, and bromochloromethane at 24.5%. The continuing calibration analyzed on 10/14/03 at 0840 displayed percent differences greater than the control limit with a negative bias for acetone at 34.7%, methylene chloride at 23.8%, and methyl acetate at 21.9%. The continuing calibration analyzed on 10/15/03 at 0919 displayed a percent difference greater than the control limit with a negative bias for carbon disulfide at 27.5%. Non-detect associated field samples were flagged "UJ,c" while positive associated field sample results were flagged "J,c" for anomalous compounds with a negative bias, unless previously qualified for a method blank detection for acetone. The associated field samples were non-detect for the anomalous compounds that displayed a positive bias, thus, no data qualifying action was taken.

The laboratory control spike for batch 90044-213 displayed a percent recovery greater than the upper laboratory generated control limit (i.e., 127%) for methyl-tert-butyl ether at 130%. The associated field samples were non-detect while the laboratory control spike displayed a positive bias. No data qualifying action was taken.

The matrix spike pair for sample FSB2A displayed percent recoveries outside the laboratory generated control limits for 1,2-dibromo-3-chloropropane (147%), trans-1,2-dichloroethene (130%), acetone (21%), carbon disulfide (40%/48%), and methyl-tert-butyl ether (146%). The matrix spike duplicate for sample FSB2A displayed a recovery less than the laboratory generated lower control limit for methyl ethyl ketone at 0% while the matrix spike displayed an acceptable recovery at 113%. This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for methyl ethyl ketone at 50% and acetone at 25%. The parent sample was non-detect for carbon disulfide and was flagged "UJ,m". The parent sample was positive for methyl ethyl ketone and was flagged "J,m". The parent sample acetone result was positive and previously qualified for a continuing calibration anomaly. The other anomalous compounds displayed a positive bias while the parent sample results were non-detect. No further data qualifying action was taken.

For the SVOC analyses, the associated equipment blank EQB1 submitted with sample delivery group 36440-2 contained bis(2-ethylhexyl)phthalate at 1.0 ug/L, butyl benzyl phthalate at 0.96 ug/L, diethylphthalate at 0.10 ug/L, and several tentatively identified compounds (TICs). Positive results less than ten times the blank concentration of these target phthalates and less than five times the blank concentration of the TICs were flagged "B,x" in the associated samples.

The continuing calibration analyzed on 10/14/03 at 0518 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for benzaldehyde at 28.2% and with a positive bias for 4-chloroaniline at 21.4%, 3-nitroaniline at 21.1%, 4,6-dinitro-2-methylphenol at 24.3%, 4-nitroaniline at 31.9%, and pentachlorophenol at 24.5%. All associated field sample results were non-detect for benzaldehyde and were flagged "UJ,c". All associated field sample results were non-detect for the other anomalous compounds while the continuing calibration displayed a positive bias, thus, no data qualifying action was required. The continuing calibration analyzed on 10/15/03 at 1103 displayed percent differences greater than the control limit with a negative bias for benzaldehyde at 29.7% and 4-chloroaniline at 24.2% and with a positive bias for bis(2-chloroethyl)ether at 20.8%, 2,4-dinitrophenol at 26.3%, and 4,6-dinitro-2-methylphenol at 20.1%. All associated field sample results were non-detect for benzaldehyde and 4-chloroaniline and were flagged "UJ,c". All associated field sample results were non-detect for the other anomalous compounds while the continuing calibration displayed a positive bias, thus, no data qualifying action was required.

The laboratory control spike recoveries were greater than the upper control limit for 3,3'-dichlorobenzidine at 116%, benzo(k)fluoranthene at 118%, and carbazole at 125%. All associated field sample results were non-detect while the laboratory control spike displayed a positive bias. No data qualifying action was taken.

The matrix spike pair for sample FSB2A displayed percent recoveries outside the laboratory generated control limits for 2,4,5-trichlorophenol (119%/129%), 2,6-

dinitrotoluene (119%/122%), 2-nitroaniline (114%), 3,3'-dichlorobenzidine (19%/27%), 4-bromophenyl phenyl ether (114%/117%), 4-chloroaniline (15%/14%), 4-nitroaniline (56%), diethylphthalate (120%/122%), and fluorene (114%). This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 24%) for 3-nitroaniline at 34%. The parent sample results were non-detect for 2,4,5-trichlorophenol, 2,6-dinitrotoluene, 2-nitroaniline, 4-bromophenyl phenyl ether, 3-nitroaniline, and fluorene while the spike recoveries displayed a positive bias or imprecision, thus, no data qualifying action was taken. The parent sample result was positive for diethylphthalate and previously flagged due to an equipment blank detection, therefore, no further data qualifying action was taken. The parent sample results for 3,3'-dichlorobenzidine, 4-chloroaniline, and 4-nitroaniline were non-detect and were flagged "UJ,m".

Sample FSB1A displayed two acid fraction surrogate recoveries greater than the upper laboratory generated control limits for 2-fluorophenol at 125% and 2,4,6-tribromophenol at 114%. The positive associated acid target constituents were flagged "J,s". Sample FSB2C displayed one acid surrogate recovery greater than the upper laboratory generated control limit (i.e., 115%) for 2-fluorophenol at 117%. Sample FSB3A displayed one acid surrogate recovery greater than the upper laboratory generated control limit (i.e., 113%) for 2,4,6-tribromophenol at 117%. No data qualifying action is taken with only one acid fraction surrogate recovery outlier.

Sample 37SB1A was initially analyzed at a dilution of 16 due to the presence of a non-target matrix interference. This sample was re-analyzed at a dilution of 160. Both analytical runs displayed internal standard area counts less than the lower control limit (i.e., -50%) for perylene-d10 at -78.6% and -67.2%. The associated field sample results were non-detect and were flagged "UJ,i". The original analysis used be used for data interpretation.

For the PAH analyses, the laboratory control spike for batch 90138-110 displayed a recovery less than the lower laboratory generated control limit (i.e., 86%) but greater than the project QAPP lower control limit (i.e., 40%) for benzo(a)anthracene at 73%. The associated field sample results were non-detect and were flagged "UJ,l".

The matrix spike pair for sample FSB2A displayed recoveries less than the lower laboratory generated control limits for benzo(g,h,i)perylene (75%), fluoranthene (70%/74%), and phenanthrene (62%). The parent sample results were non-detect for these compounds and were flagged "UJ,m".

For the explosive analyses, the opening continuing calibration analyzed on 10/19/03 at 0414 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 3-nitrotoluene at 17.3%. The closing continuing calibration analyzed on 10/19/03 at 0852 displayed percent differences greater than the control limit with a negative bias for 3-nitrotoluene at 17.0% and HMX at 24.0%. All associated sample results were non-detect and were flagged "UJ,c".

For the pesticide analyses, the closing continuing calibration analyzed on 10/10/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias for delta BHC at 18.6%, 4,4'-DDD at 19.73%, endosulfan II at 15.76%,

methoxychlor at 19.24%, and endosulfan sulfate at 15.16% on column one. The associated field sample results were non-detect or did not confirm on the passing analytical column two. No data qualifying action was taken based on these anomalies.

The matrix spike duplicate for sample FSB2A submitted with sample delivery group 36440-2 displayed several recoveries less than the lower laboratory generated control limits. This matrix spike duplicate was analyzed twice and the second analysis results were reported. This matrix spike pair also displayed several relative percent differences greater than the laboratory generated control limits. Since the matrix spike displayed acceptable recoveries and all recoveries were within the QAPP specified limits, no data qualifying action was taken based on these anomalies.

The relative percent difference between the two analytical column concentrations was greater than the control limit (i.e., 40%) for dieldrin in sample 37SB1A at 53%. This result was flagged "J,g".

For the herbicide analyses, the laboratory control spike displayed a recovery less than the lower control limit at for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (91%) for MCPP at 117%. The associated field sample results were non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. A re-extraction occurred on 10/17/03 that was 17 and 18 days after the sampling date because the initial extraction did not recover dinoseb. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. All dinoseb results from the re-extraction were non-detect and were flagged "UJ,h".

The re-extractions for samples FSB2A and 46SB1A displayed surrogate recoveries greater than the laboratory generated upper control limit (i.e., 114%) for 2,4-dichlorophenylacetic acid at 136% and 129%, respectively. The associated field sample results were non-detect, thus, no data qualifying action was required.

The matrix spike pair for sample FSB2A from the original extraction displayed recoveries less than the laboratory generated lower control limits for dinoseb (2%/7%) and dicamba (46%). This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 40%) for dicamba at 90%. The matrix spike pair for sample FSB2A from the re-extraction displayed recoveries less than the lower control limit (i.e., 50%) for dinoseb (29%/42%). All dinoseb results from the original extraction were manually removed by the reviewer. Since the matrix spike duplicate displayed an acceptable recovery for dicamba and all recoveries were within the QAPP specified limits, no data qualifying action was taken based on these anomalies.

For the metal analyses by 6020, the method blank for batch 89772-103 contained arsenic at 0.0321 mg/Kg and silver at 0.00596 mg/Kg. The field sample results were greater than five times the associated method blank concentration for arsenic and silver, thus, no data qualifying action was required. The method blank for batch 89769-106 contained antimony at 0.45 mg/Kg. All associated field sample results for antimony were positive and less than five times the blank concentration. These results were flagged "B,p".

The associated equipment blank EQB1 submitted with sample delivery group 36440-2 contained lead at 0.3 ug/L. The associated field sample results were positive and greater than five times the equipment blank concentration. No data qualifying action was required.

The serial dilution performed on sample FSB2A displayed a percent difference greater than the control limit (i.e., 10%) for nickel at 15.4%. All associated field sample results were positive and were flagged "J,s".

For the metal analyses by 6010B, the method blank for batch 89813-103 contained positive results for cadmium at 0.255 mg/Kg, chromium at 0.930 mg/Kg, vanadium at 0.247 mg/Kg, and zinc at 1.63 mg/Kg. The method blank for batch 89817-107 contained positive results for barium at 0.128 mg/Kg, cadmium at 0.329 mg/Kg, iron at 2.87 mg/Kg, potassium at 12.5 mg/Kg, and sodium at 18.7 mg/Kg. Positive results less than five times the blank concentration for cadmium and sodium were flagged "B,p" in the associated samples. All other field sample results were greater than five times the associated method blank concentration and no data qualifying action was required.

The associated equipment blank EQB1 submitted with sample delivery group 36440-2 contained beryllium at 0.3 ug/L and sodium at 220 ug/L. Associated positive field sample results less than five times the equipment blank concentration were flagged "B,x", unless previously flagged due to a method blank detection.

The matrix spike pair performed on sample FSB2A displayed recoveries less than the lower laboratory generated control limit (i.e., 70%) for calcium (60%/62%). All associated field sample results were positive and were flagged "L,m". The post digestion spike performed on this parent sample displayed a recovery less than the lower control limit (i.e., 75%) for iron at 71%. No data qualifying action is taken based solely on a post digestion spike anomaly. The serial dilution performed on sample FSB2A displayed percent differences greater than the control limit (i.e., 10%) for cobalt at 28.6%, chromium at 20.0%, iron at 10.4%, and potassium at 11.0%. All associated field sample results were positive and were flagged "J,s".

The field duplicate pair (FSB2B and SBD1) displayed relative percent differences greater than the control limit (i.e., 35%) for aluminum at 38.6%, calcium at 101.4%, iron at 39.7%, and magnesium at 67.5%. The field sample results for calcium were previously flagged for low matrix spike recoveries and the field sample results for iron were previously flagged for a high percent difference in the serial dilution, thus, no further data qualifying action was taken. The positive results for aluminum and magnesium were flagged "J,f" in these two samples.

Correctable Anomalies:

The chain of custody incorrectly requested herbicide analyses for several samples that were subsequently cancelled by the client. The client requested that the analyses proceed for the field sample 37SB1C sampled on 10/1/03 to be relabeled as 37SB1B. The client requested also that the field sample 37SB1B sampled on 10/1/03 be discarded. The laboratory proceeded with this direction. However, the encores for volatile analyses were not transferred and preserved within holding time. The client cancelled the volatiles analysis for relabeled sample 37SB1B collected on 10/1/03, the client

recollected 37SB1B, and the volatiles results for this sample were submitted by the laboratory in sample delivery group 36440-6.

Comments: Sample 37SB1A was initially analyzed for SVOCs at a dilution of 16 due to non-target matrix interference with the internal standards. Sample 37SB1A was initially analyzed for herbicides at a dilution of 16 due to non-target matrix interference with the instrument detector. Due to the abundance of target compounds, most of the samples were analyzed at dilutions for the metals analyses. Cyanide results for FSB2B, SBD-1, and FSB2C were reported from dilutions due to matrix interference with the instrument detector. Therefore, the reporting limits were elevated.

A field cooler containing 37SB1A, 37SB1B, and 37SB1C was received at the laboratory with an internal temperature of 1.7°C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. No anomalies were encountered if a given fraction was not mentioned. Except for data flagged "R", all data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-1	344823	FSB1A	SO	09/30/03
36440-1	344824	FSB1B	SO	09/30/03
36440-1	344825	FSB1C	SO	09/30/03
36440-1	344826	FSB2A	SO	09/30/03
36440-1	344827	FSB2B	SO	09/30/03
36440-1	344828	SBD-1	SO	09/30/03
36440-1	344829	FSB2C	SO	09/30/03
36440-1	344922	FSB3A	SO	10/01/03
36440-1	344923	FSB3B	SO	10/01/03
36440-1	344924	FSB3C	SO	10/01/03
36440-1	344925	46SB1A	SO	10/01/03
36440-1	344926	46SB1B	SO	10/01/03
36440-1	344927	46SB1C	SO	10/01/03
36440-1	344928	46SB2A	SO	10/01/03
36440-1	344929	46SB2B	SO	10/01/03
36440-1	344930	46SB2C	SO	10/01/03
36440-1	344931	SBD2	SO	10/01/03
36440-1	344932	37SB1A	SO	10/01/03
36440-1	345024	37SB1B	SO	10/01/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1A**	QC Batch:	90044 -113
Sample #:	**344823**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.15

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.7 U		5.7	0.490
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.7 U		5.7	0.873
79-34-5	1,1,2,2-Tetrachloroethane	5.7 U		5.7	0.751
79-00-5	1,1,2-Trichloroethane	5.7 U		5.7	0.682
75-34-3	1,1-Dichloroethane	5.7 U		5.7	0.833
75-35-4	1,1-Dichloroethylene	5.7 U		5.7	0.843
106-93-4	1,2-Dibromoethane	5.7 U		5.7	0.788
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.39
95-50-1	1,2-Dichlorobenzene	5.7 U		5.7	0.557
107-06-2	1,2-Dichloroethane	5.7 U		5.7	0.496
156-59-2	**cis-1,2-Dichloroethene**	**7.8**		5.7	0.817
156-60-5	trans-1,2-Dichloroethene	5.7 U		5.7	0.808
78-87-5	1,2-Dichloropropane	5.7 U		5.7	0.674
87-61-6	1,2,3-Trichlorobenzene	5.7 U		5.7	0.626
120-82-1	1,2,4-Trichlorobenzene	5.7 U		5.7	0.472
541-73-1	1,3-Dichlorobenzene	5.7 U		5.7	0.308
106-46-7	1,4-Dichlorobenzene	5.7 U		5.7	0.817
78-93-3	**Methyl Ethyl Ketone**	**75**		22	5.75
591-78-6	**2-Hexanone**	**14**		11	2.60
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.68
67-64-1	**Acetone**	**220**	J,c	22	5.75
71-43-2	Benzene	5.7 U		5.7	0.606
74-97-5	Bromochloromethane	5.7 U		5.7	0.875
75-27-4	Dichlorobromomethane	5.7 U		5.7	0.576
75-25-2	Bromoform	5.7 U		5.7	0.665
74-83-9	Bromomethane	5.7 U		5.7	1.73
75-15-0	Carbon Disulfide	5.7 U		5.7	1.67
56-23-5	Carbon Tetrachloride	5.7 U		5.7	0.536
108-90-7	Chlorobenzene	5.7 U		5.7	0.760
75-00-3	Chloroethane	5.7 U	UJ,c	5.7	1.55
67-66-3	Chloroform	5.7 U		5.7	0.513

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1A**	QC Batch:	90044 -113
Sample #:	**344823**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.15

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.7 U		5.7	0.959
110-82-7	Cyclohexane	11 U		11	0.363
10061-01-5	cis-1,3-Dichloropropene	5.7 U		5.7	0.565
10061-02-6	trans-1,3-Dichloropropene	5.7 U		5.7	0.599
75-71-8	Dichlorodifluoromethane	5.7 U		5.7	0.768
124-48-1	Chlorodibromomethane	5.7 U		5.7	0.595
100-41-4	**Ethylbenzene**	**0.56 J**		5.7	0.486
98-82-8	Isopropylbenzene	5.7 U		5.7	0.628
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.99
108-87-2	Methylcyclohexane	11 U		11	0.972
1634-04-4	Methyl(tert)butyl Ether	5.7 U		5.7	0.737
75-09-2	**Methylene Chloride**	**5.8 J**	J,c	22	3.23
100-42-5	Styrene	5.7 U		5.7	0.508
127-18-4	Tetrachloroethene	5.7 U		5.7	0.705
108-88-3	**Toluene**	**2.7 J**		5.7	0.534
79-01-6	**Trichloroethene**	**120**		5.7	0.779
75-69-4	**Trichlorofluoromethane**	**0.91 J**		5.7	0.854
75-01-4	Vinyl Chloride	5.7 U		5.7	0.426
1330-20-7	**Xylene (Total)**	**3.6 J**		5.7	0.484

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1A**	QC Batch:	90044 -113
Sample #:	**344823**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	87
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Butanal	123-72-8	5.3	E	NJ,+
Hexanal	66-25-1	6.4	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1B**	QC Batch:	90044 -113
Sample #:	**344824**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U		5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	**Methyl Ethyl Ketone**	**72**		24	5.90
591-78-6	2-Hexanone	12 U		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**80**	J,c	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U		5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U	UJ,c	5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1B**	QC Batch:	90044 -113
Sample #:	**344824**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**4.0 J**	J,c	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1B**	QC Batch:	90044 -113
Sample #:	**344824**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1C**	QC Batch:	90044 -113
Sample #:	**344825**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	0.520
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.926
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	0.797
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	0.723
75-34-3	1,1-Dichloroethane	6.1 U		6.1	0.883
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	0.894
106-93-4	1,2-Dibromoethane	6.1 U		6.1	0.836
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.54
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	0.590
107-06-2	1,2-Dichloroethane	6.1 U		6.1	0.526
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	0.866
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	0.858
78-87-5	1,2-Dichloropropane	6.1 U		6.1	0.715
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	0.664
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	0.500
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	0.327
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.866
78-93-3	**Methyl Ethyl Ketone**	**79**		24	6.10
591-78-6	**2-Hexanone**	**14**		12	2.76
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.78
67-64-1	**Acetone**	**110**	J,c	24	6.10
71-43-2	Benzene	6.1 U		6.1	0.643
74-97-5	Bromochloromethane	6.1 U		6.1	0.928
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.611
75-25-2	Bromoform	6.1 U		6.1	0.705
74-83-9	Bromomethane	6.1 U		6.1	1.83
75-15-0	Carbon Disulfide	6.1 U		6.1	1.77
56-23-5	Carbon Tetrachloride	6.1 U		6.1	0.569
108-90-7	Chlorobenzene	6.1 U		6.1	0.806
75-00-3	Chloroethane	6.1 U	UJ,c	6.1	1.65
67-66-3	Chloroform	6.1 U		6.1	0.544

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1C**	QC Batch:	90044 -113
Sample #:	**344825**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.02
110-82-7	Cyclohexane	21 U		21	0.386
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.599
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.636
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.815
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.631
100-41-4	Ethylbenzene	6.1 U		6.1	0.516
98-82-8	Isopropylbenzene	6.1 U		6.1	0.666
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.23
108-87-2	Methylcyclohexane	21 U		21	1.03
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.782
75-09-2	**Methylene Chloride**	**6.4 J**	J,C	24	3.43
100-42-5	Styrene	6.1 U		6.1	0.539
127-18-4	Tetrachloroethene	6.1 U		6.1	0.748
108-88-3	Toluene	6.1 U		6.1	0.566
79-01-6	Trichloroethene	6.1 U		6.1	0.826
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.906
75-01-4	Vinyl Chloride	6.1 U		6.1	0.451
1330-20-7	Xylene (Total)	6.1 U		6.1	0.514

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB1C**	QC Batch:	90044 -113
Sample #:	**344825**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2A**	QC Batch:	90044 -113
Sample #:	**344826**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U		5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	**Methyl Ethyl Ketone**	**94**	J,M	24	5.90
591-78-6	**2-Hexanone**	**13**		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**150**	J,c	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	*Carbon Disulfide	5.9 U	UJ,M	5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U	UJ,c	5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2A**	QC Batch:	90044 -113
Sample #:	**344826**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**3.8 J**	J,c	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2A**	QC Batch:	90044 -113
Sample #:	**344826**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Butanal	123-72-8	7.6	E	NJ,+
Hexanal	66-25-1	6.7	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2B**	QC Batch:	90044 -113
Sample #:	**344827**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.4 U		5.4	0.460
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.4 U		5.4	0.820
79-34-5	1,1,2,2-Tetrachloroethane	5.4 U		5.4	0.705
79-00-5	1,1,2-Trichloroethane	5.4 U		5.4	0.640
75-34-3	1,1-Dichloroethane	5.4 U		5.4	0.782
75-35-4	1,1-Dichloroethylene	5.4 U		5.4	0.792
106-93-4	1,2-Dibromoethane	5.4 U		5.4	0.740
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.25
95-50-1	1,2-Dichlorobenzene	5.4 U		5.4	0.523
107-06-2	1,2-Dichloroethane	5.4 U		5.4	0.465
156-59-2	cis-1,2-Dichloroethene	5.4 U		5.4	0.767
156-60-5	trans-1,2-Dichloroethene	5.4 U		5.4	0.759
78-87-5	1,2-Dichloropropane	5.4 U		5.4	0.633
87-61-6	1,2,3-Trichlorobenzene	5.4 U		5.4	0.588
120-82-1	1,2,4-Trichlorobenzene	5.4 U		5.4	0.443
541-73-1	1,3-Dichlorobenzene	5.4 U		5.4	0.289
106-46-7	1,4-Dichlorobenzene	5.4 U		5.4	0.767
78-93-3	**Methyl Ethyl Ketone**	**65**		22	5.40
591-78-6	2-Hexanone	11 U		11	2.44
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.58
67-64-1	**Acetone**	**93**	J,c	22	5.40
71-43-2	Benzene	5.4 U		5.4	0.569
74-97-5	Bromochloromethane	5.4 U		5.4	0.822
75-27-4	Dichlorobromomethane	5.4 U		5.4	0.541
75-25-2	Bromoform	5.4 U		5.4	0.624
74-83-9	Bromomethane	5.4 U		5.4	1.62
75-15-0	Carbon Disulfide	5.4 U		5.4	1.57
56-23-5	Carbon Tetrachloride	5.4 U		5.4	0.503
108-90-7	Chlorobenzene	5.4 U		5.4	0.714
75-00-3	Chloroethane	5.4 U	UJ,c	5.4	1.46
67-66-3	Chloroform	5.4 U		5.4	0.482

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2B**	QC Batch:	90044 -113
Sample #:	**344827**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.4 U		5.4	0.901
110-82-7	Cyclohexane	11 U		11	0.341
10061-01-5	cis-1,3-Dichloropropene	5.4 U		5.4	0.530
10061-02-6	trans-1,3-Dichloropropene	5.4 U		5.4	0.563
75-71-8	Dichlorodifluoromethane	5.4 U		5.4	0.721
124-48-1	Chlorodibromomethane	5.4 U		5.4	0.558
100-41-4	Ethylbenzene	5.4 U		5.4	0.457
98-82-8	Isopropylbenzene	5.4 U		5.4	0.590
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.75
108-87-2	Methylcyclohexane	11 U		11	0.913
1634-04-4	Methyl(tert)butyl Ether	5.4 U		5.4	0.692
75-09-2	**Methylene Chloride**	**3.9 J**	J,c	22	3.03
100-42-5	Styrene	5.4 U		5.4	0.477
127-18-4	Tetrachloroethene	5.4 U		5.4	0.662
108-88-3	Toluene	5.4 U		5.4	0.501
79-01-6	Trichloroethene	5.4 U		5.4	0.731
75-69-4	Trichlorofluoromethane	5.4 U		5.4	0.802
75-01-4	Vinyl Chloride	5.4 U		5.4	0.400
1330-20-7	Xylene (Total)	5.4 U		5.4	0.455

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2B**	QC Batch:	90044 -113
Sample #:	**344827**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD-1**	QC Batch:	90044 -113
Sample #:	**344828**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.14

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.7 U		5.7	0.486
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.7 U		5.7	0.865
79-34-5	1,1,2,2-Tetrachloroethane	5.7 U		5.7	0.744
79-00-5	1,1,2-Trichloroethane	5.7 U		5.7	0.676
75-34-3	1,1-Dichloroethane	5.7 U		5.7	0.825
75-35-4	1,1-Dichloroethylene	5.7 U		5.7	0.836
106-93-4	1,2-Dibromoethane	5.7 U		5.7	0.781
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.37
95-50-1	1,2-Dichlorobenzene	5.7 U		5.7	0.552
107-06-2	1,2-Dichloroethane	5.7 U		5.7	0.491
156-59-2	cis-1,2-Dichloroethene	5.7 U		5.7	0.809
156-60-5	trans-1,2-Dichloroethene	5.7 U		5.7	0.801
78-87-5	1,2-Dichloropropane	5.7 U		5.7	0.668
87-61-6	1,2,3-Trichlorobenzene	5.7 U		5.7	0.620
120-82-1	1,2,4-Trichlorobenzene	5.7 U		5.7	0.467
541-73-1	1,3-Dichlorobenzene	5.7 U		5.7	0.306
106-46-7	1,4-Dichlorobenzene	5.7 U		5.7	0.809
78-93-3	**Methyl Ethyl Ketone**	**59**		22	5.70
591-78-6	2-Hexanone	11 U		11	2.58
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.66
67-64-1	**Acetone**	**97**	J/c	22	5.70
71-43-2	Benzene	5.7 U		5.7	0.601
74-97-5	Bromochloromethane	5.7 U		5.7	0.868
75-27-4	Dichlorobromomethane	5.7 U		5.7	0.571
75-25-2	Bromoform	5.7 U		5.7	0.659
74-83-9	Bromomethane	5.7 U		5.7	1.71
75-15-0	Carbon Disulfide	5.7 U		5.7	1.65
56-23-5	Carbon Tetrachloride	5.7 U		5.7	0.531
108-90-7	Chlorobenzene	5.7 U		5.7	0.754
75-00-3	Chloroethane	5.7 U	UJc	5.7	1.54
67-66-3	Chloroform	5.7 U		5.7	0.508

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD-1**	QC Batch:	90044 -113
Sample #:	**344828**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.14

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.7 U		5.7	0.951
110-82-7	Cyclohexane	11 U		11	0.360
10061-01-5	cis-1,3-Dichloropropene	5.7 U		5.7	0.560
10061-02-6	trans-1,3-Dichloropropene	5.7 U		5.7	0.594
75-71-8	Dichlorodifluoromethane	5.7 U		5.7	0.762
124-48-1	Chlorodibromomethane	5.7 U		5.7	0.589
100-41-4	Ethylbenzene	5.7 U		5.7	0.482
98-82-8	Isopropylbenzene	5.7 U		5.7	0.622
79-20-9	Methyl Acetate	22 U	UJ/c	22	3.96
108-87-2	Methylcyclohexane	11 U		11	0.963
1634-04-4	Methyl(tert)butyl Ether	5.7 U		5.7	0.731
75-09-2	**Methylene Chloride**	**9.5 J**	J/c	22	3.20
100-42-5	Styrene	5.7 U		5.7	0.504
127-18-4	Tetrachloroethene	5.7 U		5.7	0.699
108-88-3	Toluene	5.7 U		5.7	0.529
79-01-6	Trichloroethene	5.7 U		5.7	0.772
75-69-4	**Trichlorofluoromethane**	**1.2 J**		5.7	0.847
75-01-4	Vinyl Chloride	5.7 U		5.7	0.422
1330-20-7	Xylene (Total)	5.7 U		5.7	0.480

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD-1**	QC Batch:	90044 -113
Sample #:	**344828**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2C**	QC Batch:	90044 -113
Sample #:	**344829**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U		5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	**Methyl Ethyl Ketone**	**78**		24	5.90
591-78-6	2-Hexanone	12 U		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**100**	J,c	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U		5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U	UJ,c	5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2C**	QC Batch:	90044 -113
Sample #:	**344829**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**4.2 J**	J,c	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB2C**	QC Batch:	90044 -113
Sample #:	**344829**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Butanal	123-72-8	6.9	E	NJ,+
Hexanal	66-25-1	30	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3A**	QC Batch:	90044 -113
Sample #:	**344922**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.8 U		5.8	0.494
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.8 U		5.8	0.880
79-34-5	1,1,2,2-Tetrachloroethane	5.8 U		5.8	0.757
79-00-5	1,1,2-Trichloroethane	5.8 U		5.8	0.688
75-34-3	1,1-Dichloroethane	5.8 U		5.8	0.840
75-35-4	1,1-Dichloroethylene	5.8 U		5.8	0.850
106-93-4	1,2-Dibromoethane	5.8 U		5.8	0.795
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.41
95-50-1	1,2-Dichlorobenzene	5.8 U		5.8	0.561
107-06-2	1,2-Dichloroethane	5.8 U		5.8	0.500
156-59-2	cis-1,2-Dichloroethene	5.8 U		5.8	0.824
156-60-5	trans-1,2-Dichloroethene	5.8 U		5.8	0.815
78-87-5	1,2-Dichloropropane	5.8 U		5.8	0.680
87-61-6	1,2,3-Trichlorobenzene	5.8 U		5.8	0.631
120-82-1	1,2,4-Trichlorobenzene	5.8 U		5.8	0.476
541-73-1	1,3-Dichlorobenzene	5.8 U		5.8	0.311
106-46-7	1,4-Dichlorobenzene	5.8 U		5.8	0.824
78-93-3	**Methyl Ethyl Ketone**	**78**		24	5.80
591-78-6	2-Hexanone	12 U		12	2.62
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.69
67-64-1	**Acetone**	**77**	B,Z	24	5.80
71-43-2	Benzene	5.8 U		5.8	0.611
74-97-5	Bromochloromethane	5.8 U		5.8	0.883
75-27-4	Dichlorobromomethane	5.8 U		5.8	0.581
75-25-2	Bromoform	5.8 U		5.8	0.670
74-83-9	Bromomethane	5.8 U		5.8	1.74
75-15-0	Carbon Disulfide	5.8 U		5.8	1.68
56-23-5	Carbon Tetrachloride	5.8 U		5.8	0.541
108-90-7	Chlorobenzene	5.8 U		5.8	0.767
75-00-3	Chloroethane	5.8 U	UJ,C	5.8	1.57
67-66-3	Chloroform	5.8 U		5.8	0.517

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3A**	QC Batch:	90044 -113
Sample #:	**344922**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.8 U		5.8	0.967
110-82-7	Cyclohexane	12 U		12	0.367
10061-01-5	cis-1,3-Dichloropropene	5.8 U		5.8	0.570
10061-02-6	trans-1,3-Dichloropropene	5.8 U		5.8	0.604
75-71-8	Dichlorodifluoromethane	5.8 U		5.8	0.775
124-48-1	Chlorodibromomethane	5.8 U		5.8	0.600
100-41-4	Ethylbenzene	5.8 U		5.8	0.491
98-82-8	Isopropylbenzene	5.8 U		5.8	0.633
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.03
108-87-2	Methylcyclohexane	12 U		12	0.980
1634-04-4	Methyl(tert)butyl Ether	5.8 U		5.8	0.744
75-09-2	**Methylene Chloride**	**3.4 J**	J,c	24	3.26
100-42-5	Styrene	5.8 U		5.8	0.513
127-18-4	Tetrachloroethene	5.8 U		5.8	0.711
108-88-3	Toluene	5.8 U		5.8	0.538
79-01-6	Trichloroethene	5.8 U		5.8	0.785
75-69-4	Trichlorofluoromethane	5.8 U		5.8	0.862
75-01-4	Vinyl Chloride	5.8 U		5.8	0.429
1330-20-7	Xylene (Total)	5.8 U		5.8	0.488

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3A**	QC Batch:	90044 -113
Sample #:	**344922**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3B**	QC Batch:	90044 -113
Sample #:	**344923**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.11

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.6 U		5.6	0.473
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.6 U		5.6	0.842
79-34-5	1,1,2,2-Tetrachloroethane	5.6 U		5.6	0.725
79-00-5	1,1,2-Trichloroethane	5.6 U		5.6	0.658
75-34-3	1,1-Dichloroethane	5.6 U		5.6	0.804
75-35-4	1,1-Dichloroethylene	5.6 U		5.6	0.814
106-93-4	1,2-Dibromoethane	5.6 U		5.6	0.760
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.31
95-50-1	1,2-Dichlorobenzene	5.6 U		5.6	0.537
107-06-2	1,2-Dichloroethane	5.6 U		5.6	0.478
156-59-2	cis-1,2-Dichloroethene	5.6 U		5.6	0.788
156-60-5	trans-1,2-Dichloroethene	5.6 U		5.6	0.780
78-87-5	1,2-Dichloropropane	5.6 U		5.6	0.650
87-61-6	1,2,3-Trichlorobenzene	5.6 U		5.6	0.604
120-82-1	1,2,4-Trichlorobenzene	5.6 U		5.6	0.455
541-73-1	1,3-Dichlorobenzene	5.6 U		5.6	0.297
106-46-7	1,4-Dichlorobenzene	5.6 U		5.6	0.788
78-93-3	**Methyl Ethyl Ketone**	**58**		22	5.55
591-78-6	2-Hexanone	11 U		11	2.51
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.62
67-64-1	**Acetone**	**71**	B,Z	22	5.55
71-43-2	Benzene	5.6 U		5.6	0.585
74-97-5	Bromochloromethane	5.6 U		5.6	0.845
75-27-4	Dichlorobromomethane	5.6 U		5.6	0.556
75-25-2	Bromoform	5.6 U		5.6	0.642
74-83-9	Bromomethane	5.6 U		5.6	1.67
75-15-0	Carbon Disulfide	5.6 U		5.6	1.61
56-23-5	Carbon Tetrachloride	5.6 U		5.6	0.517
108-90-7	Chlorobenzene	5.6 U		5.6	0.734
75-00-3	Chloroethane	5.6 U	VJ,C	5.6	1.50
67-66-3	Chloroform	5.6 U		5.6	0.495

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3B**	QC Batch:	90044 -113
Sample #:	**344923**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.11

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.6 U		5.6	0.926
110-82-7	Cyclohexane	11 U		11	0.351
10061-01-5	cis-1,3-Dichloropropene	5.6 U		5.6	0.545
10061-02-6	trans-1,3-Dichloropropene	5.6 U		5.6	0.578
75-71-8	Dichlorodifluoromethane	5.6 U		5.6	0.741
124-48-1	Chlorodibromomethane	5.6 U		5.6	0.574
100-41-4	Ethylbenzene	5.6 U		5.6	0.470
98-82-8	Isopropylbenzene	5.6 U		5.6	0.606
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.85
108-87-2	Methylcyclohexane	11 U		11	0.938
1634-04-4	Methyl(tert)butyl Ether	5.6 U		5.6	0.712
75-09-2	**Methylene Chloride**	**4.2 J**	J,c	22	3.12
100-42-5	Styrene	5.6 U		5.6	0.491
127-18-4	Tetrachloroethene	5.6 U		5.6	0.680
108-88-3	Toluene	5.6 U		5.6	0.515
79-01-6	Trichloroethene	5.6 U		5.6	0.751
75-69-4	Trichlorofluoromethane	5.6 U		5.6	0.825
75-01-4	Vinyl Chloride	5.6 U		5.6	0.411
1330-20-7	Xylene (Total)	5.6 U		5.6	0.467

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3B**	QC Batch:	90044 -113
Sample #:	**344923**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	90
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3C**	QC Batch:	90044 -113
Sample #:	**344924**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U		7.0	0.601
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U		7.0	1.07
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U		7.0	0.921
79-00-5	1,1,2-Trichloroethane	7.0 U		7.0	0.836
75-34-3	1,1-Dichloroethane	7.0 U		7.0	1.02
75-35-4	1,1-Dichloroethylene	7.0 U		7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U		7.0	0.966
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.93
95-50-1	1,2-Dichlorobenzene	7.0 U		7.0	0.682
107-06-2	1,2-Dichloroethane	7.0 U		7.0	0.608
156-59-2	cis-1,2-Dichloroethene	7.0 U		7.0	1.00
156-60-5	trans-1,2-Dichloroethene	7.0 U		7.0	0.991
78-87-5	1,2-Dichloropropane	7.0 U		7.0	0.826
87-61-6	1,2,3-Trichlorobenzene	7.0 U		7.0	0.767
120-82-1	1,2,4-Trichlorobenzene	7.0 U		7.0	0.578
541-73-1	1,3-Dichlorobenzene	7.0 U		7.0	0.378
106-46-7	1,4-Dichlorobenzene	7.0 U		7.0	1.00
78-93-3	**Methyl Ethyl Ketone**	**150**		28	7.05
591-78-6	**2-Hexanone**	**19**		14	3.19
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.06
67-64-1	**Acetone**	**290**	J,c	28	7.05
71-43-2	Benzene	7.0 U		7.0	0.743
74-97-5	Bromochloromethane	7.0 U		7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U		7.0	0.706
75-25-2	Bromoform	7.0 U		7.0	0.815
74-83-9	Bromomethane	7.0 U		7.0	2.12
75-15-0	Carbon Disulfide	7.0 U		7.0	2.04
56-23-5	Carbon Tetrachloride	7.0 U		7.0	0.657
108-90-7	Chlorobenzene	7.0 U		7.0	0.932
75-00-3	Chloroethane	7.0 U	UJ,c	7.0	1.90
67-66-3	Chloroform	7.0 U		7.0	0.629

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3C**	QC Batch:	90044 -113
Sample #:	**344924**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.18
110-82-7	Cyclohexane	14 U		14	0.446
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.692
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.735
75-71-8	Dichlorodifluoromethane	7.0 U		7.0	0.942
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.729
100-41-4	Ethylbenzene	7.0 U		7.0	0.596
98-82-8	Isopropylbenzene	7.0 U		7.0	0.770
79-20-9	Methyl Acetate	28 U	UJ,c	28	4.89
108-87-2	Methylcyclohexane	14 U		14	1.19
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.904
75-09-2	**Methylene Chloride**	**5.9 J**	J,c	28	3.96
100-42-5	Styrene	7.0 U		7.0	0.623
127-18-4	Tetrachloroethene	7.0 U		7.0	0.864
108-88-3	Toluene	7.0 U		7.0	0.654
79-01-6	Trichloroethene	7.0 U		7.0	0.955
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.05
75-01-4	Vinyl Chloride	7.0 U		7.0	0.522
1330-20-7	Xylene (Total)	7.0 U		7.0	0.594

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**FSB3C**	QC Batch:	90044 -113
Sample #:	**344924**	Anal. Batch:	208041
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Butanal	123-72-8	14	E NJ,+
Hexanal	66-25-1	49	E NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1A**	QC Batch:	90037 -115
Sample #:	**344925**	Anal. Batch:	207752
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	60 U		60	7.10
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	60 U		60	8.95
79-34-5	1,1,2,2-Tetrachloroethane	60 U		60	7.40
79-00-5	1,1,2-Trichloroethane	60 U		60	7.10
75-34-3	1,1-Dichloroethane	60 U		60	2.85
75-35-4	1,1-Dichloroethylene	60 U		60	6.65
106-93-4	1,2-Dibromoethane	60 U		60	8.55
96-12-8	1,2-Dibromo-3-chloropropane	120 U		120	13.5
95-50-1	1,2-Dichlorobenzene	60 U		60	8.20
107-06-2	1,2-Dichloroethane	60 U		60	5.55
156-59-2	cis-1,2-Dichloroethene	60 U		60	6.95
156-60-5	trans-1,2-Dichloroethene	60 U		60	7.15
78-87-5	1,2-Dichloropropane	60 U		60	12.8
87-61-6	1,2,3-Trichlorobenzene	60 U		60	11.4
120-82-1	1,2,4-Trichlorobenzene	60 U		60	9.45
541-73-1	1,3-Dichlorobenzene	60 U		60	8.00
106-46-7	1,4-Dichlorobenzene	60 U		60	6.20
78-93-3	**Methyl Ethyl Ketone**	**140 J**		600	20.8
591-78-6	2-Hexanone	600 U		600	22.8
108-10-1	4-Methyl-2-Pentanone	600 U		600	18.2
67-64-1	***Acetone**	**870**	B,Z	600	53.5
71-43-2	Benzene	60 U		60	1.08
74-97-5	Bromochloromethane	60 U		60	3.79
75-27-4	Dichlorobromomethane	60 U		60	21.6
75-25-2	Bromoform	60 U		60	5.50
74-83-9	Bromomethane	60 U		60	13.4
75-15-0	Carbon Disulfide	60 U	UJ,C	60	2.97
56-23-5	Carbon Tetrachloride	60 U		60	5.75
108-90-7	Chlorobenzene	60 U		60	7.85
75-00-3	Chloroethane	60 U		60	9.00
67-66-3	Chloroform	60 U		60	5.05

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1A**	QC Batch:	90037 -115
Sample #:	**344925**	Anal. Batch:	207752
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	60 U	60	5.15
110-82-7	Cyclohexane	600 U	600	10.8
10061-01-5	cis-1,3-Dichloropropene	60 U	60	9.45
10061-02-6	trans-1,3-Dichloropropene	60 U	60	5.85
75-71-8	Dichlorodifluoromethane	60 U	60	6.00
124-48-1	Chlorodibromomethane	60 U	60	5.40
100-41-4	Ethylbenzene	60 U	60	9.75
98-82-8	Isopropylbenzene	60 U	60	4.51
79-20-9	Methyl Acetate	600 U	600	11.6
108-87-2	Methylcyclohexane	600 U	600	8.40
1634-04-4	**Methyl(tert)butyl Ether**	**7.8 J**	60	3.85
75-09-2	Methylene Chloride	60 U	60	5.85
100-42-5	Styrene	60 U	60	6.85
127-18-4	Tetrachloroethene	60 U	60	9.65
108-88-3	Toluene	60 U	60	10.7
79-01-6	Trichloroethene	60 U	60	10.6
75-69-4	Trichlorofluoromethane	60 U	60	2.54
75-01-4	Vinyl Chloride	60 U	60	5.95
1330-20-7	Xylene (Total)	60 U	60	26.5

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1A**	QC Batch:	90037 -115
Sample #:	**344925**	Anal. Batch:	207752
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1B**	QC Batch:	90044 -213
Sample #:	**344926**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**55**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	**Acetone**	**98**	J,C	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U		6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1B**	QC Batch:	90044 -213
Sample #:	**344926**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	VJ,c	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**4.1 J**	B,z	26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1B**	QC Batch:	90044 -213
Sample #:	**344926**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1C**	QC Batch:	90044 -213
Sample #:	**344927**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.47

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.4 U		7.4	0.626
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.4 U		7.4	1.12
79-34-5	1,1,2,2-Tetrachloroethane	7.4 U		7.4	0.960
79-00-5	1,1,2-Trichloroethane	7.4 U		7.4	0.872
75-34-3	1,1-Dichloroethane	7.4 U		7.4	1.06
75-35-4	1,1-Dichloroethylene	7.4 U		7.4	1.08
106-93-4	1,2-Dibromoethane	7.4 U		7.4	1.01
96-12-8	1,2-Dibromo-3-chloropropane	15 U		15	3.06
95-50-1	1,2-Dichlorobenzene	7.4 U		7.4	0.711
107-06-2	1,2-Dichloroethane	7.4 U		7.4	0.634
156-59-2	cis-1,2-Dichloroethene	7.4 U		7.4	1.04
156-60-5	trans-1,2-Dichloroethene	7.4 U		7.4	1.03
78-87-5	1,2-Dichloropropane	7.4 U		7.4	0.861
87-61-6	1,2,3-Trichlorobenzene	7.4 U		7.4	0.800
120-82-1	1,2,4-Trichlorobenzene	7.4 U		7.4	0.603
541-73-1	1,3-Dichlorobenzene	7.4 U		7.4	0.394
106-46-7	1,4-Dichlorobenzene	7.4 U		7.4	1.04
78-93-3	**Methyl Ethyl Ketone**	**100**		30	7.35
591-78-6	2-Hexanone	15 U		15	3.32
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.15
67-64-1	**Acetone**	**150**	J,C	30	7.35
71-43-2	Benzene	7.4 U		7.4	0.775
74-97-5	Bromochloromethane	7.4 U		7.4	1.12
75-27-4	Dichlorobromomethane	7.4 U		7.4	0.736
75-25-2	Bromoform	7.4 U		7.4	0.850
74-83-9	Bromomethane	7.4 U		7.4	2.21
75-15-0	Carbon Disulfide	7.4 U		7.4	2.13
56-23-5	Carbon Tetrachloride	7.4 U		7.4	0.685
108-90-7	Chlorobenzene	7.4 U		7.4	0.972
75-00-3	Chloroethane	7.4 U		7.4	1.98
67-66-3	Chloroform	7.4 U		7.4	0.656

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**46SB1C**	QC Batch:	90044 -213
Sample #:	**344927**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.47

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.4 U		7.4	1.23
110-82-7	Cyclohexane	15 U		15	0.465
10061-01-5	cis-1,3-Dichloropropene	7.4 U		7.4	0.722
10061-02-6	trans-1,3-Dichloropropene	7.4 U		7.4	0.766
75-71-8	Dichlorodifluoromethane	7.4 U		7.4	0.982
124-48-1	Chlorodibromomethane	7.4 U		7.4	0.760
100-41-4	Ethylbenzene	7.4 U		7.4	0.622
98-82-8	Isopropylbenzene	7.4 U		7.4	0.803
79-20-9	Methyl Acetate	30 U	VJ,c	30	5.10
108-87-2	Methylcyclohexane	15 U		15	1.24
1634-04-4	Methyl(tert)butyl Ether	7.4 U		7.4	0.942
75-09-2	**Methylene Chloride**	**5.0 J**	B,z	30	4.13
100-42-5	Styrene	7.4 U		7.4	0.650
127-18-4	Tetrachloroethene	7.4 U		7.4	0.901
108-88-3	Toluene	7.4 U		7.4	0.682
79-01-6	Trichloroethene	7.4 U		7.4	0.995
75-69-4	Trichlorofluoromethane	7.4 U		7.4	1.09
75-01-4	Vinyl Chloride	7.4 U		7.4	0.544
1330-20-7	Xylene (Total)	7.4 U		7.4	0.619

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB1C**	QC Batch:	90044 -213
Sample #:	**344927**	Anal. Batch:	208004
Matrix:	Soil	Percent Solids:	68
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2A**	QC Batch:	90044 -114
Sample #:	**344928**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	**Methyl Ethyl Ketone**	**71**		24	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	**Acetone**	**160**	J,C	24	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U		6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2A**	QC Batch:	90044 -114
Sample #:	**344928**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	Methylene Chloride	24 U	UJ,C	24	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	**Trichloroethene**	**23**		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2A**	QC Batch:	90044 -114
Sample #:	**344928**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Butanal	123-72-8	7.0	E	NJ,+
Hexanal	66-25-1	30	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2B**	QC Batch:	90044 -114
Sample #:	**344929**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.524
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.934
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.803
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.729
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.891
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.902
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.843
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.56
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.595
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.530
156-59-2	**cis-1,2-Dichloroethene**	**1.6 J**		6.2	0.873
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.865
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.721
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.669
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.504
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.330
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.873
78-93-3	**Methyl Ethyl Ketone**	**61**		24	6.15
591-78-6	2-Hexanone	12 U		12	2.78
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.80
67-64-1	**Acetone**	**89**	B,Z	24	6.15
71-43-2	Benzene	6.2 U		6.2	0.648
74-97-5	Bromochloromethane	6.2 U		6.2	0.936
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.616
75-25-2	Bromoform	6.2 U		6.2	0.711
74-83-9	Bromomethane	6.2 U		6.2	1.85
75-15-0	Carbon Disulfide	6.2 U		6.2	1.78
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.573
108-90-7	Chlorobenzene	6.2 U		6.2	0.813
75-00-3	Chloroethane	6.2 U		6.2	1.66
67-66-3	Chloroform	6.2 U		6.2	0.549

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2B**	QC Batch:	90044 -114
Sample #:	**344929**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U		6.2	1.03
110-82-7	Cyclohexane	12 U		12	0.389
10061-01-5	cis-1,3-Dichloropropene	6.2 U		6.2	0.604
10061-02-6	trans-1,3-Dichloropropene	6.2 U		6.2	0.641
75-71-8	Dichlorodifluoromethane	6.2 U		6.2	0.822
124-48-1	Chlorodibromomethane	6.2 U		6.2	0.636
100-41-4	Ethylbenzene	6.2 U		6.2	0.520
98-82-8	Isopropylbenzene	6.2 U		6.2	0.672
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.27
108-87-2	Methylcyclohexane	12 U		12	1.04
1634-04-4	Methyl(tert)butyl Ether	6.2 U		6.2	0.788
75-09-2	**Methylene Chloride**	**3.6 J**	J,c	24	3.46
100-42-5	Styrene	6.2 U		6.2	0.544
127-18-4	Tetrachloroethene	6.2 U		6.2	0.754
108-88-3	Toluene	6.2 U		6.2	0.571
79-01-6	**Trichloroethene**	**3.4 J**		6.2	0.833
75-69-4	Trichlorofluoromethane	6.2 U		6.2	0.914
75-01-4	Vinyl Chloride	6.2 U		6.2	0.455
1330-20-7	Xylene (Total)	6.2 U		6.2	0.518

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2B**	QC Batch:	90044 -114
Sample #:	**344929**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**46SB2C**	QC Batch:	90044 -114
Sample #:	**344930**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.5 U		7.5	0.635
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.5 U		7.5	1.13
79-34-5	1,1,2,2-Tetrachloroethane	7.5 U		7.5	0.973
79-00-5	1,1,2-Trichloroethane	7.5 U		7.5	0.884
75-34-3	1,1-Dichloroethane	7.5 U		7.5	1.08
75-35-4	1,1-Dichloroethylene	7.5 U		7.5	1.09
106-93-4	1,2-Dibromoethane	7.5 U		7.5	1.02
96-12-8	1,2-Dibromo-3-chloropropane	15 U		15	3.10
95-50-1	1,2-Dichlorobenzene	7.5 U		7.5	0.721
107-06-2	1,2-Dichloroethane	7.5 U		7.5	0.642
156-59-2	cis-1,2-Dichloroethene	7.5 U		7.5	1.06
156-60-5	trans-1,2-Dichloroethene	7.5 U		7.5	1.05
78-87-5	1,2-Dichloropropane	7.5 U		7.5	0.873
87-61-6	1,2,3-Trichlorobenzene	7.5 U		7.5	0.811
120-82-1	1,2,4-Trichlorobenzene	7.5 U		7.5	0.611
541-73-1	1,3-Dichlorobenzene	7.5 U		7.5	0.399
106-46-7	1,4-Dichlorobenzene	7.5 U		7.5	1.06
78-93-3	**Methyl Ethyl Ketone**	**76**		30	7.45
591-78-6	2-Hexanone	15 U		15	3.37
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.18
67-64-1	**Acetone**	**80**	B,Z	30	7.45
71-43-2	Benzene	7.5 U		7.5	0.785
74-97-5	Bromochloromethane	7.5 U		7.5	1.13
75-27-4	Dichlorobromomethane	7.5 U		7.5	0.746
75-25-2	Bromoform	7.5 U		7.5	0.861
74-83-9	Bromomethane	7.5 U		7.5	2.24
75-15-0	Carbon Disulfide	7.5 U		7.5	2.16
56-23-5	Carbon Tetrachloride	7.5 U		7.5	0.694
108-90-7	Chlorobenzene	7.5 U		7.5	0.985
75-00-3	Chloroethane	7.5 U		7.5	2.01
67-66-3	Chloroform	7.5 U		7.5	0.665

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**46SB2C**	QC Batch:	90044 -114
Sample #:	**344930**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.5 U		7.5	1.24
110-82-7	Cyclohexane	15 U		15	0.471
10061-01-5	cis-1,3-Dichloropropene	7.5 U		7.5	0.732
10061-02-6	trans-1,3-Dichloropropene	7.5 U		7.5	0.776
75-71-8	Dichlorodifluoromethane	7.5 U		7.5	0.995
124-48-1	Chlorodibromomethane	7.5 U		7.5	0.770
100-41-4	Ethylbenzene	7.5 U		7.5	0.630
98-82-8	Isopropylbenzene	7.5 U		7.5	0.814
79-20-9	Methyl Acetate	30 U	UJ,c	30	5.17
108-87-2	Methylcyclohexane	15 U		15	1.26
1634-04-4	Methyl(tert)butyl Ether	7.5 U		7.5	0.955
75-09-2	**Methylene Chloride**	**4.4 J**	J,c	30	4.19
100-42-5	Styrene	7.5 U		7.5	0.659
127-18-4	Tetrachloroethene	7.5 U		7.5	0.913
108-88-3	Toluene	7.5 U		7.5	0.691
79-01-6	Trichloroethene	7.5 U		7.5	1.01
75-69-4	Trichlorofluoromethane	7.5 U		7.5	1.11
75-01-4	Vinyl Chloride	7.5 U		7.5	0.551
1330-20-7	Xylene (Total)	7.5 U		7.5	0.627

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**46SB2C**	QC Batch:	90044 -114
Sample #:	**344930**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD2**	QC Batch:	90044 -114
Sample #:	**344931**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.5 U		7.5	0.635
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.5 U		7.5	1.13
79-34-5	1,1,2,2-Tetrachloroethane	7.5 U		7.5	0.973
79-00-5	1,1,2-Trichloroethane	7.5 U		7.5	0.884
75-34-3	1,1-Dichloroethane	7.5 U		7.5	1.08
75-35-4	1,1-Dichloroethylene	7.5 U		7.5	1.09
106-93-4	1,2-Dibromoethane	7.5 U		7.5	1.02
96-12-8	1,2-Dibromo-3-chloropropane	15 U		15	3.10
95-50-1	1,2-Dichlorobenzene	7.5 U		7.5	0.721
107-06-2	1,2-Dichloroethane	7.5 U		7.5	0.642
156-59-2	cis-1,2-Dichloroethene	7.5 U		7.5	1.06
156-60-5	trans-1,2-Dichloroethene	7.5 U		7.5	1.05
78-87-5	1,2-Dichloropropane	7.5 U		7.5	0.873
87-61-6	1,2,3-Trichlorobenzene	7.5 U		7.5	0.811
120-82-1	1,2,4-Trichlorobenzene	7.5 U		7.5	0.611
541-73-1	1,3-Dichlorobenzene	7.5 U		7.5	0.399
106-46-7	1,4-Dichlorobenzene	7.5 U		7.5	1.06
78-93-3	**Methyl Ethyl Ketone**	**79**		30	7.45
591-78-6	2-Hexanone	15 U		15	3.37
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.18
67-64-1	**Acetone**	**91**	B,Z	30	7.45
71-43-2	Benzene	7.5 U		7.5	0.785
74-97-5	Bromochloromethane	7.5 U		7.5	1.13
75-27-4	Dichlorobromomethane	7.5 U		7.5	0.746
75-25-2	Bromoform	7.5 U		7.5	0.861
74-83-9	Bromomethane	7.5 U		7.5	2.24
75-15-0	Carbon Disulfide	7.5 U		7.5	2.16
56-23-5	Carbon Tetrachloride	7.5 U		7.5	0.694
108-90-7	Chlorobenzene	7.5 U		7.5	0.985
75-00-3	Chloroethane	7.5 U		7.5	2.01
67-66-3	Chloroform	7.5 U		7.5	0.665

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD2**	QC Batch:	90044 -114
Sample #:	**344931**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.5 U		7.5	1.24
110-82-7	Cyclohexane	15 U		15	0.471
10061-01-5	cis-1,3-Dichloropropene	7.5 U		7.5	0.732
10061-02-6	trans-1,3-Dichloropropene	7.5 U		7.5	0.776
75-71-8	Dichlorodifluoromethane	7.5 U		7.5	0.995
124-48-1	Chlorodibromomethane	7.5 U		7.5	0.770
100-41-4	Ethylbenzene	7.5 U		7.5	0.630
98-82-8	Isopropylbenzene	7.5 U		7.5	0.814
79-20-9	Methyl Acetate	30 U	UJ,C	30	5.17
108-87-2	Methylcyclohexane	15 U		15	1.26
1634-04-4	Methyl(tert)butyl Ether	7.5 U		7.5	0.955
75-09-2	Methylene Chloride	30 U	UJ,C	30	4.19
100-42-5	Styrene	7.5 U		7.5	0.659
127-18-4	Tetrachloroethene	7.5 U		7.5	0.913
108-88-3	Toluene	7.5 U		7.5	0.691
79-01-6	Trichloroethene	7.5 U		7.5	1.01
75-69-4	Trichlorofluoromethane	7.5 U		7.5	1.11
75-01-4	Vinyl Chloride	7.5 U		7.5	0.551
1330-20-7	Xylene (Total)	7.5 U		7.5	0.627

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD2**	QC Batch:	90044 -114
Sample #:	**344931**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**37SB1A**	QC Batch:	90044 -114
Sample #:	**344932**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1.64

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	8.2 U		8.2	0.699
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	8.2 U		8.2	1.24
79-34-5	1,1,2,2-Tetrachloroethane	8.2 U		8.2	1.07
79-00-5	1,1,2-Trichloroethane	8.2 U		8.2	0.973
75-34-3	1,1-Dichloroethane	8.2 U		8.2	1.19
75-35-4	1,1-Dichloroethylene	8.2 U		8.2	1.20
106-93-4	1,2-Dibromoethane	8.2 U		8.2	1.12
96-12-8	1,2-Dibromo-3-chloropropane	16 U		16	3.41
95-50-1	1,2-Dichlorobenzene	8.2 U		8.2	0.794
107-06-2	1,2-Dichloroethane	8.2 U		8.2	0.707
156-59-2	cis-1,2-Dichloroethene	8.2 U		8.2	1.16
156-60-5	trans-1,2-Dichloroethene	8.2 U		8.2	1.15
78-87-5	1,2-Dichloropropane	8.2 U		8.2	0.961
87-61-6	1,2,3-Trichlorobenzene	8.2 U		8.2	0.892
120-82-1	1,2,4-Trichlorobenzene	8.2 U		8.2	0.672
541-73-1	1,3-Dichlorobenzene	8.2 U		8.2	0.440
106-46-7	1,4-Dichlorobenzene	8.2 U		8.2	1.16
78-93-3	Methyl Ethyl Ketone	32 U		32	8.20
591-78-6	2-Hexanone	16 U		16	3.71
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.39
67-64-1	**Acetone**	**110**	J,C	32	8.20
71-43-2	Benzene	8.2 U		8.2	0.864
74-97-5	Bromochloromethane	8.2 U		8.2	1.25
75-27-4	Dichlorobromomethane	8.2 U		8.2	0.822
75-25-2	Bromoform	8.2 U		8.2	0.948
74-83-9	Bromomethane	8.2 U		8.2	2.46
75-15-0	Carbon Disulfide	8.2 U		8.2	2.38
56-23-5	Carbon Tetrachloride	8.2 U		8.2	0.764
108-90-7	Chlorobenzene	8.2 U		8.2	1.08
75-00-3	Chloroethane	8.2 U		8.2	2.21
67-66-3	Chloroform	8.2 U		8.2	0.731

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**37SB1A**	QC Batch:	90044 -114
Sample #:	**344932**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1.64

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	8.2 U		8.2	1.37
110-82-7	Cyclohexane	16 U		16	0.518
10061-01-5	cis-1,3-Dichloropropene	8.2 U		8.2	0.805
10061-02-6	trans-1,3-Dichloropropene	8.2 U		8.2	0.854
75-71-8	Dichlorodifluoromethane	8.2 U		8.2	1.10
124-48-1	Chlorodibromomethane	8.2 U		8.2	0.848
100-41-4	Ethylbenzene	8.2 U		8.2	0.694
98-82-8	Isopropylbenzene	8.2 U		8.2	0.895
79-20-9	Methyl Acetate	32 U	UJ,c	32	5.69
108-87-2	Methylcyclohexane	16 U		16	1.39
1634-04-4	Methyl(tert)butyl Ether	8.2 U		8.2	1.05
75-09-2	Methylene Chloride	32 U	UJc	32	4.61
100-42-5	Styrene	8.2 U		8.2	0.725
127-18-4	Tetrachloroethene	8.2 U		8.2	1.01
108-88-3	Toluene	8.2 U		8.2	0.761
79-01-6	Trichloroethene	8.2 U		8.2	1.11
75-69-4	Trichlorofluoromethane	8.2 U		8.2	1.22
75-01-4	Vinyl Chloride	8.2 U		8.2	0.607
1330-20-7	Xylene (Total)	8.2 U		8.2	0.690

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-1**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1A**	QC Batch:	90044 -114
Sample #:	**344932**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	61
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1A**	QC Batch:	89845 -109
Sample #:	**344823**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.45
95-95-4	2,4,5-Trichlorophenol	200 U		200	3.67
88-06-2	2,4,6-Trichlorophenol	200 U		200	2.88
120-83-2	2,4-Dichlorophenol	200 U		200	3.87
105-67-9	2,4-Dimethylphenol	200 U		200	8.73
51-28-5	2,4-Dinitrophenol	380 U		380	3.52
121-14-2	2,4-Dinitrotoluene	200 U		200	3.47
606-20-2	2,6-Dinitrotoluene	200 U		200	30.5
91-58-7	2-Chloronaphthalene	200 U		200	2.53
95-57-8	2-Chlorophenol	200 U		200	2.21
91-57-6	2-Methylnaphthalene	200 U		200	3.01
95-48-7	2-Methylphenol	200 U		200	5.32
88-74-4	2-Nitroaniline	200 U		200	5.06
88-75-5	2-Nitrophenol	200 U		200	1.87
91-94-1	3,3'-Dichlorobenzidine	200 U		200	73.4
99-09-2	3-Nitroaniline	200 U		200	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	4.96
101-55-3	4-Bromophenyl Phenylether	200 U		200	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**35 J**	J,S	200	5.73
106-47-8	4-Chloroaniline	200 U		200	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.60
106-44-5	4-Methylphenol	200 U		200	7.01
100-01-6	4-Nitroaniline	200 U		200	7.98
100-02-7	4-Nitrophenol	380 U		380	3.11
83-32-9	Acenaphthene	200 U		200	1.89
208-96-8	Acenaphthylene	200 U		200	1.65
98-86-2	Acetophenone	200 U		200	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1A**	QC Batch:	89845 -109
Sample #:	**344823**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.08
1912-24-9	Atrazine	200 U		200	7.57
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.46
56-55-3	Benzo (a) Anthracene	200 U		200	14.6
50-32-8	Benzo (a) Pyrene	200 U		200	6.28
205-99-2	Benzo (b) Fluoranthene	200 U		200	10.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	9.59
207-08-9	Benzo (k) Fluoranthene	200 U		200	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.45
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	1.90
117-81-7	Bis (2-ethylhexyl)-Phthalate	200 U		200	2.28
85-68-7	Butyl Benzyl Phthalate	200 U		200	4.93
105-60-2	Caprolactam	380 U		380	7.02
86-74-8	Carbazole	200 U		200	6.71
218-01-9	Chrysene	200 U		200	11.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	6.49
132-64-9	Dibenzofuran	200 U		200	3.48
84-66-2	**Diethylphthalate**	**10 J**	B,x	200	2.09
131-11-3	Dimethylphthalate	200 U		200	3.64
84-74-2	**Di-n-Butylphthalate**	**25 J**		200	4.20
117-84-0	Di-n-Octylphthalate	200 U		200	3.41
206-44-0	Fluoranthene	200 U		200	2.59
86-73-7	Fluorene	200 U		200	1.85
118-74-1	Hexachlorobenzene	200 U		200	2.76
87-68-3	Hexachlorobutadiene	200 U		200	4.26
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.18
67-72-1	Hexachloroethane	200 U		200	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.31
78-59-1	Isophorone	200 U		200	1.90
91-20-3	Naphthalene	200 U		200	3.03
98-95-3	Nitrobenzene	200 U		200	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1A**	QC Batch:	89845 -109
Sample #:	**344823**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.62
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.23
87-86-5	Pentachlorophenol	380 U	380	4.83
85-01-8	Phenanthrene	200 U	200	2.53
108-95-2	Phenol	200 U	200	4.36
129-00-0	Pyrene	200 U	200	1.63

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1A**	QC Batch:	89845 -109
Sample #:	**344823**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	87
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	35	E	B,X
2(3H)-Furanone, 5-acetyldihydro-	029393-32-6	74	E	NJ,T
2,5-Cyclohexadiene-1,4-dione, 2,6-bis(1,1-dimethylethyl	719-22-2	86	E	NJ,T
2-Cyclopentene-1,4-dione	930-60-9	61	E	NJ,T
2-Ethyl-1-Hexanol	104-76-7	22	E	NJ,T

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1B**	QC Batch:	89845 -109
Sample #:	**344824**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	390 U	390	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	80.0
99-09-2	3-Nitroaniline	200 U	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**36 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	390 U	390	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1B**	QC Batch:	89845 -109
Sample #:	**344824**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	J,C	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**51 J**	B,X	200	2.48
85-68-7	**Butyl Benzyl Phthalate**	**40 J**	B,X	200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**4.3 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**40 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1B**	QC Batch:	89845 -109
Sample #:	**344824**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1B**	QC Batch:	89845 -109
Sample #:	**344824**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	63	E	B,x
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	94	E	B,x
2-Ethyl-1-Hexanol	104-76-7	30	E	NJ,+
Erucylamide	112-84-5	640	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1C**	QC Batch:	89845 -109
Sample #:	**344825**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U	210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U	210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U	210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U	210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U	210	3.14
120-83-2	2,4-Dichlorophenol	210 U	210	4.22
105-67-9	2,4-Dimethylphenol	210 U	210	9.53
51-28-5	2,4-Dinitrophenol	400 U	400	3.84
121-14-2	2,4-Dinitrotoluene	210 U	210	3.78
606-20-2	2,6-Dinitrotoluene	210 U	210	33.2
91-58-7	2-Chloronaphthalene	210 U	210	2.76
95-57-8	2-Chlorophenol	210 U	210	2.41
91-57-6	2-Methylnaphthalene	210 U	210	3.29
95-48-7	2-Methylphenol	210 U	210	5.81
88-74-4	2-Nitroaniline	210 U	210	5.52
88-75-5	2-Nitrophenol	210 U	210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U	210	80.0
99-09-2	3-Nitroaniline	210 U	210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U	210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U	210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**25 J**	210	6.25
106-47-8	4-Chloroaniline	210 U	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U	210	3.92
106-44-5	4-Methylphenol	210 U	210	7.64
100-01-6	4-Nitroaniline	210 U	210	8.70
100-02-7	4-Nitrophenol	400 U	400	3.40
83-32-9	Acenaphthene	210 U	210	2.06
208-96-8	Acenaphthylene	210 U	210	1.80
98-86-2	Acetophenone	210 U	210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1C**	QC Batch:	89845 -109
Sample #:	**344825**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U	UJ,c	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**46 J**	B,X	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**2.8 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**35 J**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1C**	QC Batch:	89845 -109
Sample #:	**344825**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB1C**	QC Batch:	89845 -109
Sample #:	**344825**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	CAS Number	Result (ug/kg dr	Qualifier	
(Z)-9-Octadecenamide	301-02-0	100	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	47	E	B,X
1-Octadecanol	112-92-5	28	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	70	E	B,X
2-Ethyl-1-Hexanol	104-76-7	23	E	NJ,+
Erucylamide	112-84-5	490	E	NJ,+
Phenytoin	57-41-0	480	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~21~~	~~E~~	

AS 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2A**	QC Batch:	89845 -109
Sample #:	**344826**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	UJ,M	200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**38 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,M	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U	UJ,M	200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2A**	QC Batch:	89845 -109
Sample #:	**344826**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**54 J**	B,x	200	2.48
85-68-7	**Butyl Benzyl Phthalate**	**38 J**	B,x	200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**3.9 J**	B,x	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**45 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2A**	QC Batch:	89845 -109
Sample #:	**344826**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2A**	QC Batch:	89845 -109
Sample #:	**344826**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	44	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	69	E	B,X
1-Heptadecanol	1454-85-9	22	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	30	E	NJ,+
Butyl Ester Octadecanioc	123-95-5	35	E	NJ,+
Erucylamide	112-84-5	730	E	NJ,+
Hexadecanoic acid, 1,1-dimethylethyl ester	31158-91-5	42	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~30~~	~~E~~	AS 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2B**	QC Batch:	89845 -109
Sample #:	**344827**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	180 U	180	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	180 U	180	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	180 U	180	1.45
95-95-4	2,4,5-Trichlorophenol	180 U	180	3.67
88-06-2	2,4,6-Trichlorophenol	180 U	180	2.88
120-83-2	2,4-Dichlorophenol	180 U	180	3.87
105-67-9	2,4-Dimethylphenol	180 U	180	8.73
51-28-5	2,4-Dinitrophenol	350 U	350	3.52
121-14-2	2,4-Dinitrotoluene	180 U	180	3.47
606-20-2	2,6-Dinitrotoluene	180 U	180	30.5
91-58-7	2-Chloronaphthalene	180 U	180	2.53
95-57-8	2-Chlorophenol	180 U	180	2.21
91-57-6	2-Methylnaphthalene	180 U	180	3.01
95-48-7	2-Methylphenol	180 U	180	5.32
88-74-4	2-Nitroaniline	180 U	180	5.06
88-75-5	2-Nitrophenol	180 U	180	1.87
91-94-1	3,3'-Dichlorobenzidine	180 U	180	73.4
99-09-2	3-Nitroaniline	180 U	180	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	180 U	180	4.96
101-55-3	4-Bromophenyl Phenylether	180 U	180	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**33 J**	180	5.73
106-47-8	4-Chloroaniline	180 U	180	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	180 U	180	3.60
106-44-5	4-Methylphenol	180 U	180	7.01
100-01-6	4-Nitroaniline	180 U	180	7.98
100-02-7	4-Nitrophenol	350 U	350	3.11
83-32-9	Acenaphthene	180 U	180	1.89
208-96-8	Acenaphthylene	180 U	180	1.65
98-86-2	Acetophenone	180 U	180	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2B**	QC Batch:	89845 -109
Sample #:	**344827**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	180 U		180	5.08
1912-24-9	Atrazine	180 U		180	7.57
100-52-7	Benzaldehyde	180 U	VJ,c	180	4.46
56-55-3	Benzo (a) Anthracene	180 U		180	14.6
50-32-8	**Benzo (a) Pyrene**	**17 J**		180	6.28
205-99-2	**Benzo (b) Fluoranthene**	**40 J**		180	10.7
191-24-2	Benzo (g,h,i,) Perylene	180 U		180	9.59
207-08-9	Benzo (k) Fluoranthene	180 U		180	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	180 U		180	3.45
111-44-4	Bis (2-Chloroethyl) Ether	180 U		180	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**56 J**	B,x	180	2.28
85-68-7	**Butyl Benzyl Phthalate**	**39 J**	B,x	180	4.93
105-60-2	Caprolactam	350 U		350	7.02
86-74-8	Carbazole	180 U		180	6.71
218-01-9	Chrysene	180 U		180	11.2
53-70-3	Dibenzo (a,h) Anthracene	180 U		180	6.49
132-64-9	Dibenzofuran	180 U		180	3.48
84-66-2	**Diethylphthalate**	**35 J**		180	2.09
131-11-3	Dimethylphthalate	180 U		180	3.64
84-74-2	**Di-n-Butylphthalate**	**39 J**		180	4.20
117-84-0	Di-n-Octylphthalate	180 U		180	3.41
206-44-0	**Fluoranthene**	**7.0 J**		180	2.59
86-73-7	Fluorene	180 U		180	1.85
118-74-1	Hexachlorobenzene	180 U		180	2.76
87-68-3	Hexachlorobutadiene	180 U		180	4.26
77-47-4	Hexachlorocyclopentadiene	180 U		180	2.18
67-72-1	Hexachloroethane	180 U		180	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	180 U		180	4.31
78-59-1	Isophorone	180 U		180	1.90
91-20-3	Naphthalene	180 U		180	3.03
98-95-3	Nitrobenzene	180 U		180	3.52

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2B**	QC Batch:	89845 -109
Sample #:	**344827**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	180 U	180	3.62
86-30-6	N-Nitroso-di-Phenylamine	180 U	180	5.23
87-86-5	Pentachlorophenol	350 U	350	4.83
85-01-8	**Phenanthrene**	**3.0 J**	180	2.53
108-95-2	Phenol	180 U	180	4.36
129-00-0	**Pyrene**	**6.0 J**	180	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2B**	QC Batch:	89845 -109
Sample #:	**344827**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	CAS Number	Result (ug/kg dr	Qualifier	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	55	E	B,X
1-Pentadecanol	629-76-5	62	E	NJ,T
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	92	E	B,X
2-Ethyl-1-Hexanol	104-76-7	31	E	NJ,T
Erucylamide	112-84-5	590	E	NJ,T
Phenytoin	57-41-0	29	E	NJ,T
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~22~~	~~E~~	~~A~~ 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD-1**	QC Batch:	89845 -109
Sample #:	**344828**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	190 U	190	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	190 U	190	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	190 U	190	1.45
95-95-4	2,4,5-Trichlorophenol	190 U	190	3.67
88-06-2	2,4,6-Trichlorophenol	190 U	190	2.88
120-83-2	2,4-Dichlorophenol	190 U	190	3.87
105-67-9	2,4-Dimethylphenol	190 U	190	8.73
51-28-5	2,4-Dinitrophenol	380 U	380	3.52
121-14-2	2,4-Dinitrotoluene	190 U	190	3.47
606-20-2	2,6-Dinitrotoluene	190 U	190	30.5
91-58-7	2-Chloronaphthalene	190 U	190	2.53
95-57-8	2-Chlorophenol	190 U	190	2.21
91-57-6	2-Methylnaphthalene	190 U	190	3.01
95-48-7	2-Methylphenol	190 U	190	5.32
88-74-4	2-Nitroaniline	190 U	190	5.06
88-75-5	2-Nitrophenol	190 U	190	1.87
91-94-1	3,3'-Dichlorobenzidine	190 U	190	73.4
99-09-2	3-Nitroaniline	190 U	190	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	190 U	190	4.96
101-55-3	4-Bromophenyl Phenylether	190 U	190	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	190	5.73
106-47-8	4-Chloroaniline	190 U	190	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	190 U	190	3.60
106-44-5	4-Methylphenol	190 U	190	7.01
100-01-6	4-Nitroaniline	190 U	190	7.98
100-02-7	4-Nitrophenol	380 U	380	3.11
83-32-9	Acenaphthene	190 U	190	1.89
208-96-8	Acenaphthylene	190 U	190	1.65
98-86-2	Acetophenone	190 U	190	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD-1**	QC Batch:	89845 -109
Sample #:	**344828**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	190 U		190	5.08
1912-24-9	Atrazine	190 U		190	7.57
100-52-7	Benzaldehyde	190 U	VJ,C	190	4.46
56-55-3	Benzo (a) Anthracene	190 U		190	14.6
50-32-8	**Benzo (a) Pyrene**	**19 J**		190	6.28
205-99-2	**Benzo (b) Fluoranthene**	**40 J**		190	10.7
191-24-2	Benzo (g,h,i,) Perylene	190 U		190	9.59
207-08-9	Benzo (k) Fluoranthene	190 U		190	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	190 U		190	3.45
111-44-4	Bis (2-Chloroethyl) Ether	190 U		190	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**50 J**	B,X	190	2.28
85-68-7	**Butyl Benzyl Phthalate**	**37 J**	B,X	190	4.93
105-60-2	Caprolactam	380 U		380	7.02
86-74-8	Carbazole	190 U		190	6.71
218-01-9	Chrysene	190 U		190	11.2
53-70-3	Dibenzo (a,h) Anthracene	190 U		190	6.49
132-64-9	Dibenzofuran	190 U		190	3.48
84-66-2	**Diethylphthalate**	**24 J**	B,X	190	2.09
131-11-3	Dimethylphthalate	190 U		190	3.64
84-74-2	**Di-n-Butylphthalate**	**31 J**		190	4.20
117-84-0	Di-n-Octylphthalate	190 U		190	3.41
206-44-0	**Fluoranthene**	**13 J**		190	2.59
86-73-7	Fluorene	190 U		190	1.85
118-74-1	Hexachlorobenzene	190 U		190	2.76
87-68-3	Hexachlorobutadiene	190 U		190	4.26
77-47-4	Hexachlorocyclopentadiene	190 U		190	2.18
67-72-1	Hexachloroethane	190 U		190	2.57
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**32 J**		190	4.31
78-59-1	Isophorone	190 U		190	1.90
91-20-3	Naphthalene	190 U		190	3.03
98-95-3	Nitrobenzene	190 U		190	3.52

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD-1**	QC Batch:	89845 -109
Sample #:	**344828**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	190 U	190	3.62
86-30-6	N-Nitroso-di-Phenylamine	190 U	190	5.23
87-86-5	Pentachlorophenol	380 U	380	4.83
85-01-8	**Phenanthrene**	**6.0 J**	190	2.53
108-95-2	Phenol	190 U	190	4.36
129-00-0	**Pyrene**	**11 J**	190	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD-1**	QC Batch:	89845 -109
Sample #:	**344828**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	51	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	46	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	54	E	B,X
2-Ethyl-1-Hexanol	104-76-7	28	E	NJ,+
Erucylamide	112-84-5	340	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2C**	QC Batch:	89845 -109
Sample #:	**344829**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	390 U	390	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	80.0
99-09-2	3-Nitroaniline	200 U	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**27 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	390 U	390	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2C**	QC Batch:	89845 -109
Sample #:	**344829**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	U5,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**50 J**	B,x	200	2.48
85-68-7	**Butyl Benzyl Phthalate**	**40 J**	B,x	200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**17 J**	B,x	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**44 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2C**	QC Batch:	89845 -109
Sample #:	**344829**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB2C**	QC Batch:	89845 -109
Sample #:	**344829**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	500	E	B,X
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	49	E	NJ,+
1-Octadecanol	112-92-5	51	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	32	E	NJ,+
Cyclopentadecane	295-48-7	92	E	NJ,+
Docosane	629-97-0	34	E	NJ,+
Oxirane, hexadecyl-	7390-81-0	91	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~20~~	~~E~~	~~B~~ 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3A**	QC Batch:	89845 -109
Sample #:	**344922**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	380 U	380	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	80.0
99-09-2	3-Nitroaniline	200 U	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**28 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	380 U	380	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**FSB3A**	QC Batch:	89845 -109
Sample #:	**344922**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,C	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**51 J**	B,X	200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	380 U		380	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**4.0 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**27 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3A**	QC Batch:	89845 -109
Sample #:	**344922**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	380 U	380	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3A**	QC Batch:	89845 -109
Sample #:	**344922**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	42	E	B,X
3-Hexene-2,5-dione	4436-75-3	230	E	NJ,+
Erucylamide	112-84-5	190	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3B**	QC Batch:	89845 -109
Sample #:	**344923**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	190 U	190	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	190 U	190	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	190 U	190	1.45
95-95-4	2,4,5-Trichlorophenol	190 U	190	3.67
88-06-2	2,4,6-Trichlorophenol	190 U	190	2.88
120-83-2	2,4-Dichlorophenol	190 U	190	3.87
105-67-9	2,4-Dimethylphenol	190 U	190	8.73
51-28-5	2,4-Dinitrophenol	370 U	370	3.52
121-14-2	2,4-Dinitrotoluene	190 U	190	3.47
606-20-2	2,6-Dinitrotoluene	190 U	190	30.5
91-58-7	2-Chloronaphthalene	190 U	190	2.53
95-57-8	2-Chlorophenol	190 U	190	2.21
91-57-6	2-Methylnaphthalene	190 U	190	3.01
95-48-7	2-Methylphenol	190 U	190	5.32
88-74-4	2-Nitroaniline	190 U	190	5.06
88-75-5	2-Nitrophenol	190 U	190	1.87
91-94-1	3,3'-Dichlorobenzidine	190 U	190	73.4
99-09-2	3-Nitroaniline	190 U	190	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	190 U	190	4.96
101-55-3	4-Bromophenyl Phenylether	190 U	190	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**	190	5.73
106-47-8	4-Chloroaniline	190 U	190	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	190 U	190	3.60
106-44-5	4-Methylphenol	190 U	190	7.01
100-01-6	4-Nitroaniline	190 U	190	7.98
100-02-7	4-Nitrophenol	370 U	370	3.11
83-32-9	Acenaphthene	190 U	190	1.89
208-96-8	Acenaphthylene	190 U	190	1.65
98-86-2	Acetophenone	190 U	190	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3B**	QC Batch:	89845 -109
Sample #:	**344923**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	190 U		190	5.08
1912-24-9	Atrazine	190 U		190	7.57
100-52-7	Benzaldehyde	190 U	VJ,C	190	4.46
56-55-3	Benzo (a) Anthracene	190 U		190	14.6
50-32-8	Benzo (a) Pyrene	190 U		190	6.28
205-99-2	Benzo (b) Fluoranthene	190 U		190	10.7
191-24-2	Benzo (g,h,i,) Perylene	190 U		190	9.59
207-08-9	Benzo (k) Fluoranthene	190 U		190	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	190 U		190	3.45
111-44-4	Bis (2-Chloroethyl) Ether	190 U		190	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**44 J**	B,X	190	2.28
85-68-7	Butyl Benzyl Phthalate	190 U		190	4.93
105-60-2	Caprolactam	370 U		370	7.02
86-74-8	Carbazole	190 U		190	6.71
218-01-9	Chrysene	190 U		190	11.2
53-70-3	Dibenzo (a,h) Anthracene	190 U		190	6.49
132-64-9	Dibenzofuran	190 U		190	3.48
84-66-2	**Diethylphthalate**	**3.0 J**	B,X	190	2.09
131-11-3	Dimethylphthalate	190 U		190	3.64
84-74-2	**Di-n-Butylphthalate**	**24 J**		190	4.20
117-84-0	Di-n-Octylphthalate	190 U		190	3.41
206-44-0	Fluoranthene	190 U		190	2.59
86-73-7	Fluorene	190 U		190	1.85
118-74-1	Hexachlorobenzene	190 U		190	2.76
87-68-3	Hexachlorobutadiene	190 U		190	4.26
77-47-4	Hexachlorocyclopentadiene	190 U		190	2.18
67-72-1	Hexachloroethane	190 U		190	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	190 U		190	4.31
78-59-1	Isophorone	190 U		190	1.90
91-20-3	Naphthalene	190 U		190	3.03
98-95-3	Nitrobenzene	190 U		190	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3B**	QC Batch:	89845 -109
Sample #:	**344923**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	190 U	190	3.62
86-30-6	N-Nitroso-di-Phenylamine	190 U	190	5.23
87-86-5	Pentachlorophenol	370 U	370	4.83
85-01-8	Phenanthrene	190 U	190	2.53
108-95-2	Phenol	190 U	190	4.36
129-00-0	Pyrene	190 U	190	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3B**	QC Batch:	89845 -109
Sample #:	**344923**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	90
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	27	E	B,x
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	31	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	59	E	B,x
2-Ethyl-1-Hexanol	104-76-7	28	E	NJ,+
Erucylamide	112-84-5	380	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3C**	QC Batch:	89845 -109
Sample #:	**344924**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U	240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U	240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U	240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U	240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U	240	3.67
120-83-2	2,4-Dichlorophenol	240 U	240	4.93
105-67-9	2,4-Dimethylphenol	240 U	240	11.1
51-28-5	2,4-Dinitrophenol	460 U	460	4.48
121-14-2	2,4-Dinitrotoluene	240 U	240	4.41
606-20-2	2,6-Dinitrotoluene	240 U	240	38.8
91-58-7	2-Chloronaphthalene	240 U	240	3.22
95-57-8	2-Chlorophenol	240 U	240	2.81
91-57-6	2-Methylnaphthalene	240 U	240	3.84
95-48-7	2-Methylphenol	240 U	240	6.78
88-74-4	2-Nitroaniline	240 U	240	6.44
88-75-5	2-Nitrophenol	240 U	240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U	240	93.4
99-09-2	3-Nitroaniline	240 U	240	46.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U	240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U	240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**41 J**	240	7.29
106-47-8	4-Chloroaniline	240 U	240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U	240	4.58
106-44-5	4-Methylphenol	240 U	240	8.92
100-01-6	4-Nitroaniline	240 U	240	10.2
100-02-7	4-Nitrophenol	460 U	460	3.96
83-32-9	Acenaphthene	240 U	240	2.41
208-96-8	Acenaphthylene	240 U	240	2.10
98-86-2	Acetophenone	240 U	240	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3C**	QC Batch:	89845 -109
Sample #:	**344924**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U	UJ,C	240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**61 J**	B,X	240	2.90
85-68-7	**Butyl Benzyl Phthalate**	**49 J**	B,X	240	6.27
105-60-2	Caprolactam	460 U		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**5.0 J**	B,X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**48 J**		240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3C**	QC Batch:	89845 -109
Sample #:	**344924**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**FSB3C**	QC Batch:	89845 -109
Sample #:	**344924**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	65	E	B,X
1-Hexadecanol	36653-82-4	27	E	NJ,+
1-Octadecanol	112-92-5	61	E	NJ,+
3-Hexene-2,5-dione	4436-75-3	230	E	NJ,+
Erucylamide	112-84-5	1000	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~41~~	~~E~~	

* 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1A**	QC Batch:	89845 -109
Sample #:	**344925**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	400 U	400	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	80.0
99-09-2	3-Nitroaniline	200 U	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**13 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	400 U	400	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1A**	QC Batch:	89845 -109
Sample #:	**344925**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	400 U		400	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**52 J**	B,x	200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	Diethylphthalate	200 U		200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**21 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1A**	QC Batch:	89845 -109
Sample #:	**344925**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**2.0 J**	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1A**	QC Batch:	89845 -109
Sample #:	**344925**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	42	E	NJ,+
(Z)-9-Octadecenamide	301-02-0	440	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	24	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	43	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB1B**	QC Batch:	89845 -109
Sample #:	**344926**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	86.7
99-09-2	3-Nitroaniline	220 U	220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**22 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB1B**	QC Batch:	89845 -109
Sample #:	**344926**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	VJ,c	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**52 J**	B,x	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**3.0 J**	B,x	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**30 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1B**	QC Batch:	89845 -109
Sample #:	**344926**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1B**	QC Batch:	89845 -109
Sample #:	**344926**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	770	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	34	E	B,x
17-Pentatriacontene	6971-40-0	52	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	26	E	NJ,+
3-Hexene-2,5-dione	4436-75-3	160	E	NJ,+
Ditriacontane	544-85-4	40	E	NJ,+
Docosane	629-97-0	45	E	NJ,+
Heptacosane	593-49-7	60	E	NJ,+
Tetratriacontane	14167-59-0	44	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1C**	QC Batch:	89845 -109
Sample #:	**344927**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	250 U	250	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	250 U	250	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	250 U	250	1.98
95-95-4	2,4,5-Trichlorophenol	250 U	250	5.01
88-06-2	2,4,6-Trichlorophenol	250 U	250	3.93
120-83-2	2,4-Dichlorophenol	250 U	250	5.28
105-67-9	2,4-Dimethylphenol	250 U	250	11.9
51-28-5	2,4-Dinitrophenol	490 U	490	4.80
121-14-2	2,4-Dinitrotoluene	250 U	250	4.73
606-20-2	2,6-Dinitrotoluene	250 U	250	41.6
91-58-7	2-Chloronaphthalene	250 U	250	3.45
95-57-8	2-Chlorophenol	250 U	250	3.02
91-57-6	2-Methylnaphthalene	250 U	250	4.11
95-48-7	2-Methylphenol	250 U	250	7.26
88-74-4	2-Nitroaniline	250 U	250	6.90
88-75-5	2-Nitrophenol	250 U	250	2.55
91-94-1	3,3'-Dichlorobenzidine	250 U	250	100
99-09-2	3-Nitroaniline	250 U	250	50.0
534-52-1	4,6-Dinitro-2-Methylphenol	250 U	250	6.77
101-55-3	4-Bromophenyl Phenylether	250 U	250	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**27 J**	250	7.82
106-47-8	4-Chloroaniline	250 U	250	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	250 U	250	4.91
106-44-5	4-Methylphenol	250 U	250	9.56
100-01-6	4-Nitroaniline	250 U	250	10.9
100-02-7	4-Nitrophenol	480 U	480	4.25
83-32-9	Acenaphthene	250 U	250	2.58
208-96-8	Acenaphthylene	250 U	250	2.25
98-86-2	Acetophenone	250 U	250	2.85

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB1C**	QC Batch:	89845 -109
Sample #:	**344927**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	250 U		250	6.93
1912-24-9	Atrazine	250 U		250	10.3
100-52-7	Benzaldehyde	250 U	VJ,C	250	6.08
56-55-3	Benzo (a) Anthracene	250 U		250	20.0
50-32-8	Benzo (a) Pyrene	250 U		250	8.57
205-99-2	Benzo (b) Fluoranthene	250 U		250	14.6
191-24-2	Benzo (g,h,i,) Perylene	250 U		250	13.1
207-08-9	Benzo (k) Fluoranthene	250 U		250	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	250 U		250	4.71
111-44-4	Bis (2-Chloroethyl) Ether	250 U		250	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**56 J**	B,X	250	3.11
85-68-7	Butyl Benzyl Phthalate	250 U		250	6.72
105-60-2	Caprolactam	480 U		480	9.57
86-74-8	Carbazole	250 U		250	9.15
218-01-9	Chrysene	250 U		250	15.3
53-70-3	Dibenzo (a,h) Anthracene	250 U		250	8.85
132-64-9	Dibenzofuran	250 U		250	4.74
84-66-2	**Diethylphthalate**	**3.0 J**	B,X	250	2.85
131-11-3	Dimethylphthalate	250 U		250	4.97
84-74-2	**Di-n-Butylphthalate**	**31 J**		250	5.73
117-84-0	Di-n-Octylphthalate	250 U		250	4.65
206-44-0	Fluoranthene	250 U		250	3.53
86-73-7	Fluorene	250 U		250	2.52
118-74-1	Hexachlorobenzene	250 U		250	3.77
87-68-3	Hexachlorobutadiene	250 U		250	5.81
77-47-4	Hexachlorocyclopentadiene	250 U		250	2.97
67-72-1	Hexachloroethane	250 U		250	3.50
193-39-5	Indeno (1,2,3-cd) Pyrene	250 U		250	5.88
78-59-1	Isophorone	250 U		250	2.60
91-20-3	Naphthalene	250 U		250	4.13
98-95-3	Nitrobenzene	250 U		250	4.80

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1C**	QC Batch:	89845 -109
Sample #:	**344927**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	250 U	250	4.94
86-30-6	N-Nitroso-di-Phenylamine	250 U	250	7.13
87-86-5	Pentachlorophenol	480 U	480	6.59
85-01-8	Phenanthrene	250 U	250	3.45
108-95-2	Phenol	250 U	250	5.94
129-00-0	Pyrene	250 U	250	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB1C**	QC Batch:	89845 -109
Sample #:	**344927**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	68
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	1000	E	B,X
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	49	E	NJ,+
1-Octadecanol	112-92-5	54	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	29	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~30~~	~~E~~	~~A~~ 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB2A**	QC Batch:	89845 -109
Sample #:	**344928**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	390 U	390	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	80.0
99-09-2	3-Nitroaniline	200 U	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**25 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	390 U	390	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2A**	QC Batch:	89845 -109
Sample #:	**344928**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,C	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**51 J**	B,X	200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**3.0 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**28 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2A**	QC Batch:	89845 -109
Sample #:	**344928**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2A**	QC Batch:	89845 -109
Sample #:	**344928**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	46	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	84	E	B,X
2-Ethyl-1-Hexanol	104-76-7	28	E	NJ,+
Erucylamide	112-84-5	700	E	NJ,+
Octacosane	630-02-4	22	E	NJ,+
Phosphonic acid, dioctadecyl ester	19047-85-9	20	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~23~~	~~E~~	~~B~~ 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2B**	QC Batch:	89845 -109
Sample #:	**344929**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U	210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U	210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U	210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U	210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U	210	3.14
120-83-2	2,4-Dichlorophenol	210 U	210	4.22
105-67-9	2,4-Dimethylphenol	210 U	210	9.53
51-28-5	2,4-Dinitrophenol	410 U	410	3.84
121-14-2	2,4-Dinitrotoluene	210 U	210	3.78
606-20-2	2,6-Dinitrotoluene	210 U	210	33.2
91-58-7	2-Chloronaphthalene	210 U	210	2.76
95-57-8	2-Chlorophenol	210 U	210	2.41
91-57-6	2-Methylnaphthalene	210 U	210	3.29
95-48-7	2-Methylphenol	210 U	210	5.81
88-74-4	2-Nitroaniline	210 U	210	5.52
88-75-5	2-Nitrophenol	210 U	210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U	210	80.0
99-09-2	3-Nitroaniline	210 U	210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U	210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U	210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**21 J**	210	6.25
106-47-8	4-Chloroaniline	210 U	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U	210	3.92
106-44-5	4-Methylphenol	210 U	210	7.64
100-01-6	4-Nitroaniline	210 U	210	8.70
100-02-7	4-Nitrophenol	410 U	410	3.40
83-32-9	Acenaphthene	210 U	210	2.06
208-96-8	Acenaphthylene	210 U	210	1.80
98-86-2	Acetophenone	210 U	210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/01/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB2B**	QC Batch:	89845 -109
Sample #:	**344929**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U	VJ,c	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**49 J**	B,X	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U		410	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**3.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**24 J**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2B**	QC Batch:	89845 -109
Sample #:	**344929**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/01/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**46SB2B**	QC Batch:	89845 -109
Sample #:	**344929**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	110	E	B,X
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	31	E	NJ,+
1-Heptadecanol	1454-85-9	37	E	NJ,+
Erucylamide	112-84-5	560	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~21~~	~~E~~	

AS 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2C**	QC Batch:	89845 -109
Sample #:	**344930**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	250 U	250	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	250 U	250	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	250 U	250	1.98
95-95-4	2,4,5-Trichlorophenol	250 U	250	5.01
88-06-2	2,4,6-Trichlorophenol	250 U	250	3.93
120-83-2	2,4-Dichlorophenol	250 U	250	5.28
105-67-9	2,4-Dimethylphenol	250 U	250	11.9
51-28-5	2,4-Dinitrophenol	490 U	490	4.80
121-14-2	2,4-Dinitrotoluene	250 U	250	4.73
606-20-2	2,6-Dinitrotoluene	250 U	250	41.6
91-58-7	2-Chloronaphthalene	250 U	250	3.45
95-57-8	2-Chlorophenol	250 U	250	3.02
91-57-6	2-Methylnaphthalene	250 U	250	4.11
95-48-7	2-Methylphenol	250 U	250	7.26
88-74-4	2-Nitroaniline	250 U	250	6.90
88-75-5	2-Nitrophenol	250 U	250	2.55
91-94-1	3,3'-Dichlorobenzidine	250 U	250	100
99-09-2	3-Nitroaniline	250 U	250	50.0
534-52-1	4,6-Dinitro-2-Methylphenol	250 U	250	6.77
101-55-3	4-Bromophenyl Phenylether	250 U	250	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**26 J**	250	7.82
106-47-8	4-Chloroaniline	250 U	250	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	250 U	250	4.91
106-44-5	4-Methylphenol	250 U	250	9.56
100-01-6	4-Nitroaniline	250 U	250	10.9
100-02-7	4-Nitrophenol	490 U	490	4.25
83-32-9	Acenaphthene	250 U	250	2.58
208-96-8	Acenaphthylene	250 U	250	2.25
98-86-2	Acetophenone	250 U	250	2.85

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2C**	QC Batch:	89845 -109
Sample #:	**344930**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	250 U		250	6.93
1912-24-9	Atrazine	250 U		250	10.3
100-52-7	Benzaldehyde	250 U	VJ,c	250	6.08
56-55-3	Benzo (a) Anthracene	250 U		250	20.0
50-32-8	Benzo (a) Pyrene	250 U		250	8.57
205-99-2	Benzo (b) Fluoranthene	250 U		250	14.6
191-24-2	Benzo (g,h,i,) Perylene	250 U		250	13.1
207-08-9	Benzo (k) Fluoranthene	250 U		250	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	250 U		250	4.71
111-44-4	Bis (2-Chloroethyl) Ether	250 U		250	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**64 J**	B,x	250	3.11
85-68-7	Butyl Benzyl Phthalate	250 U		250	6.72
105-60-2	Caprolactam	490 U		490	9.57
86-74-8	Carbazole	250 U		250	9.15
218-01-9	Chrysene	250 U		250	15.3
53-70-3	Dibenzo (a,h) Anthracene	250 U		250	8.85
132-64-9	Dibenzofuran	250 U		250	4.74
84-66-2	**Diethylphthalate**	**3.0 J**	B,x	250	2.85
131-11-3	Dimethylphthalate	250 U		250	4.97
84-74-2	**Di-n-Butylphthalate**	**28 J**		250	5.73
117-84-0	Di-n-Octylphthalate	250 U		250	4.65
206-44-0	Fluoranthene	250 U		250	3.53
86-73-7	Fluorene	250 U		250	2.52
118-74-1	Hexachlorobenzene	250 U		250	3.77
87-68-3	Hexachlorobutadiene	250 U		250	5.81
77-47-4	Hexachlorocyclopentadiene	250 U		250	2.97
67-72-1	Hexachloroethane	250 U		250	3.50
193-39-5	Indeno (1,2,3-cd) Pyrene	250 U		250	5.88
78-59-1	Isophorone	250 U		250	2.60
91-20-3	Naphthalene	250 U		250	4.13
98-95-3	Nitrobenzene	250 U		250	4.80

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Individual sample results relate only to the sample tested.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2C**	QC Batch:	89845 -109
Sample #:	**344930**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	250 U	250	4.94
86-30-6	N-Nitroso-di-Phenylamine	250 U	250	7.13
87-86-5	Pentachlorophenol	490 U	490	6.59
85-01-8	Phenanthrene	250 U	250	3.45
108-95-2	Phenol	250 U	250	5.94
129-00-0	Pyrene	250 U	250	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**46SB2C**	QC Batch:	89845 -109
Sample #:	**344930**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	140	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	44	E	B,X
1-Octadecanol	112-92-5	56	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	28	E	NJ,+
3-Hexene-2,5-dione	4436-75-3	150	E	NJ,+
Erucylamide	112-84-5	710	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~27~~	~~E~~	~~NJ,+~~ AS 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD2**	QC Batch:	89845 -109
Sample #:	**344931**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	250 U	250	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	250 U	250	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	250 U	250	1.98
95-95-4	2,4,5-Trichlorophenol	250 U	250	5.01
88-06-2	2,4,6-Trichlorophenol	250 U	250	3.93
120-83-2	2,4-Dichlorophenol	250 U	250	5.28
105-67-9	2,4-Dimethylphenol	250 U	250	11.9
51-28-5	2,4-Dinitrophenol	490 U	490	4.80
121-14-2	2,4-Dinitrotoluene	250 U	250	4.73
606-20-2	2,6-Dinitrotoluene	250 U	250	41.6
91-58-7	2-Chloronaphthalene	250 U	250	3.45
95-57-8	2-Chlorophenol	250 U	250	3.02
91-57-6	2-Methylnaphthalene	250 U	250	4.11
95-48-7	2-Methylphenol	250 U	250	7.26
88-74-4	2-Nitroaniline	250 U	250	6.90
88-75-5	2-Nitrophenol	250 U	250	2.55
91-94-1	3,3'-Dichlorobenzidine	250 U	250	100
99-09-2	3-Nitroaniline	250 U	250	50.0
534-52-1	4,6-Dinitro-2-Methylphenol	250 U	250	6.77
101-55-3	4-Bromophenyl Phenylether	250 U	250	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**41 J**	250	7.82
106-47-8	4-Chloroaniline	250 U	250	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	250 U	250	4.91
106-44-5	4-Methylphenol	250 U	250	9.56
100-01-6	4-Nitroaniline	250 U	250	10.9
100-02-7	4-Nitrophenol	490 U	490	4.25
83-32-9	Acenaphthene	250 U	250	2.58
208-96-8	Acenaphthylene	250 U	250	2.25
98-86-2	Acetophenone	250 U	250	2.85

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD2**	QC Batch:	89845 -109
Sample #:	**344931**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	250 U		250	6.93
1912-24-9	Atrazine	250 U		250	10.3
100-52-7	Benzaldehyde	250 U	UJ,c	250	6.08
56-55-3	Benzo (a) Anthracene	250 U		250	20.0
50-32-8	Benzo (a) Pyrene	250 U		250	8.57
205-99-2	Benzo (b) Fluoranthene	250 U		250	14.6
191-24-2	Benzo (g,h,i,) Perylene	250 U		250	13.1
207-08-9	Benzo (k) Fluoranthene	250 U		250	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	250 U		250	4.71
111-44-4	Bis (2-Chloroethyl) Ether	250 U		250	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**65 J**	B,x	250	3.11
85-68-7	Butyl Benzyl Phthalate	250 U		250	6.72
105-60-2	Caprolactam	490 U		490	9.57
86-74-8	Carbazole	250 U		250	9.15
218-01-9	Chrysene	250 U		250	15.3
53-70-3	Dibenzo (a,h) Anthracene	250 U		250	8.85
132-64-9	Dibenzofuran	250 U		250	4.74
84-66-2	**Diethylphthalate**	**5.0 J**	B,x	250	2.85
131-11-3	Dimethylphthalate	250 U		250	4.97
84-74-2	**Di-n-Butylphthalate**	**48 J**		250	5.73
117-84-0	Di-n-Octylphthalate	250 U		250	4.65
206-44-0	Fluoranthene	250 U		250	3.53
86-73-7	Fluorene	250 U		250	2.52
118-74-1	Hexachlorobenzene	250 U		250	3.77
87-68-3	Hexachlorobutadiene	250 U		250	5.81
77-47-4	Hexachlorocyclopentadiene	250 U		250	2.97
67-72-1	Hexachloroethane	250 U		250	3.50
193-39-5	Indeno (1,2,3-cd) Pyrene	250 U		250	5.88
78-59-1	Isophorone	250 U		250	2.60
91-20-3	Naphthalene	250 U		250	4.13
98-95-3	Nitrobenzene	250 U		250	4.80

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD2**	QC Batch:	89845 -109
Sample #:	**344931**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	250 U	250	4.94
86-30-6	N-Nitroso-di-Phenylamine	250 U	250	7.13
87-86-5	Pentachlorophenol	490 U	490	6.59
85-01-8	Phenanthrene	250 U	250	3.45
108-95-2	Phenol	250 U	250	5.94
129-00-0	Pyrene	250 U	250	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD2**	QC Batch:	89845 -109
Sample #:	**344931**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	240	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	66	E	B,x
1-Heptadecanol	1454-85-9	31	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	36	E	NJ,+
9-HEPTADECANONE	540-08-9	25	E	NJ,+
Erucylamide	112-84-5	1100	E	NJ,+
Phosphonic acid, dioctadecyl ester	19047-85-9	55	E	NJ,+
Squalene	7683-64-9	170	E	NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~41~~	~~E~~	As 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	16

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	2800 U	2800	39.4
95-94-3	1,2,4,5-Tetrachloro-benzene	2800 U	2800	459
108-60-1	Bis (2-Chloroisopropyl)-Ether	2800 U	2800	21.1
95-95-4	2,4,5-Trichlorophenol	2800 U	2800	53.4
88-06-2	2,4,6-Trichlorophenol	2800 U	2800	41.9
120-83-2	2,4-Dichlorophenol	2800 U	2800	56.3
105-67-9	2,4-Dimethylphenol	2800 U	2800	127
51-28-5	2,4-Dinitrophenol	5600 U	5600	51.2
121-14-2	**2,4-Dinitrotoluene**	**260 J**	2800	50.4
606-20-2	2,6-Dinitrotoluene	2800 U	2800	443
91-58-7	2-Chloronaphthalene	2800 U	2800	36.8
95-57-8	2-Chlorophenol	2800 U	2800	32.2
91-57-6	2-Methylnaphthalene	2800 U	2800	43.8
95-48-7	2-Methylphenol	2800 U	2800	77.4
88-74-4	2-Nitroaniline	2800 U	2800	73.6
88-75-5	2-Nitrophenol	2800 U	2800	27.2
91-94-1	3,3'-Dichlorobenzidine	2800 U	2800	1070
99-09-2	3-Nitroaniline	2800 U	2800	533
534-52-1	4,6-Dinitro-2-Methylphenol	2800 U	2800	72.2
101-55-3	4-Bromophenyl Phenylether	2800 U	2800	54.1
59-50-7	4-Chloro-3-Methylphenol	2800 U	2800	83.4
106-47-8	4-Chloroaniline	2800 U	2800	20.2
7005-72-3	4-Chlorophenylphenyl-Ether	2800 U	2800	52.3
106-44-5	4-Methylphenol	2800 U	2800	102
100-01-6	4-Nitroaniline	2800 U	2800	116
100-02-7	4-Nitrophenol	5600 U	5600	45.3
83-32-9	Acenaphthene	2800 U	2800	27.5
208-96-8	Acenaphthylene	2800 U	2800	24.0
98-86-2	Acetophenone	2800 U	2800	30.4

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	16

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	2800 U		2800	73.9
1912-24-9	Atrazine	2800 U		2800	110
100-52-7	Benzaldehyde	2800 U	UJ,c	2800	64.8
56-55-3	Benzo (a) Anthracene	2800 U		2800	213
50-32-8	*Benzo (a) Pyrene	2800 UR	UJ,i	2800	91.4
205-99-2	*Benzo (b) Fluoranthene	2800 UR	UJ,i	2800	156
191-24-2	*Benzo (g,h,i,) Perylene	2800 UR	UJ,i	2800	140
207-08-9	*Benzo (k) Fluoranthene	2800 UR	UJ,i	2800	214
111-91-1	Bis (2-Chloroethoxy)-Methane	2800 U		2800	50.2
111-44-4	Bis (2-Chloroethyl) Ether	2800 U		2800	27.7
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**890 J**	B,X	2800	33.1
85-68-7	Butyl Benzyl Phthalate	2800 U		2800	71.7
105-60-2	Caprolactam	5600 U		5600	102
86-74-8	Carbazole	2800 U		2800	97.6
218-01-9	Chrysene	2800 U		2800	163
53-70-3	*Dibenzo (a,h) Anthracene	2800 UR	UJ,i	2800	94.4
132-64-9	Dibenzofuran	2800 U		2800	50.6
84-66-2	Diethylphthalate	2800 U		2800	30.4
131-11-3	Dimethylphthalate	2800 U		2800	53.0
84-74-2	**Di-n-Butylphthalate**	**14000**		2800	61.1
117-84-0	Di-n-Octylphthalate	2800 U		2800	49.6
206-44-0	**Fluoranthene**	**120 J**		2800	37.6
86-73-7	Fluorene	2800 U		2800	26.9
118-74-1	Hexachlorobenzene	2800 U		2800	40.2
87-68-3	Hexachlorobutadiene	2800 U		2800	61.9
77-47-4	Hexachlorocyclopentadiene	2800 U		2800	31.7
67-72-1	Hexachloroethane	2800 U		2800	37.3
193-39-5	*Indeno (1,2,3-cd) Pyrene	2800 UR	UJ,i	2800	62.7
78-59-1	Isophorone	2800 U		2800	27.7
91-20-3	Naphthalene	2800 U		2800	44.0
98-95-3	Nitrobenzene	2800 U		2800	51.2

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	16

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	2800 U	2800	52.6
86-30-6	**N-Nitroso-di-Phenylamine**	**450 J**	2800	76.0
87-86-5	Pentachlorophenol	5600 U	5600	70.2
85-01-8	**Phenanthrene**	**40 J**	2800	36.8
108-95-2	Phenol	2800 U	2800	63.4
129-00-0	**Pyrene**	**110 J**	2800	23.7

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932**	Anal. Batch:	207691
Matrix:	Soil	Percent Solids:	61
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
1,2-Benzenedicarboxylic acid, butyl 8-methylnonyl ester	89-18-9	280	E NJ,+
2 (5H)-Furanone	497-23-4	320	E NJ,+
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~3800~~	~~E~~

12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932DL**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	160

See DF 16 dh 12/10/03

CAS Number	Semivolatile Organics *OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	28000 U		28000	394
95-94-3	1,2,4,5-Tetrachloro-benzene	28000 U		28000	4590
108-60-1	Bis (2-Chloroisopropyl)-Ether	28000 U		28000	211
95-95-4	2,4,5-Trichlorophenol	28000 U		28000	534
88-06-2	2,4,6-Trichlorophenol	28000 U		28000	419
120-83-2	2,4-Dichlorophenol	28000 U		28000	563
105-67-9	2,4-Dimethylphenol	28000 U		28000	1270
51-28-5	2,4-Dinitrophenol	56000 U		56000	512
121-14-2	2,4-Dinitrotoluene	28000 U		28000	504
606-20-2	2,6-Dinitrotoluene	28000 U		28000	4430
91-58-7	2-Chloronaphthalene	28000 U		28000	368
95-57-8	2-Chlorophenol	28000 U		28000	322
91-57-6	2-Methylnaphthalene	28000 U		28000	438
95-48-7	2-Methylphenol	28000 U		28000	774
88-74-4	2-Nitroaniline	28000 U		28000	736
88-75-5	2-Nitrophenol	28000 U		28000	272
91-94-1	3,3'-Dichlorobenzidine	28000 U		28000	10700
99-09-2	3-Nitroaniline	28000 U		28000	5330
534-52-1	4,6-Dinitro-2-Methylphenol	28000 U		28000	722
101-55-3	4-Bromophenyl Phenylether	28000 U		28000	541
59-50-7	4-Chloro-3-Methylphenol	28000 U		28000	834
106-47-8	4-Chloroaniline	28000 U	UJ,c	28000	202
7005-72-3	4-Chlorophenylphenyl-Ether	28000 U		28000	523
106-44-5	4-Methylphenol	28000 U		28000	1020
100-01-6	4-Nitroaniline	28000 U		28000	1160
100-02-7	4-Nitrophenol	56000 U		56000	453
83-32-9	Acenaphthene	28000 U		28000	275
208-96-8	Acenaphthylene	28000 U		28000	240
98-86-2	Acetophenone	28000 U		28000	304

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932DL**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	160

See DF 16 JM 12/16/03

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	28000 U		28000	739
1912-24-9	Atrazine	28000 U		28000	1100
100-52-7	Benzaldehyde	28000 U	UJ,c	28000	648
56-55-3	Benzo (a) Anthracene	28000 U		28000	2130
50-32-8	*Benzo (a) Pyrene	28000 UJ	UJ,i	28000	914
205-99-2	*Benzo (b) Fluoranthene	28000 UJ	UJ,i	28000	1560
191-24-2	*Benzo (g,h,i,) Perylene	28000 UJ	UJ,i	28000	1400
207-08-9	*Benzo (k) Fluoranthene	28000 UJ	UJ,i	28000	2140
111-91-1	Bis (2-Chloroethoxy)-Methane	28000 U		28000	502
111-44-4	Bis (2-Chloroethyl) Ether	28000 U		28000	277
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**4500 J**	B,x	28000	331
85-68-7	Butyl Benzyl Phthalate	28000 U		28000	717
105-60-2	Caprolactam	56000 U		56000	1020
86-74-8	Carbazole	28000 U		28000	976
218-01-9	Chrysene	28000 U		28000	1630
53-70-3	*Dibenzo (a,h) Anthracene	28000 UJ	UJ,i	28000	944
132-64-9	Dibenzofuran	28000 U		28000	506
84-66-2	**Diethylphthalate**	**4200 J**	B,x	28000	304
131-11-3	Dimethylphthalate	28000 U		28000	530
84-74-2	**Di-n-Butylphthalate**	**13000 J**		28000	611
117-84-0	Di-n-Octylphthalate	28000 U		28000	496
206-44-0	Fluoranthene	28000 U		28000	376
86-73-7	Fluorene	28000 U		28000	269
118-74-1	Hexachlorobenzene	28000 U		28000	402
87-68-3	Hexachlorobutadiene	28000 U		28000	619
77-47-4	Hexachlorocyclopentadiene	28000 U		28000	317
67-72-1	Hexachloroethane	28000 U		28000	373
193-39-5	*Indeno (1,2,3-cd) Pyrene	28000 UJ	UJ,i	28000	627
78-59-1	Isophorone	28000 U		28000	277
91-20-3	Naphthalene	28000 U		28000	440
98-95-3	Nitrobenzene	28000 U		28000	512

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1A**	QC Batch:	89845 -109
Sample #:	**344932DL**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	160

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	28000 U	28000	526
86-30-6	N-Nitroso-di-Phenylamine	28000 U	28000	760
87-86-5	Pentachlorophenol	56000 U	56000	702
85-01-8	Phenanthrene	28000 U	28000	368
108-95-2	Phenol	28000 U	28000	634
129-00-0	Pyrene	28000 U	28000	237

See DF 16 & 12/10/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB1B**	QC Batch:	89845 -109
Sample #:	**345024**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.46
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	28.7
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.32
95-95-4	2,4,5-Trichlorophenol	200 U		200	3.34
88-06-2	2,4,6-Trichlorophenol	200 U		200	2.62
120-83-2	2,4-Dichlorophenol	200 U		200	3.52
105-67-9	2,4-Dimethylphenol	200 U		200	7.94
51-28-5	2,4-Dinitrophenol	400 U		400	3.20
121-14-2	2,4-Dinitrotoluene	200 U		200	3.15
606-20-2	2,6-Dinitrotoluene	200 U		200	27.7
91-58-7	2-Chloronaphthalene	200 U		200	2.30
95-57-8	2-Chlorophenol	200 U		200	2.01
91-57-6	2-Methylnaphthalene	200 U		200	2.74
95-48-7	2-Methylphenol	200 U		200	4.84
88-74-4	2-Nitroaniline	200 U		200	4.60
88-75-5	2-Nitrophenol	200 U		200	1.70
91-94-1	3,3'-Dichlorobenzidine	200 U		200	66.7
99-09-2	3-Nitroaniline	200 U		200	33.3
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	4.51
101-55-3	4-Bromophenyl Phenylether	200 U		200	3.38
59-50-7	**4-Chloro-3-Methylphenol**	**24 J**		200	5.21
106-47-8	4-Chloroaniline	200 U	UJ,c	200	1.26
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.27
106-44-5	4-Methylphenol	200 U		200	6.37
100-01-6	4-Nitroaniline	200 U		200	7.25
100-02-7	4-Nitrophenol	400 U		400	2.83
83-32-9	Acenaphthene	200 U		200	1.72
208-96-8	Acenaphthylene	200 U		200	1.50
98-86-2	Acetophenone	200 U		200	1.90

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1B**	QC Batch:	89845 -109
Sample #:	**345024**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	4.62
1912-24-9	Atrazine	200 U		200	6.88
100-52-7	Benzaldehyde	200 U	UJ,C	200	4.05
56-55-3	Benzo (a) Anthracene	200 U		200	13.3
50-32-8	Benzo (a) Pyrene	200 U		200	5.71
205-99-2	Benzo (b) Fluoranthene	200 U		200	9.76
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	8.72
207-08-9	Benzo (k) Fluoranthene	200 U		200	13.4
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.14
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	1.73
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**46 J**	B,X	200	2.07
85-68-7	Butyl Benzyl Phthalate	200 U		200	4.48
105-60-2	Caprolactam	400 U		400	6.38
86-74-8	Carbazole	200 U		200	6.10
218-01-9	Chrysene	200 U		200	10.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	5.90
132-64-9	Dibenzofuran	200 U		200	3.16
84-66-2	Diethylphthalate	200 U		200	1.90
131-11-3	**Dimethylphthalate**	**30 J**		200	3.31
84-74-2	**Di-n-Butylphthalate**	**33 J**		200	3.82
117-84-0	Di-n-Octylphthalate	200 U		200	3.10
206-44-0	Fluoranthene	200 U		200	2.35
86-73-7	Fluorene	200 U		200	1.68
118-74-1	Hexachlorobenzene	200 U		200	2.51
87-68-3	Hexachlorobutadiene	200 U		200	3.87
77-47-4	Hexachlorocyclopentadiene	200 U		200	1.98
67-72-1	Hexachloroethane	200 U		200	2.33
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	3.92
78-59-1	Isophorone	200 U		200	1.73
91-20-3	Naphthalene	200 U		200	2.75
98-95-3	Nitrobenzene	200 U		200	3.20

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1B**	QC Batch:	89845 -109
Sample #:	**345024**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.29
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	4.75
87-86-5	Pentachlorophenol	400 U	400	4.39
85-01-8	Phenanthrene	200 U	200	2.30
108-95-2	Phenol	200 U	200	3.96
129-00-0	Pyrene	200 U	200	1.48

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1B**	QC Batch:	89845 -109
Sample #:	**345024**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	110	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	45	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	100	E	B,X
~~Unknown Acid~~	~~XXX-XX-XXXX~~	~~22~~	~~E~~	

~~*~~ 12/10/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB1A**	QC Batch:	90138 -110
Sample #:	**344823**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.15

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.8
208-96-8	Acenaphthylene	240 U		240	13.3
120-12-7	Anthracene	24 U		24	0.805
56-55-3	Benzo (a) Anthracene	24 U	UJ,I	24	0.920
50-32-8	Benzo (a) Pyrene	24 U		24	1.15
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.50
191-24-2	Benzo (g,h,i,) Perylene	110 U		110	14.4
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.15
218-01-9	Chrysene	24 U		24	1.38
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.61
206-44-0	Fluoranthene	24 U		24	1.96
86-73-7	Fluorene	24 U		24	1.50
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.805
91-20-3	Naphthalene	110 U		110	9.09
85-01-8	Phenanthrene	24 U		24	0.690
129-00-0	Pyrene	24 U		24	1.04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB1B**	QC Batch:	90138 -110
Sample #:	**344824**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.1
208-96-8	Acenaphthylene	250 U		250	13.7
120-12-7	Anthracene	25 U		25	0.826
56-55-3	Benzo (a) Anthracene	25 U	VJ,I	25	0.944
50-32-8	Benzo (a) Pyrene	25 U		25	1.18
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.53
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	14.8
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.18
218-01-9	Chrysene	25 U		25	1.42
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.65
206-44-0	Fluoranthene	25 U		25	2.01
86-73-7	Fluorene	25 U		25	1.53
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.826
91-20-3	Naphthalene	120 U		120	9.32
85-01-8	Phenanthrene	25 U		25	0.708
129-00-0	Pyrene	25 U		25	1.06

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/13/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**FSB1C**	QC Batch:	90138 -110
Sample #:	**344825**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.5
208-96-8	Acenaphthylene	260 U		260	14.2
120-12-7	Anthracene	26 U		26	0.854
56-55-3	Benzo (a) Anthracene	26 U	UJ,I	26	0.976
50-32-8	Benzo (a) Pyrene	26 U		26	1.22
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.59
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	15.3
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.22
218-01-9	Chrysene	26 U		26	1.46
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.71
206-44-0	Fluoranthene	26 U		26	2.07
86-73-7	Fluorene	26 U		26	1.59
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.854
91-20-3	Naphthalene	120 U		120	9.64
85-01-8	Phenanthrene	26 U		26	0.732
129-00-0	Pyrene	26 U		26	1.10

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB2A**	QC Batch:	90138 -110
Sample #:	**344826**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.1
208-96-8	Acenaphthylene	250 U		250	13.7
120-12-7	Anthracene	25 U		25	0.826
56-55-3	Benzo (a) Anthracene	25 U	UJ,I	25	0.944
50-32-8	Benzo (a) Pyrene	25 U		25	1.18
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.53
191-24-2	Benzo (g,h,i,) Perylene	120 U	UJ,M	120	14.8
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.18
218-01-9	Chrysene	25 U		25	1.42
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.65
206-44-0	Fluoranthene	25 U	UJ,M	25	2.01
86-73-7	Fluorene	25 U		25	1.53
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.826
91-20-3	Naphthalene	120 U		120	9.32
85-01-8	Phenanthrene	25 U	UJ,M	25	0.708
129-00-0	Pyrene	25 U		25	1.06

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB2B**	QC Batch:	90138 -110
Sample #:	**344827**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.07

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.1
208-96-8	Acenaphthylene	230 U		230	12.4
120-12-7	Anthracene	23 U		23	0.749
56-55-3	Benzo (a) Anthracene	23 U	UJ,I	23	0.856
50-32-8	Benzo (a) Pyrene	23 U		23	1.07
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.39
191-24-2	Benzo (g,h,i,) Perylene	110 U		110	13.4
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.07
218-01-9	Chrysene	23 U		23	1.28
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.50
206-44-0	Fluoranthene	23 U		23	1.82
86-73-7	Fluorene	23 U		23	1.39
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.749
91-20-3	Naphthalene	110 U		110	8.45
85-01-8	Phenanthrene	23 U		23	0.642
129-00-0	Pyrene	23 U		23	0.963

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD-1**	QC Batch:	90138 -110
Sample #:	**344828**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.14

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.7
208-96-8	Acenaphthylene	240 U		240	13.2
120-12-7	Anthracene	24 U		24	0.798
56-55-3	Benzo (a) Anthracene	24 U	UJ,I	24	0.912
50-32-8	Benzo (a) Pyrene	24 U		24	1.14
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.48
191-24-2	Benzo (g,h,i,) Perylene	110 U		110	14.3
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.14
218-01-9	Chrysene	24 U		24	1.37
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.60
206-44-0	Fluoranthene	24 U		24	1.94
86-73-7	Fluorene	24 U		24	1.48
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.798
91-20-3	Naphthalene	110 U		110	9.01
85-01-8	Phenanthrene	24 U		24	0.684
129-00-0	Pyrene	24 U		24	1.03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB2C**	QC Batch:	90138 -110
Sample #:	**344829**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.1
208-96-8	Acenaphthylene	250 U		250	13.7
120-12-7	Anthracene	25 U		25	0.826
56-55-3	Benzo (a) Anthracene	25 U	VJ,1	25	0.944
50-32-8	Benzo (a) Pyrene	25 U		25	1.18
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.53
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	14.8
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.18
218-01-9	Chrysene	25 U		25	1.42
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.65
206-44-0	Fluoranthene	25 U		25	2.01
86-73-7	Fluorene	25 U		25	1.53
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.826
91-20-3	Naphthalene	120 U		120	9.32
85-01-8	Phenanthrene	25 U		25	0.708
129-00-0	Pyrene	25 U		25	1.06

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB3A**	QC Batch:	90138 -110
Sample #:	**344922**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	10.9
208-96-8	Acenaphthylene	240 U		240	13.5
120-12-7	Anthracene	24 U		24	0.812
56-55-3	Benzo (a) Anthracene	24 U	UJ,I	24	0.928
50-32-8	Benzo (a) Pyrene	24 U		24	1.16
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.51
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	14.5
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.16
218-01-9	Chrysene	24 U		24	1.39
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.62
206-44-0	Fluoranthene	24 U		24	1.97
86-73-7	Fluorene	24 U		24	1.51
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.812
91-20-3	Naphthalene	120 U		120	9.16
85-01-8	Phenanthrene	24 U		24	0.696
129-00-0	Pyrene	24 U		24	1.04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB3B**	QC Batch:	90138 -110
Sample #:	**344923**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	90
Unit:	ug/kg dry	Dilution Factor:	1.11

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.4
208-96-8	Acenaphthylene	230 U		230	12.9
120-12-7	Anthracene	23 U		23	0.777
56-55-3	Benzo (a) Anthracene	23 U	VJ,1	23	0.888
50-32-8	Benzo (a) Pyrene	23 U		23	1.11
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.44
191-24-2	Benzo (g,h,i,) Perylene	110 U		110	13.9
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.11
218-01-9	Chrysene	23 U		23	1.33
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.55
206-44-0	Fluoranthene	23 U		23	1.89
86-73-7	Fluorene	23 U		23	1.44
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.777
91-20-3	Naphthalene	110 U		110	8.77
85-01-8	Phenanthrene	23 U		23	0.666
129-00-0	Pyrene	23 U		23	0.999

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**FSB3C**	QC Batch:	90138 -110
Sample #:	**344924**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U		140	13.3
208-96-8	Acenaphthylene	300 U		300	16.4
120-12-7	Anthracene	30 U		30	0.987
56-55-3	Benzo (a) Anthracene	30 U	UJ, I	30	1.13
50-32-8	Benzo (a) Pyrene	30 U		30	1.41
205-99-2	Benzo (b) Fluoranthene	30 U		30	1.83
191-24-2	Benzo (g,h,i,) Perylene	140 U		140	17.6
207-08-9	Benzo (k) Fluoranthene	30 U		30	1.41
218-01-9	Chrysene	30 U		30	1.69
53-70-3	Dibenzo (a,h) Anthracene	30 U		30	1.97
206-44-0	Fluoranthene	30 U		30	2.40
86-73-7	Fluorene	30 U		30	1.83
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U		30	0.987
91-20-3	Naphthalene	140 U		140	11.1
85-01-8	Phenanthrene	30 U		30	0.846
129-00-0	Pyrene	30 U		30	1.27

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB1A**	QC Batch:	90138 -110
Sample #:	**344925**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U	UJ, I	25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U		25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB1B**	QC Batch:	90138 -110
Sample #:	**344926**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.31

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U		130	12.3
208-96-8	Acenaphthylene	280 U		280	15.2
120-12-7	Anthracene	28 U		28	0.917
56-55-3	Benzo (a) Anthracene	28 U	VJ, I	28	1.05
50-32-8	Benzo (a) Pyrene	28 U		28	1.31
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.70
191-24-2	Benzo (g,h,i,) Perylene	130 U		130	16.4
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.31
218-01-9	Chrysene	28 U		28	1.57
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.83
206-44-0	Fluoranthene	28 U		28	2.23
86-73-7	Fluorene	28 U		28	1.70
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.917
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	28 U		28	0.786
129-00-0	Pyrene	28 U		28	1.18

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB1C**	QC Batch:	90138 -110
Sample #:	**344927**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.47

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	13.8
208-96-8	Acenaphthylene	310 U	310	17.1
120-12-7	Anthracene	31 U	31	1.03
56-55-3	Benzo (a) Anthracene	31 U	31	1.18
50-32-8	Benzo (a) Pyrene	31 U	31	1.47
205-99-2	Benzo (b) Fluoranthene	31 U	31	1.91
191-24-2	Benzo (g,h,i,) Perylene	150 U	150	18.4
207-08-9	Benzo (k) Fluoranthene	31 U	31	1.47
218-01-9	Chrysene	31 U	31	1.76
53-70-3	Dibenzo (a,h) Anthracene	31 U	31	2.06
206-44-0	Fluoranthene	31 U	31	2.50
86-73-7	Fluorene	31 U	31	1.91
193-39-5	Indeno (1,2,3-cd) Pyrene	31 U	31	1.03
91-20-3	Naphthalene	150 U	150	11.6
85-01-8	Phenanthrene	31 U	31	0.882
129-00-0	Pyrene	31 U	31	1.32

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB2A**	QC Batch:	90138 -110
Sample #:	**344928**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.2
208-96-8	Acenaphthylene	250 U		250	13.8
120-12-7	Anthracene	25 U		25	0.833
56-55-3	Benzo (a) Anthracene	25 U	UJ,1	25	0.952
50-32-8	Benzo (a) Pyrene	25 U		25	1.19
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.55
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	14.9
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.19
218-01-9	Chrysene	25 U		25	1.43
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.67
206-44-0	Fluoranthene	25 U		25	2.02
86-73-7	Fluorene	25 U		25	1.55
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.833
91-20-3	Naphthalene	120 U		120	9.40
85-01-8	Phenanthrene	25 U		25	0.714
129-00-0	Pyrene	25 U		25	1.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB2B**	QC Batch:	90138 -110
Sample #:	**344929**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.6
208-96-8	Acenaphthylene	260 U		260	14.3
120-12-7	Anthracene	26 U		26	0.861
56-55-3	Benzo (a) Anthracene	26 U	VJ,1	26	0.984
50-32-8	Benzo (a) Pyrene	26 U		26	1.23
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.60
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	15.4
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.23
218-01-9	Chrysene	26 U		26	1.48
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.72
206-44-0	Fluoranthene	26 U		26	2.09
86-73-7	Fluorene	26 U		26	1.60
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.861
91-20-3	Naphthalene	120 U		120	9.72
85-01-8	Phenanthrene	26 U		26	0.738
129-00-0	Pyrene	26 U		26	1.11

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**46SB2C**	QC Batch:	90138 -110
Sample #:	**344930**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	150 U		150	14.0
208-96-8	Acenaphthylene	310 U		310	17.3
120-12-7	Anthracene	31 U		31	1.04
56-55-3	Benzo (a) Anthracene	31 U	UJ,I	31	1.19
50-32-8	Benzo (a) Pyrene	31 U		31	1.49
205-99-2	Benzo (b) Fluoranthene	31 U		31	1.94
191-24-2	Benzo (g,h,i,) Perylene	120 U		120	18.6
207-08-9	Benzo (k) Fluoranthene	31 U		31	1.49
218-01-9	Chrysene	31 U		31	1.79
53-70-3	Dibenzo (a,h) Anthracene	31 U		31	2.09
206-44-0	Fluoranthene	31 U		31	2.53
86-73-7	Fluorene	31 U		31	1.94
193-39-5	Indeno (1,2,3-cd) Pyrene	31 U		31	1.04
91-20-3	Naphthalene	150 U		150	11.8
85-01-8	Phenanthrene	31 U		31	0.894
129-00-0	Pyrene	31 U		31	1.34

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD2**	QC Batch:	90138 -110
Sample #:	**344931**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.0
208-96-8	Acenaphthylene	310 U	310	17.3
120-12-7	Anthracene	31 U	31	1.04
56-55-3	Benzo (a) Anthracene	31 U	31	1.19
50-32-8	Benzo (a) Pyrene	31 U	31	1.49
205-99-2	Benzo (b) Fluoranthene	31 U	31	1.94
191-24-2	Benzo (g,h,i,) Perylene	150 U	150	18.6
207-08-9	Benzo (k) Fluoranthene	31 U	31	1.49
218-01-9	Chrysene	31 U	31	1.79
53-70-3	Dibenzo (a,h) Anthracene	31 U	31	2.09
206-44-0	Fluoranthene	31 U	31	2.53
86-73-7	Fluorene	31 U	31	1.94
193-39-5	Indeno (1,2,3-cd) Pyrene	31 U	31	1.04
91-20-3	Naphthalene	150 U	150	11.8
85-01-8	Phenanthrene	31 U	31	0.894
129-00-0	Pyrene	31 U	31	1.34

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB1A**	QC Batch:	90138 -110
Sample #:	**344932**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1.64

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	160 U		160	15.4
208-96-8	Acenaphthylene	340 U		340	19.0
120-12-7	Anthracene	34 U		34	1.15
56-55-3	Benzo (a) Anthracene	34 U	UJ,I	34	1.31
50-32-8	Benzo (a) Pyrene	34 U		34	1.64
205-99-2	Benzo (b) Fluoranthene	34 U		34	2.13
191-24-2	Benzo (g,h,i,) Perylene	160 U		160	20.5
207-08-9	Benzo (k) Fluoranthene	34 U		34	1.64
218-01-9	Chrysene	34 U		34	1.97
53-70-3	Dibenzo (a,h) Anthracene	34 U		34	2.30
206-44-0	**Fluoranthene**	**73**		34	2.79
86-73-7	Fluorene	34 U		34	2.13
193-39-5	Indeno (1,2,3-cd) Pyrene	34 U		34	1.15
91-20-3	Naphthalene	160 U		160	13.0
85-01-8	**Phenanthrene**	**15 J**		34	0.984
129-00-0	**Pyrene**	**58**		34	1.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB1B**	QC Batch:	90138 -110
Sample #:	**345024**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U	VJ,1	25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U		25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB1A**	QC Batch:	89967 -113
Sample #:	**344823**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	87
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB1B**	QC Batch:	89967 -113
Sample #:	**344824**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB1C**	QC Batch:	89967 -113
Sample #:	**344825**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB2A**	QC Batch:	89967 -113
Sample #:	**344826**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB2B**	QC Batch:	89967 -113
Sample #:	**344827**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	93
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD-1**	QC Batch:	89967 -113
Sample #:	**344828**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	88
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB2C**	QC Batch:	89967 -113
Sample #:	**344829**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB3A**	QC Batch:	89967 -113
Sample #:	**344922**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	86
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB3B**	QC Batch:	89967 -113
Sample #:	**344923**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	90
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**FSB3C**	QC Batch:	89967 -113
Sample #:	**344924**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB1A**	QC Batch:	89967 -113
Sample #:	**344925**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	83
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB1B**	QC Batch:	89967 -113
Sample #:	**344926**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB1C**	QC Batch:	89967 -113
Sample #:	**344927**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	68
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB2A**	QC Batch:	89967 -113
Sample #:	**344928**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB2B**	QC Batch:	89967 -113
Sample #:	**344929**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	81
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**46SB2C**	QC Batch:	89967 -113
Sample #:	**344930**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	67
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD2**	QC Batch:	89967 -113
Sample #:	**344931**	Anal. Batch:	207867
Matrix:	Soil	Percent Solids:	67
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB1A**	QC Batch:	89967 -113
Sample #:	**344932**	Anal. Batch:	207866
Matrix:	Soil	Percent Solids:	61
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.27 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	VJ,C	1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB1B**	QC Batch:	89967 -113
Sample #:	**345024**	Anal. Batch:	207866
Matrix:	Soil	Percent Solids:	83
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	UJ,C	1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

003244

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**FSB2A**	QC Batch:	90181 -109
Sample #:	**344826**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	24 U	24	0.286
72-55-9	4,4'-DDE	24 U	24	0.210
50-29-3	4,4'-DDT	24 U	24	0.216
309-00-2	Aldrin	24 U	24	0.365
319-84-6	Alpha-BHC	24 U	24	0.364
57-74-9	A-Chlordane	24 U	24	0.521
5103-74-2	G-Chlordane	24 U	24	0.844
319-85-7	Beta-BHC	24 U	24	1.36
319-86-8	Delta-BHC	24 U	24	0.982
60-57-1	Dieldrin	24 U	24	0.371
115-29-7	Endosulfan I	24 U	24	1.09
33213-65-9	Endosulfan II	24 U	24	0.257
1031-07-8	Endosulfan Sulfate	24 U	24	0.604
72-20-8	Endrin	24 U	24	0.358
7421-93-4	Endrin Aldehyde	24 U	24	1.33
53494-70-5	Endrin Ketone	24 U	24	0.330
58-89-9	Lindane	24 U	24	0.233
76-44-8	Heptachlor	24 U	24	0.846
1024-57-3	Heptachlor Epoxide	24 U	24	0.546
72-43-5	Methoxychlor	24 U	24	0.336
8001-35-2	Toxaphene	200 U	200	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**46SB1A**	QC Batch:	90181 -109
Sample #:	**344925**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	24 U	24	0.286
72-55-9	4,4'-DDE	24 U	24	0.210
50-29-3	4,4'-DDT	24 U	24	0.216
309-00-2	Aldrin	24 U	24	0.365
319-84-6	Alpha-BHC	24 U	24	0.364
57-74-9	A-Chlordane	24 U	24	0.521
5103-74-2	G-Chlordane	24 U	24	0.844
319-85-7	Beta-BHC	24 U	24	1.36
319-86-8	Delta-BHC	24 U	24	0.982
60-57-1	Dieldrin	24 U	24	0.371
115-29-7	Endosulfan I	24 U	24	1.09
33213-65-9	Endosulfan II	24 U	24	0.257
1031-07-8	Endosulfan Sulfate	24 U	24	0.604
72-20-8	Endrin	24 U	24	0.358
7421-93-4	Endrin Aldehyde	24 U	24	1.33
53494-70-5	Endrin Ketone	24 U	24	0.330
58-89-9	Lindane	24 U	24	0.233
76-44-8	Heptachlor	24 U	24	0.846
1024-57-3	Heptachlor Epoxide	24 U	24	0.546
72-43-5	Methoxychlor	24 U	24	0.336
8001-35-2	Toxaphene	200 U	200	28.0

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**37SB1A**	QC Batch:	90181 -109
Sample #:	**344932**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
72-54-8	4,4'-DDD	33 U		33	0.381
72-55-9	4,4'-DDE	33 U		33	0.280
50-29-3	4,4'-DDT	33 U		33	0.288
309-00-2	Aldrin	33 U		33	0.486
319-84-6	Alpha-BHC	33 U		33	0.485
57-74-9	A-Chlordane	33 U		33	0.694
5103-74-2	G-Chlordane	33 U		33	1.12
319-85-7	Beta-BHC	33 U		33	1.81
319-86-8	Delta-BHC	33 U		33	1.31
60-57-1	**Dieldrin**	**11 J**	J,g	33	0.494
115-29-7	Endosulfan I	33 U		33	1.46
33213-65-9	Endosulfan II	33 U		33	0.342
1031-07-8	Endosulfan Sulfate	33 U		33	0.805
72-20-8	Endrin	33 U		33	0.477
7421-93-4	Endrin Aldehyde	33 U		33	1.78
53494-70-5	Endrin Ketone	33 U		33	0.440
58-89-9	Lindane	33 U		33	0.310
76-44-8	Heptachlor	33 U		33	1.13
1024-57-3	Heptachlor Epoxide	33 U		33	0.728
72-43-5	Methoxychlor	33 U		33	0.448
8001-35-2	Toxaphene	280 U		280	37.3

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**FSB2A**	QC Batch:	89881 -109
Sample #:	**344826**	Anal. Batch:	207710
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	78 U	78	19.2
11104-28-2	PCB-1221	39 U	39	2.40
11141-16-5	PCB-1232	39 U	39	6.00
53469-21-9	PCB-1242	39 U	39	3.60
12672-29-6	PCB-1248	39 U	39	6.00
11097-69-1	PCB-1254	39 U	39	3.60
11096-82-5	PCB-1260	39 U	39	8.40

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Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**46SB1A**	QC Batch:	89881 -109
Sample #:	**344925**	Anal. Batch:	207710
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	80 U	80	19.2
11104-28-2	PCB-1221	40 U	40	2.40
11141-16-5	PCB-1232	40 U	40	6.00
53469-21-9	PCB-1242	40 U	40	3.60
12672-29-6	PCB-1248	40 U	40	6.00
11097-69-1	PCB-1254	40 U	40	3.60
11096-82-5	PCB-1260	40 U	40	8.40

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-1**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**37SB1A**	QC Batch:	89881 -109
Sample #:	**344932**	Anal. Batch:	207710
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	110 U	110	25.6
11104-28-2	PCB-1221	54 U	54	3.20
11141-16-5	PCB-1232	54 U	54	8.00
53469-21-9	PCB-1242	54 U	54	4.80
12672-29-6	PCB-1248	54 U	54	8.00
11097-69-1	**PCB-1254**	**180**	54	4.80
11096-82-5	PCB-1260	54 U	54	11.2

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**FSB2A**	QC Batch:	90218 -110
Sample #:	**344826**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	59 U	59	2.40
93-72-1	2,4,5-TP (Silvex)	59 U	59	4.80
94-75-7	2,4-D	240 U	240	19.2
94-82-6	2,4-DB	240 U	240	74.4
75-99-0	Dalapon	290 U	290	68.4
1918-00-9	Dicamba	240 U	240	2.40
120-36-5	Dichlorprop	240 U	240	20.4
~~88-85-7~~	~~*Dinoseb~~	~~240 U~~ R,1	~~240~~	~~25.2~~
94-74-6	MCPA	24000 U	24000	1680
93-65-2	MCPP	24000 U	24000	6070

~~AS 12/10/03~~

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/01/03 @ 09:15
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**FSB2A**	QC Batch:	90218 -110
Sample #:	**344826DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	*Herbicides	Analytical Result		Reporting Limit	MDL
93-76-5	2,4,5-T	59 U		59	2.40
93-72-1	2,4,5-TP (Silvex)	59 U		59	4.80
94-75-7	2,4-D	240 U		240	19.2
94-82-6	2,4-DB	240 U		240	74.4
75-99-0	Dalapon	290 U		290	68.4
1918-00-9	Dicamba	240 U		240	2.40
120-36-5	Dichlorprop	240 U		240	20.4
88-85-7	Dinoseb	240 U	UJ, h	240	25.2
94-74-6	MCPA	24000 U		24000	1680
93-65-2	MCPP	24000 U		24000	6070

* See attached Statement of Data Qualifications.

VSL only Dinoseb ✱ 12/10/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**46SB1A**	QC Batch:	90218 -110
Sample #:	**344925**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	60 U	60	2.40
93-72-1	2,4,5-TP (Silvex)	60 U	60	4.80
94-75-7	2,4-D	240 U	240	19.2
94-82-6	2,4-DB	240 U	240	74.4
75-99-0	Dalapon	300 U	300	68.4
1918-00-9	Dicamba	240 U	240	2.40
120-36-5	Dichlorprop	240 U	240	20.4
~~88-85-7~~	~~*Dinoseb~~	~~240 U~~ R,1	~~240~~	~~25.2~~ AR, 12/10/03
94-74-6	MCPA	24000 U	24000	1680
93-65-2	MCPP	24000 U	24000	6070

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**46SB1A**	QC Batch:	90218 -110
Sample #:	**344925DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	*Herbicides	Analytical Result		Reporting Limit	MDL
93-76-5	2,4,5-T	60 U		60	2.40
93-72-1	2,4,5-TP (Silvex)	60 U		60	4.80
94-75-7	2,4-D	240 U		240	19.2
94-82-6	2,4-DB	240 U		240	74.4
75-99-0	Dalapon	300 U		300	68.4
1918-00-9	Dicamba	240 U		240	2.40
120-36-5	Dichlorprop	240 U		240	20.4
88-85-7	Dinoseb	240 U	UJ,h	240	25.2
94-74-6	MCPA	24000 U		24000	1680
93-65-2	MCPP	24000 U		24000	6070

* See attached Statement of Data Qualifications.

Use only Dinoseb, 12/10/03

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**37SB1A**	QC Batch:	90218 -110
Sample #:	**344932**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	16

CAS Number	*Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	820 U	820	32.0
93-72-1	2,4,5-TP (Silvex)	820 U	820	64.0
94-75-7	2,4-D	3300 U	3300	256
94-82-6	2,4-DB	3300 U	3300	992
75-99-0	Dalapon	4100 U	4100	912
1918-00-9	Dicamba	3300 U	3300	32.0
120-36-5	Dichlorprop	3300 U	3300	272
~~88-85-7~~	~~*Dinoseb~~	~~3300 U~~ R,1	~~3300~~	~~336~~ AS 12/10/03
94-74-6	MCPA	330000 U	330000	22300
93-65-2	MCPP	330000 U	330000	80900

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-1**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/29/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**37SB1A**	QC Batch:	90218 -110
Sample #:	**344932DL**	Anal. Batch:	208404
Matrix:	Soil	Percent Solids:	61
Unit:	ug/kg dry	Dilution Factor:	1

CAS Number	Herbicides	Analytical Result		Reporting Limit	MDL
93-76-5	2,4,5-T	82 U		82	2.00
93-72-1	2,4,5-TP (Silvex)	82 U		82	4.00
94-75-7	2,4-D	330 U		330	16.0
94-82-6	2,4-DB	330 U		330	62.0
75-99-0	Dalapon	410 U		410	57.0
1918-00-9	Dicamba	330 U		330	2.00
120-36-5	Dichlorprop	330 U		330	17.0
88-85-7	Dinoseb	330 U	VS,h	330	21.0
94-74-6	MCPA	33000 U		33000	1400
93-65-2	MCPP	33000 U		33000	5060

VSL only Dinoseb result, AS 12/10/03

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Individual sample results relate only to the sample tested.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB1A**
Sample #: **344823**
Matrix: Soil

Percent Solids: 87

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	16500	500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.85 B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.5	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	127	5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.9	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	23300 L,M	2500	830.0	50	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	22 J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	12 J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	16	1.0	0.368		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Iron, Total	29500 J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	15	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	16700	2500	160.50	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	529	10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.017 J	0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	15 J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2160 J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.66 J	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.052 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	55 J B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.21 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	47	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	56	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB1B**
Sample #: **344824**
Matrix: Soil

Percent Solids: 85

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17400		500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.66	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.9		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	102		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1670	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	26	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	16		1.0	0.368		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Iron, Total	34200	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	14		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	4920		500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	553		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.013 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	15	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2250	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.64 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.045 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	47 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.22 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	49		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	64		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB1C**
Sample #: **344825**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	24400		1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.73	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	5.2		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	67		1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.20 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.0		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2050	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	31	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	11	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	25		1.0	0.368		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Iron, Total	35500	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	17		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	24000		2500	160.50	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	463		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.028 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	23	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	5460	J,S	200	50.00	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.82 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.13 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	64 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.34 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	43		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	74		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 15:00
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB2A**
Sample #: **344826**
Matrix: Soil

Percent Solids: 85

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17100		500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.55	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.7		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	102		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.087 J	B,X	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.0		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
* Calcium, Total	2020	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	25	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	14	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	15		1.0	0.368		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Iron, Total	34600	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	12		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	4380		500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	607		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.018 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
* Nickel, Total	13	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2100	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.66 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.041 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	24 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.19 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	50		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	55		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 15:15
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB2B**
Sample #: **344827**
Matrix: Soil

Percent Solids: 93

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	11900	J,f	500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.54	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.0		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	72		1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.99 J	B,P	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	27600	L,M	2500	830.0	50	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	17	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	13		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	24400	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	11		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	15700	J,f	1250	80.25	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	481		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.012 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	13	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1840	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.53 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.069 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	52 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.16 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	32		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	38		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD-1**
Sample #: **344828**
Matrix: Soil

Percent Solids: 88

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17600	J,f	500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.46 J	B,P	0.50	0.0528		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.6		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	96		1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.2		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	9030	L,m	1250	415.0	25	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	23	J,s	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,s	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	16		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	36500	J,s	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	15		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	7780	J,f	1250	80.25	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	590		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.019 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	15	J,s	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2090	J,s	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.63 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.060 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	38 J	B,x	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	44		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	54		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 09/30/03 @ 15:45
Sampler: B.F. & J.S.
Received: 10/01/03 @ 09:15

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB2C**
Sample #: **344829**
Matrix: Soil

Percent Solids: 85

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	16500	500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.38 J	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.9	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	76	1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.1	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	34600	2500	830.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	22	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	9.3	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	15	1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	32900	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	13	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	16500	1250	80.25	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	469	10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.015 J	0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	14	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2430	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.59 J	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.067 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	70 J	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.21 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	39	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	46	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 08:00
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB3A**
Sample #: **344922**
Matrix: Soil

Percent Solids: 86

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	18200		500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.34 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.7		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	107		5.0	0.530		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.098 J	B,X	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.1		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	3890	L,M	500	166.0	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	26	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	18		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	37200	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	14		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	6000		500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	558		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.013 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	17	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2470	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.69 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.056 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	42 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.27 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	54		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	65		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 08:15
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB3B**
Sample #: **344923**
Matrix: Soil

Percent Solids: 90

Parameter	Analytical Result	Reporting Limit	MDL	Df	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	18600	500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.36 J B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.0	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	96	1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.8	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1710 L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	142 J,S	25	4.560	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Cobalt, Total	12 J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	22	1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	38900 J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	12	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	5190	500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	625	10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.017 J	0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	15 J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2160 J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.64 J	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.063 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	40 J B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.22 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	54	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	52	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 08:30
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB3C**
Sample #: **344924**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	25700		1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.37 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	6.0		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	87		1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.17 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.7		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1530	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	26	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	10	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	22		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	34800	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	11		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	22000		2500	160.50	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	1170		25	6.600	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.033 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	23	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	6880	J,S	200	50.00	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.68 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	50 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.38 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	44		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	41		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
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Sampled: 10/01/03 @ 12:10
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB1A**
Sample #: **344925**
Matrix: Soil

Percent Solids: 83

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	22500		1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.32 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.9		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	114		5.0	0.530		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.77 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.2		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1350	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	26	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	11	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	16		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	33800	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	13		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	4690		500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	506		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.035 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	17	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2170	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.059 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	40 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.24 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	56		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	65		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
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Sampled: 10/01/03 @ 12:20
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB1B**
Sample #: **344926**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	27000		1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.36 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.9		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	101		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.87 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2900	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	30	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	9.0	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	20		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	34400	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	12		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	15100		1250	80.25	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	457		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.031 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	21	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	4000	J,S	200	50.00	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.81 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	52 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.25 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	54		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	58		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 12:50
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB1C**
Sample #: **344927**
Matrix: Soil

Percent Solids: 68

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	42900	1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.38 J B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	4.5	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	137	5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	1.2	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.89 J B,P	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	9970 L,M	1250	415.0	25	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	28 J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	7.6 J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	20	1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	37800 J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	13	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	30200	2500	160.50	10	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	411	10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.053 J	0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	26 J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	6520 J,S	200	50.00	D	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	1.2	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.14 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	84 J B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.36 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	60	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	68	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 13:25
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB2A**
Sample #: **344928**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	23700		1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.33 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.3		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	105		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.68 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.2		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1530	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	25	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	15		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	35900	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	14		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	5290		500	32.10	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	573		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.031 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	16	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2180	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.63 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.057 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	50 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.27 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	56		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	72		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 13:40
Sampler: B.F. & J.S.
Received: 10/01/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB2B**
Sample #: **344929**
Matrix: Soil

Percent Solids: 81

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	33600		1000	183.00	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.43 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	3.3		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	114		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	0.74 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	2.4		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1050	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	25	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	10	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	18		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	35200	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	14		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	13800		1250	80.25	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	466		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.059 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	22	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	3060	J,S	100	25.00	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	0.89 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	54 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.29 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	57		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	57		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 13:50
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB2C**
Sample #: **344930**
Matrix: Soil

Percent Solids: 67

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	55400		2500	457.50	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.42 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	5.6		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	145		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	1.5		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.1	B,P	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1220	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	38	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	7.1	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	21		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	37800	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	15		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	50100		5000	321.00	20	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	365		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.066 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	30	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	13200	J,S	500	125.00	25	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	1.3		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.18 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	87 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.43 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	72		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	62		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD2**
Sample #: **344931**
Matrix: Soil

Percent Solids: 67

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	58100		2500	457.50	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.42 J	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	5.6		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	153		5.0	0.530	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Beryllium, Total	1.4		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1160	L,M	250	83.0	5	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	38	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	7.4	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	19		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	42600	J,S	1000	212.000	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	16		1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	53300		5000	321.00	20	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	335		10	2.640	2	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.081 J		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	34	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	11800	J,S	500	125.00	25	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Selenium, Total	1.4		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.18 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	88 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.49 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	72		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	61		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 15:30
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB1A**
Sample #: **344932**
Matrix: Soil

Percent Solids: 61

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	13100		500	91.50		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Antimony, Total	0.52	B,P	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	3.8		0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	51		1.0	0.106		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.64 J		1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	35700	L,M	2500	830.0	50	mg/kg dry	10/14/03	DWJ	USEPA-6010B
Chromium, Total	72	J,S	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	2.8	J,S	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	78		1.0	0.368		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Iron, Total	14300	J,S	500	106.000		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Lead, Total	80		10	0.2180	10	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3270		250	16.05		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Manganese, Total	147		5.0	1.320		mg/kg dry	10/14/03	DWJ	USEPA-6010B
Mercury, Total	0.41		0.10	0.0077		mg/kg dry	10/06/03	MSS	USEPA-7471A
Nickel, Total	30	J,S	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	860	J,S	20	5.00		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Selenium, Total	0.47 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.14 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	70 J	B,X	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.069 J		0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	16		1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	67		4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/01/03 @ 16:00
Sampler: B.F. & J.S.
Received: 10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB1B**
Sample #: **345024**
Matrix: Soil

Percent Solids: 83

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14100	500	91.50		mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.19 J	0.50	0.0518		mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.0	0.40	0.0232		mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	132	5.0	0.530	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.71 J	1.0	0.0391		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.79 J	1.0	0.182		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1990	250	16.6		mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18	5.0	0.912		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	8.4	1.0	0.208		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	8.0	1.0	0.368		mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	20200	500	106.000		mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	8.4	1.0	0.0218		mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3630	250	16.05		mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	479	10	2.640	2	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U	0.10	0.0077		mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	12	0.50	0.0356		mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2000	100	25.00	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.60 J	1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.063 J	3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	67 J	100	8.92		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.16 J	0.50	0.0270		mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	27	1.0	0.207		mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	55	4.0	0.517		mg/kg dry	10/13/03	KLVM	USEPA-6010B

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Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB1A**		
Sample #:	**344823**		
Matrix:	Soil	Percent Solids:	87

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	87	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

004267

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB1B**		
Sample #:	**344824**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.1780	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB1C**		
Sample #:	**344825**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.05 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB2A**		
Sample #:	**344826**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB2B**		
Sample #:	**344827**		
Matrix:	Soil	Percent Solids:	93

	Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
	Percent Solids	93	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
*	Cyanide, Total	0.53 U	0.53	0.3560	mg/kg dry	10/09/03	JLB	USEPA-9012A

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD-1**		
Sample #:	**344828**		
Matrix:	Soil	Percent Solids:	88

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	88	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
* Cyanide, Total	0.56 U	0.56	0.3560	mg/kg dry	10/09/03	JLB	USEPA-9012A

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	09/30/03 @ 15:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 09:15
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB2C**		
Sample #:	**344829**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
* Cyanide, Total	0.56 U	0.56	0.3560	mg/kg dry	10/09/03	JLB	USEPA-9012A

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB3A**		
Sample #:	**344922**		
Matrix:	Soil	Percent Solids:	86

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	86	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.06 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **FSB3B**
Sample #: **344923**
Matrix: Soil
Percent Solids: 90

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	90	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

004271

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**FSB3C**		
Sample #:	**344924**		
Matrix:	Soil	Percent Solids:	71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

004276

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**46SB1A**		
Sample #:	**344925**		
Matrix:	Soil	Percent Solids:	83

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	83	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

004277

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**46SB1B**		
Sample #:	**344926**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

004270

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TriMatrix
Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 12:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**46SB1C**		
Sample #:	**344927**		
Matrix:	Soil	Percent Solids:	68

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	68	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.15 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

004279

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:25
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **46SB2A**
Sample #: **344928**
Matrix: Soil
Percent Solids: 84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/01/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**46SB2B**		
Sample #:	**344929**		
Matrix:	Soil	Percent Solids:	81

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	81	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 13:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**46SB2C**		
Sample #:	**344930**		
Matrix:	Soil	Percent Solids:	67

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	67	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

004232

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD2**		
Sample #:	**344931**		
Matrix:	Soil	Percent Solids:	67

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	67	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55
Submittal #:	**36440-1**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB1A**		
Sample #:	**344932**		
Matrix:	Soil	Percent Solids:	61

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	61	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.80	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/01/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/02/03 @ 08:55

Submittal #: **36440-1**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB1B**
Sample #: **345024**
Matrix: Soil Percent Solids: 83

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	B3	0.1	0.1	%	10/08/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes:
1. a cooler at 1.7C
2. 37SB1B was cancelled by client.
3. 37SB1C was supposed to be renamed 37SB1B and analyzed, but the encores were not preserved within hold time. This sample was resampled and submitted in SDG 36440-6.

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.			x
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.			x

Notes: acetone

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery							Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?						x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?						x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?								x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.								
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.								x
		1 or more <10%		1 high/low	2 or 3 high/low	2 or 3 all low	2 or 3 all high		
	Positives	L		J	J	L	K		
	Non-detects	R		UJ	UJ	UL	NONE		
	Note: The B qualifier remains over surrogate flagging.								

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 19			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:1			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 99.9%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{O}C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: a cooler @ 1.7C

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentrationof the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?		x	
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?		x	
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		x	
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualificationof the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).		x	
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes: 37SB1A was analyzed at dilution due to the last internal recovery low and associated analytes should be used from this dilution for data assessment.

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x	37SB1A DF16	
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 19			
	Number of target compounds in each analysis: 66			
	Number of results rejected and not reported: 0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2) 100			
	% Completeness = #DIV/0!			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

X Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: cooler @ 1.7C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes: collected from 9/30/03-10/01/03 and extracted on 10/10/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	19			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: a cooler @ 1.7C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes: sampled between 9/30/03-10/1/03, extracted on 10/13/03, and analyzed between 10/18/03-10/19/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	positive	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	19			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

X SW-846 - 8081/8082
X NFG - Region III Modifications
___ CLP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: PEST/PCB
Method No.: 8081A/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: a cooler at 1.7C

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes: sampled between 9/30/03-10/1/03, prepared on 10/09/03, analyzed 10/10/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			x

	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
	1 out	high/low	No action	No action
	2 out	2 high same column	K	No action
		2 low same column	L, UL	No action
		mixed same column	J, UJ	No action
		2 high diff columns	J	Not applicable
		2 low diff columns	J, UJ	Not applicable
		mixed diff columns	Professional judgement	Not applicable
	3 out	All high	K	Not applicable
		All low	L, UL	Not applicable
		2 high, 1 low	K (2 high)	J (1 low 2nd column)
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
		other mixed	J, UJ	Not applicable
	4 out	All high	K	Not applicable
		All low	L, UL	Not applicable
		Mixed	J, UJ	Not applicable
	If any recovery is >0% and <10% then L(+)/R(-).			
	If any recovery is 0% then R(+/-).			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A submitted in SDG 36440-2, BDL for pest and 0.053/0.051 for Aroclor 1254.

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).	x		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	3	3			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-1
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: a cooler @ 1.7C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).	x		
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes: re-extraction for Dinoseb occured outside the 14 day extraction holding time, but less than 28 days
FSB2A, collected on 9/30/03, re-extracted on 10/17/03
46SB1A, collected on 10/01/03, re-extracted on 10/17/03
37SB1A, collected on 10/01/03, re-extracted on 10/17/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?	x	Dinoseb	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes: Most of the surrogates for the extraction to report dinoseb have high recoveries.

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: multiple

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A and SDB-3 submitted in SDG 36440-2 were both non-detect.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?		x	

Notes: 37SB1A was analyzed at diltion and reported with elevated detection limits due to matrix interference of one or more interfering peaks during analysis.

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	3			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

Project Name: Radford SSP
SDG No.: 36440-1
Reviewer: AS
Project No.: 15291974.30000
Date: December-03

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{O}C \pm 2\ ^{O}C$)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: a cooler @ 1.7C

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x			x			x	

Note:

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			x		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	Sb					x	x					
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%					

Note: batch 207811 has a new high point added to Al, Ba, Ca, Fe, Mg, Mn, & K, an elevated RL by 5

4.0 Blanks		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes: < -IDL L(+)/UL(-); > IDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note: _____

7.0 Laboratory Duplicates (MSD)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note: _____

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125%?	x				x		x			x		
	%R > 125% / 30%< %R < 74% / < 30%												
	Positive: K / L / L												
	Non-detect: None / UL / R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: FSB2A 6010B MS/MSD calcium 60%/62% (70%)

PDS for iron low at 71%, MS/MSD did not meet four times rule.

9.0 Instrument Detection Limits (IDL)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).		x			x							

Note: 6010B: FSB2A - Cobalt at 28.6%, chromium at 20.0%, iron at 10.4%, and potassium at 11.0%.

6020: - Nickel at 15.4%

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	x				x		x			x		

Note: _____

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: CN for FSB2B, SBD-1, and FSB2C were reported from dilutions due to matrix interference

Several metals by 6010B and lead by 6020 were analyzed straight and then at dilution due to the presence of high target concentrations

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples:												
13.1.2	Number of target compounds in each analysis:												
13.1.3	Number of results rejected and not reported:												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness =	100%			100%			100%			100%		

Note: _____

Cart 2
Vol Soil Fridge
Nº 1073

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
07604-317	RFAAP

Project Contact (Name and Phone Number)
Darren Kenne (804) 965-9000

Samplers:
Brett Fisher / Josh Spangler

LAB: Trimatrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	WERS	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
FSB1A	9/30/05 1400	5		X	S	F	/	5	X	X	X			X		X						X	3 jars 3 encore
FSB1B	9/30/05 1415	5		X	S	F	/	5	X	X	X			X		X						X	3 jars 3 encore
FSB1C	9/30/05 1430	5		X	S	F	/	5	X	X	X			X		X						X	3 jars 3 encore
FSB2A	9/30/05 1500	5		X	S	F	/	6	X	X	X	X	X	X		X						X	4 jars 3 encore
FSB2A MS	9/30/05 1500	5		X	S	F	/	6	X	X	X	X	X	X		X						X	4 jars 3 encore
FSB2A MSD	9/30/05 1500	5		X	S	F	/	6	X	X	X	X	X	X		X						X	4 jars 3 encore
FSB2B	9/30/05 1515	5		X	S	F	/	5	X	X	X			X		X						X	3 jars 3 encore
SBD[redacted]-1	9/30/05	5		X	S	F	/	5	X	X	X			X		X						X	3 jars 3 encore
FSB2C	9/30/05 1545	5		X	S	F	/	5	X	X	X			X		X							3 jars 3 encore

Cancelled per client

Box #1			Box #2			Box #3	Box #4	
1. Surface Water	6. Trip Blank		A. HCl + Ice	F. Ice Only		F. Filtered	R. Rush - 3 Day	
2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other _____		U. Unfiltered	S. Standard 28 Day	
3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice			T. Timely 14 Day	
4. Rinsate	9. Other _____		D. H2SO4 + Ice	I. ZnAc + NaOH + Ice			O. Other _____	
5. Soil Sediment/Sludge			E. Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	9/30/05 1800				JAF 10/01/05 9:15
Relinquished by:	Date/time	Received by: (for lab)	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

S-4

36440-1

TMO576

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1075

000056

Project Number	Project Name
37604-317	RFAAP

Project Contact (Name and Phone Number): Terron Ronne (804) 965-9000

Samplers: Brett Fisher / Jake Sampler

LAB: Tri-matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [illegible])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[illegible] (NERB)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
FSB3A	10/1/03 900	5		X	5	F	/	5	X	X	X			X		X							TG
FSB3B	10/1/03 915	5		X	5	F	/	5	X	X	X			X		X							2C
FSB3C	10/1/03 930	5		X	5	F	/	5	X	X	X			X		X							2C
46SB1A	10/1/03 1210	5		X	5	F	/	7	X	X	X	X	X	X		X						X	2C
46SB1B	10/1/03 1220	5		X	5	F	/	5	X	X	X			X		X							2C
46SB1C	10/1/03 1250	5		X	5	F	/	5	X	X	X			X		X							
46SB2A	10/1/03 1325	5		X	5	F	/	5	X	X	X			X		X							
46SB2B	10/1/03 1340	5		X	5	F	/	5	X	X	X			X		X							
46SB2C	10/1/03 1350	5		X	5	F	/	5	X	X	X			X		X							
SBD2	10/1/03 —	5		X	5	F	/	5	X	X	X			X		X							

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/1/03 1800				[signature] 10/02/03 8:55
Relinquished by:	Date/time	Received by: (for lab)	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

7-5

36440-1

TM0127 Cart 4

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1084

000057

Project Number	Project Name
07604 317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 731-9000

Samplers: Brett Fisher, Josh Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) / CRL	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	HERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
375B1A	10/1/03 1530	5		X	5	P	/	7	X	X	X	X	X	X		X						X	375B1A is mainly
375B1B	10/1/03 1545	5		X	5	F	/	5	X	X	X			X		X		HOLD					consisted of sludge.
375B1C	10/1/03 1600	5		X	5	F	/	5	X	X	X			X		X		HOLD					Treat as Light contains TNT
																							- per Client 10/2/03

Box #1			Box #2			Box #3	Box #4	
1. Surface Water	6. Trip Blank		A. HCl + Ice	F. Ice Only		F. Filtered	R. Rush - 3 Day	
2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other _____		U. Unfiltered	S. Standard 28 Day	
3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice			T. Timely 14 Day	
4. Rinsate	9. Other _____		D. H2SO4 + Ice	I. ZnAc + NaOH + Ice			O. Other _____	
5. Soil Sediment/Sludge			E. Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/1/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/2/03	8:55	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

36440-1

7-5

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-2 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford SSP

Reviewer: AS **Date:** December 9, 2003

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies:

For the SVOC analyses, the 1:24 dilution analysis of sample 37SB2A and the neat analyses of samples SBD3, QSB1A, and QSB3A displayed internal standard area counts less than the lower control limit (i.e., 50%) for perylene-d_{10} at 12.5%, 3.3%, 16.4%, and 11.9%, respectively. The associated field sample results were non-detect and were flagged "R,i". The samples were re-analyzed at dilutions with more acceptable internal standard area counts. The associated results from the dilutions should be used for data interpretation.

The matrix spike pair for sample 37SB2A displayed percent recoveries severely less than the lower control limit for 2-nitroaniline (10%/8%), 3,3'-dichlorobenzidine (0%/0%), 3-nitroaniline (4%/3%), 4-chloroaniline (2%/2%), and 4-nitroaniline (5%/5%). This sample represents a sludge matrix from a calcium sulfate drying bed. No other samples from this project were indicated by the field team to be of a sludge matrix. The parent sample results were non-detect and were flagged "R,m".

Minor Anomalies:

For the VOC analyses, the method blank for batch 90038-110 contained acetone at 0.00980 mg/Kg. The method blank for batch 90038-111 contained acetone at 0.00710 mg/Kg. The method blank for batch 89888-115 contained acetone at 13.0 ug/L and methylene chloride at 0.410 ug/L. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The equipment blank EQB1 displayed positive detections for acetone at 2.9 ug/L and methylene chloride at 0.60 ug/L. The trip blank displayed positive detections for methylene chloride at 1.0 ug/L and toluene at 0.27 ug/L. The field blank detections for methylene chloride and acetone were previously qualified due to method blank detections. Since the trip blank is only associated with the aqueous field samples, no further data qualifying action was required.

The continuing calibration analyzed on 10/10/03 at 1112 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for methylene chloride at 24.0%, trans-1,2-dichloroethene at 20.1%, and methyl acetate at 29.4%. The continuing calibration analyzed on 10/11/03 at 1331 displayed percent differences greater than the control limit with a negative bias for acetone at 39.4%, carbon disulfide at 23.9%, methylene chloride at 24.8%, methyl acetate at 25.4%, 4-methyl-2-pentanone at 26.3%, and 2-hexanone at 20.7%. The

continuing calibration analyzed on 10/15/03 at 0919 displayed a percent difference greater than the control limit with a negative bias for carbon disulfide at 27.5%. Non-detect associated field sample results were flagged "UJ,c" while positive associated field sample results were flagged "J,c", unless previously qualified for a method blank detection for acetone.

The matrix spike pair for sample 37SB2A displayed percent recoveries outside the laboratory generated control limits for 1,2-dibromo-3-chloropropane (60%), 1,2-dichlorobenzene (54%/48%), 1,2,3-trichlorobenzene (31%/20%), 1,2,4-trichlorobenzene (33%/23%), 1,3-dichlorobenzene (57%/48%), 1,4-dichlorobenzene (54%/45%), acetone (52%), carbon disulfide (49%/46%), chloroethane (125%), ethylbenzene (58%), methyl-tert-butyl ether (141%), styrene (46%/34%), toluene (56%), and total xylenes (49%). This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for 1,2,3-trichlorobenzene at 41%, methyl ethyl ketone at 21%, and 1,2,4-trichlorobenzene at 36%. The parent sample was non-detect for the anomalous compounds that displayed a negative bias. These results were flagged "UJ,m", unless previously qualified for an internal standard anomaly. The parent sample result for acetone was positive and previously qualified for a method blank detection. The other anomalous compounds displayed a positive bias or imprecision while the parent sample results were non-detect. No further data qualifying action was taken.

The matrix spike pair for sample 37SB3B displayed percent recoveries less than the laboratory generated lower control limits for carbon disulfide (34%/42%) and acetone (30%). This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for methyl ethyl ketone at 42% and 2-hexanone at 54%. The parent sample was non-detect for carbon disulfide and was flagged "UJ,m". The parent sample acetone result was positive and previously qualified for a method blank detection. The other anomalous compounds displayed an imprecision while the parent sample results were non-detect. No further data qualifying action was taken.

Sample 37SB2A displayed an internal standard area count less than the lower control limit (i.e., 50%) for 1,4-dichlorobenzene-d_4 at 41%. The associated field sample results were non-detect and were flagged "UJ,i".

For the SVOC analyses, the method blank for extraction batch 89818-108 displayed positive detections for bis(2-ethylhexyl)phthalate at 1.10 ug/L and diethylphthalate at 0.150 ug/L. The method blank for extraction batch 90209-109 displayed a positive detection for diethylphthalate at 0.0160 mg/Kg. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The equipment blank EQB1 contained bis(2-ethylhexyl)phthalate at 1.0 ug/L, butyl benzyl phthalate at 0.96 ug/L, diethylphthalate at 0.10 ug/L, and several tentatively identified compounds (TICs). The equipment blank detections for bis(2-ethylhexyl) phthalate and diethylphthalate were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than ten times the blank concentration for butyl benzyl phthalate and less than five times the blank concentration of the TICs were flagged "B,x" in the associated samples.

The continuing calibration analyzed on 10/15/03 at 1103 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for benzaldehyde at 29.7% and 4-chloroaniline at 24.2% and with a positive bias for bis(2-chloroethyl)ether at 20.8%, 2,4,5-

trichlorophenol at 22.8%, 2,4-dinitrophenol at 26.3%, and 4,6-dinitro-2-methylphenol at 20.1%. All associated field sample results were non-detect for benzaldehyde and 4-chloroaniline and were flagged "UJ,c". All associated field sample results were non-detect for the other anomalous compounds while the continuing calibration displayed a positive bias, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/15/03 at 2147 displayed percent differences greater than the control limit with a negative bias for benzaldehyde at 37.5%, 4-chloroaniline at 39.9%, caprolactam at 24.1%, and 4-nitroaniline at 20.9%. All associated field sample results were non-detect and were flagged "UJ,c".

The continuing calibration analyzed on 10/16/03 at 2111 displayed percent differences greater than the control limit with a negative bias for atrazine at 38.6%, benzaldehyde at 34.4%, 4-chloroaniline at 21.9%, bis(2-ethylhexyl)phthalate at 27.9%, 3,3'-dichlorobenzidine at 20.6%, and di-n-octylphthalate at 24.9%. All associated non-detect field sample results were flagged "UJ,c" while positive field sample results were flagged "J,c", unless previously flagged for a matrix spike anomaly. This continuing calibration displayed percent differences greater than the control limit with a positive bias for 2,4-dinitrophenol at 25.6% and pentachlorophenol at 28.3%. All associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/17/03 at 1307 displayed percent differences greater than the control limit with a negative bias for benzaldehyde at 21.9% and with a positive bias for hexachlorocyclopentadiene at 21.4%, 3,3'-dichlorobenzidine at 20.5%, and di-n-octylphthalate at 21.1%. The associated field sample result was non-detect for benzaldehyde and was flagged "UJ,c". The associated field sample results were non-detect for the other anomalous compounds while the continuing calibration displayed a positive bias, thus, no data qualifying action was required.

The laboratory control spike pair for batch 89818-108 displayed recoveries less than the laboratory generated lower control limit (i.e., 50%) but greater than the QAPP lower control limit (i.e., 10%) for caprolactam (40%/37%). The laboratory control spike for batch 90209-109 displayed a recovery less than the laboratory generated lower control limit (i.e., 16%) but greater than the QAPP lower control limit (i.e., 10%) for 4-chloroaniline at 14%. The associated field sample results were non-detect and were previously flagged for a negative bias in the continuing calibration. No further data qualifying action was taken.

The laboratory control spike duplicate for batch 89818-108 displayed recoveries greater than the laboratory generated upper control limits for benzo(g,h,i) perylene at 127% and pentachlorophenol at 122%. The laboratory control spike for batch 89845-109 displayed recoveries greater than the laboratory generated upper control limits for 3,3'-dichlorobenzidine at 116%, benzo(k)fluoranthene at 118%, and carbazole at 125%. The laboratory control spike for batch 90209-109 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 122%, 2,6-dinitrotoluene at 119%, benzo(b)fluoranthene at 121%, carbazole at 127%, diethylphthalate at 123%, dimethylphthalate at 117%, and fluorene at 117%. The laboratory control spike for batch 90209-116 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 132%, 2-nitroaniline at 125%, 4-bromophenyl phenyl ether at 126%, 4-chloroaniline at 71%, 4-chlorophenyl phenyl ether at 121%, acenaphthylene at 118%, anthracene at 125%, benzo(a)pyrene at 131%, benzo(b)fluoranthene at 133%, benzo(k)fluoranthene at 119%, carbazole at 134%, diethylphthalate at 123%, dimethylphthalate at 122%, fluorene at 124%, and

hexachlorocyclopentadiene at 119%. Sample 37SB2A displayed a positive detection for diethylphthalate that was flagged "J,l". All other associated field sample results were non-detect or previously flagged for a method blank detection while the laboratory control spike displayed a positive bias. No data qualifying action was taken.

The matrix spike pair for sample 37SB2A displayed several percent recoveries and relative percent differences outside the laboratory generated control limits. For matrix spike recoveries that displayed a negative bias, positive parent sample results were flagged "J,m" while non-detects were flagged "UJ,m", unless previously flagged for a surrogate recovery. For matrix spike recoveries that displayed a positive bias or anomalous relative percent differences, positive parent sample results were flagged "J,m".

The matrix spike pair for sample 37SB3B displayed several percent recoveries and relative percent differences outside the laboratory generated control limits. For matrix spike recoveries that displayed a negative bias, positive parent sample results were flagged "J,m" while non-detects were flagged "UJ,m", unless previously flagged for a continuing calibration anomaly. For matrix spike recoveries that displayed a positive bias or anomalous relative percent differences, positive parent sample results were flagged "J,m".

The dilution analysis of sample SBD3 displayed an internal standard area count less than the lower control limit (i.e., 50%) for perylene-d_{10} at 37%. The associated field sample results were non-detect and were flagged "UJ,i".

The 1:24 dilution analysis of sample 37SB2A displayed two acid fraction surrogate recoveries outside the laboratory generated control limits for phenol-d_6 at 36% and 2,4,6-tribromophenol at 125%. The associated acid fraction constituents were non-detect and were flagged "UJ,s". The neat analysis of sample SBD3 displayed two acid fraction surrogate recoveries less than the laboratory generated lower control limits for 2-fluorophenol at 19% and phenol-d_6 at 19%. The associated acid fraction constituents were non-detect and were flagged "UL,s". The acid fraction surrogate 2-fluorophenol displayed percent recoveries greater than the laboratory generated upper control limit (i.e., 115%) for sample 37SB3A at 118%, 37SB3B at 117%, 37SB3C at 121%, and QSB1B at 120%. The neat analysis of sample QSB3A displayed a base/neutral fraction surrogate recovery less than the laboratory generated lower control limit (i.e., 38%) for phenol-d_6 at 24%. Since only one surrogate recovery was outside the control limits, no data qualifying action was required. The dilution analyses of samples QSB1A and QSB3A displayed several surrogate recoveries less than the laboratory generated lower control limits. Since the laboratory has indicated that these surrogates were diluted out, no data qualifying action was taken.

Sample 37SB2A initial extraction was brought to five times the normal final volume due to solidification into a gel upon concentration. This extract was further diluted by a factor of two prior to analysis. All internal standards failed and the surrogates had been lost. This analysis was subsequently discarded. This sample including the matrix spike pair was re-extracted at a smaller initial volume and was brought to five times the normal final volume including surrogate and spike addition where appropriate at increased concentrations to compensate for the final dilution factor.

For the PAH analyses, the laboratory control spike for batch 90138-110 displayed recoveries less than the laboratory generated lower control limits but greater than the project QAPP lower control limit (i.e., 40%) for benzo(a)anthracene at 73%, fluoranthene at 68%, and pyrene at 74%. The laboratory control spike for batch 90708-113 displayed a recovery less than the

laboratory generated lower control limit (i.e., 87%) but greater than the project QAPP lower control limit (i.e., 40%) for fluoranthene at 77%. Positive associated field sample results were flagged "J,l" while non-detects were flagged "UJ,l".

The surrogate, 2-fluorobiphenyl, recovery was greater than the laboratory upper control limit (i.e., 125%) for the EQB1 at 126%. All results for EQB1 were non-detect, thus, no data qualifying action was required. The surrogate recoveries were less than the laboratory lower control limit (i.e., 49%) for 37SB2A at 48%, 37SB3C at 36%, QSB1B at 44%, QSB3A at 47%, QSB3B at 42%, and QSB3C at 46%. Positive associated field sample results were flagged "L,s" while non-detects were flagged "UL,s", unless previously qualified for matrix spike or laboratory control spike anomalies.

The matrix spike duplicate for sample 37SB2A displayed recoveries less than the laboratory generated lower control limits for dibenzo(a,h)anthracene at 63%, fluoranthene at 50%, and pyrene at 25%. The non-detect parent sample result for dibenzo(a,h)anthracene was flagged "UJ,m". The matrix spike displayed recoveries greater than the laboratory generated upper control limits for benzo(a,h)anthracene at 120% and benzo(g,h,i) perylene at 197%. The matrix spike duplicate displayed a recovery greater than the laboratory generated upper control limit for benzo(g,h,i) perylene at 211%. The parent sample results were non-detect for these compounds that displayed a positive bias, thus, no data qualifying action was taken. This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for benzo(a) anthracene at 20%, benzo(b)fluoranthene at 26%, benzo(k)fluoranthene at 25%, dibenzo(a,h)anthracene at 25%, fluoranthene at 31%, and fluorene at 21%. Positive parent sample results were flagged "J,d".

For the explosive analyses, the continuing calibration analyzed on 10/19/03 at 0414 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 3-nitrotoluene at 17.3%. The continuing calibration analyzed on 10/19/03 at 0852 displayed percent differences greater than the control limit with a negative bias for 3-nitrotoluene at 17.0% and HMX at 24.0%. The continuing calibration analyzed on 10/21/03 at 1533 displayed percent differences greater than the control limit with a negative bias for 2-nitrotoluene at 18.9% and 3-nitrotoluene at 30.3%. The continuing calibration analyzed on 10/21/03 at 2100 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 16.0%. The continuing calibration analyzed on 10/22/03 at 0227 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 19.9%. All associated sample results were non-detect and were flagged "UJ,c".

The matrix spike pair for sample 37SB2A displayed spike recoveries outside the laboratory generated control limits for 2,4-dinitrotoluene (30%) and 4-amino-2,6-dinitrotoluene (182%/211%). This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 40%) for 2-amino-4,6-dinitrotoluene at 48%. The parent sample result for 2,4-dinitrotoluene was positive and was flagged "J,m". The matrix spike pair for sample 37SB3B displayed relative percent differences greater than the laboratory generated control limit (i.e., 40%) for 2,4-dinitrotoluene at 50% and 2-amino-4,6-dinitrotoluene at 41%. The parent sample results were non-detect for these compounds that displayed a positive bias or imprecision, thus, no data qualifying action was taken.

For the pesticide analyses, the opening continuing calibration analyzed on 10/10/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for delta BHC at 18.6%, 4,4'-DDD at 19.73%, endosulfan II at 15.76%, methoxychlor at 19.24%, and endosulfan sulfate at 15.16%. The closing continuing calibration displayed a

percent difference greater than the control limit with a positive bias on column one for delta BHC at 15.11%. The associated field sample results were non-detect or did not confirm on the passing alternate analytical column. No data qualifying action was taken based on these anomalies.

The initial calibration displayed a relative standard deviation greater than the control limit (i.e., 20%) on column one for 4,4'-DDD at 24.13%. The closing continuing calibration analyzed on 10/18/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for delta BHC at 16.89%, 4,4'-DDD at 33.20%, 4,4'-DDT at 18.77%, methoxychlor at 28.37%, and endosulfan sulfate at 15.85%. This closing continuing calibration displayed percent differences greater than the control limit with a positive bias on column two for 4,4'-DDD at 17.38% and methoxychlor at 20.16%. The associated field sample results were non-detect on one or both columns while the continuing calibration displayed a positive bias. No data qualifying action was taken based on these anomalies.

The laboratory control spike pair for batch 90180-108 displayed recoveries greater than the laboratory generated upper control limits for a-chlordane (111%), endosulfan sulfate (145%), endrin aldehyde (139%), and methoxychlor (148%/133%). The associated field sample, EQB1, was non-detect for these compounds while the laboratory control spikes displayed a positive bias. No data qualifying action was taken based on these anomalies.

The matrix spike duplicate for sample FSB2A submitted with sample delivery group 36440-1 displayed several recoveries less than the laboratory generated lower control limits. This matrix spike duplicate was analyzed twice and the second analysis results were reported. This matrix spike pair also displayed several relative percent differences greater than the laboratory generated control limits. Since the matrix spike displayed acceptable recoveries and all recoveries were within the QAPP specified limits, no data qualifying action was taken based on these anomalies.

For the herbicide analyses, the laboratory control spike pair for batch 90447-109 displayed recoveries greater than the laboratory generated upper control limits for dicamba (130%), dichlorprop (109%), MCPA (98%), and MCPP (122%/106%). The associated field sample, EQB1, was non-detect for these constituents while the laboratory control spike displayed a positive bias. No data qualifying action was taken. The laboratory control spike for batch 90218-110 displayed a recovery less than the laboratory generated lower control limit at for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (91%) for MCPP at 117%. The associated field sample results were non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. A re-extraction occurred on 10/17/03 that was fifteen days after the sampling date because the initial extraction did not recover dinoseb. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. All dinoseb results from the re-extraction were non-detect and were flagged "UJ,h".

The original extraction for the associated matrix spike pair for sample FSB2A submitted with sample delivery group 36640-1 displayed recoveries less than the laboratory generated lower control limits for dinoseb (2%/7%) and dicamba (46%). This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 40%) for dicamba at 90%. The re-extraction for this matrix spike pair displayed recoveries less than the laboratory generated lower control limit (i.e., 50%) for dinoseb (29%/42%). All dinoseb results from the original extraction were manually removed by the reviewer. Since the matrix

spike duplicate displayed an acceptable recovery for dicamba and all recoveries were within the QAPP specified limits, no data qualifying action was taken based on these anomalies.

For the metal analyses by 6020, the method blank for batch 89770-108 contained antimony at 0.17 mg/Kg. The associated positive field sample results less than five times the blank concentration were flagged "B,p". The method blank for batch 89970-113 contained chromium at 0.58 ug/L. The associated field sample result for chromium was non-detect and no data qualifying action was required.

The equipment blank EQB1 contained lead at 0.3 ug/L. The associated field sample results were positive and greater than five times the equipment blank concentration. No data qualifying action was required.

The field duplicate pair (QSB1A and SBD3) displayed a relative percent difference greater than the control limit (i.e., 35%) for lead at 72.3%. The positive results for lead were flagged "J,f" in these two samples.

For the metal analyses by 6010B, the method blank for batch 89817-107 contained barium at 0.128 mg/Kg, cadmium at 0.329 mg/Kg, iron at 2.87 mg/Kg, potassium at 12.5 mg/Kg, and sodium at 18.7 mg/Kg. The method blank for batch 89817-110 contained barium at 0.151 mg/Kg, cadmium at 0.290 mg/Kg, iron at 1.30 mg/Kg, magnesium at 5.69 mg/Kg, potassium at 28.1 mg/Kg, sodium at 24.7 mg/Kg, and vanadium at 0.420 mg/Kg. The method blank for batch 89966-113 contained iron at 7.12 ug/L, potassium at 88 ug/L, and sodium at 421 ug/L. Positive results less than five times the blank concentration for cadmium and sodium were flagged "B,p" in the associated samples. All other field sample results were greater than five times the associated method blank concentration and no data qualifying action was required.

The equipment blank, EQB1, contained beryllium at 0.3 ug/L and sodium at 220 ug/L. The equipment blank result for sodium was previously qualified due to a method blank detection. Associated positive field sample results were greater than five times the equipment blank concentration for beryllium. No data qualifying action was required.

The matrix spike pair performed on sample 37SB3B displayed recoveries greater than the laboratory generated upper control limit (i.e., 111%) for magnesium (131%/115%). All associated field sample results were positive and were flagged "K,m".

The serial dilution performed on sample 37SB2A displayed a percent difference greater than the control limit (i.e., 10%) for chromium at 14.9%. This sample represents a sludge matrix that was digested in a batch by itself. This result was flagged "J,s".

The field duplicate pair (QSB1A and SBD3) displayed a relative percent difference greater than the control limit (i.e., 35%) for calcium at 112.9%. The positive results for calcium were flagged "J,f" in these two samples.

For mercury analyses, the matrix spike for sample 37SB2A displayed a recovery less than the laboratory generated lower control limit (i.e., 73%) at 63%. This parent sample represents a sludge matrix. The matrix spike pair for sample 37SB2B displayed acceptable recoveries. The mercury result for sample 37SB2A was positive and was flagged "J,m".

Correctable Anomalies: The client requested that the field sample 37SB1B sampled on 10/2/03 be discarded. An encore sampler labeled 37SB1B was packed with 37SB1C. And, sample 37SB1C was missing the third encore sampler. Two low level analyses were performed on these sample aliquots and the results were comparable.

Comments: Sample 37SB2A was initially analyzed for SVOCs at a dilution of 24 due to non-target matrix interference during the concentration step of the extraction and the reporting limits were elevated. Due to the abundance of target compounds, most of the samples were analyzed at dilutions for the metals analyses. Therefore, the reporting limits for these constituents were elevated.

Field coolers were received at the laboratory with internal temperatures less than the lower control limit (i.e., 2°C) at 0.7°C, 1.9 °C, and 0.9 °C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. The GIS-Key format is limited to 12 characters for a TIC CAS number. One or two SVOC TIC detections exceeded this limitation for 37SB1C, 37SB2B, 37SB2C, 37SB3B, QSB1A, QSB1B, QSB1C, QSB3B, QSB3C, QSB2A, QSB2B, and QSB2C. The laboratory reported the CAS number without the dashes. The reviewer manually entered the dashes for evaluation purposes on the hardcopy result forms included in this report.

No anomalies were encountered if a given fraction was not mentioned. Except for data flagged "R", all data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-2	345028	37SB1C	SO	10/02/03
36440-2	345029	37SB2A	SO	10/02/03
36440-2	345030	37SB2B	SO	10/02/03
36440-2	345031	37SB2C	SO	10/02/03
36440-2	345032	37SB3A	SO	10/02/03
36440-2	345033	37SB3B	SO	10/02/03
36440-2	345034	37SB3C	SO	10/02/03
36440-2	345035	QSB1A	SO	10/02/03
36440-2	345036	SBD3	SO	10/02/03
36440-2	345037	QSB1B	SO	10/02/03
36440-2	345038	QSB1C	SO	10/02/03
36440-2	345039	QSB3A	SO	10/02/03
36440-2	345040	QSB3B	SO	10/02/03
36440-2	345041	QSB3C	SO	10/02/03
36440-2	345042	QSB2A	SO	10/02/03
36440-2	345043	QSB2B	SO	10/02/03
36440-2	345044	QSB2C	SO	10/02/03
36440-2	345045	EQB1	WQ	10/02/03
36440-2	345046	Trip Blank	WQ	10/02/03

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1C**	QC Batch:	90038 -110
Sample #:	**345028**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U	UJ,c	5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	Methyl Ethyl Ketone	24 U		24	5.90
591-78-6	2-Hexanone	12 U		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**24**	B,z	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U		5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U		5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1C**	QC Batch:	90038 -110
Sample #:	**345028**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	UJC	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**5.0 J**	J,C	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	**Xylene (Total)**	**0.78 J**		5.9	0.497

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1C**	QC Batch:	90038 -110
Sample #:	**345028**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2A**	QC Batch:	90038 -110
Sample #:	**345029**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.59

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.9 U		7.9	0.677
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.9 U		7.9	1.21
79-34-5	*1,1,2,2-Tetrachloroethane	7.9 UJ	UJ,i	7.9	1.04
79-00-5	1,1,2-Trichloroethane	7.9 U		7.9	0.943
75-34-3	*1,1-Dichloroethane	7.9 UJ		7.9	1.15
75-35-4	1,1-Dichloroethylene	7.9 U		7.9	1.17
106-93-4	1,2-Dibromoethane	7.9 U		7.9	1.09
96-12-8	*1,2-Dibromo-3-chloropropane	16 UJ	UJ,i	16	3.31
95-50-1	*1,2-Dichlorobenzene	7.9 UJ	UJ,i	7.9	0.770
107-06-2	1,2-Dichloroethane	7.9 U		7.9	0.685
156-59-2	cis-1,2-Dichloroethene	7.9 U		7.9	1.13
156-60-5	*trans-1,2-Dichloroethene	7.9 UJ	UJ,c	7.9	1.12
78-87-5	1,2-Dichloropropane	7.9 U		7.9	0.932
87-61-6	*1,2,3-Trichlorobenzene	7.9 UJ	UJ,i	7.9	0.865
120-82-1	*1,2,4-Trichlorobenzene	7.9 UJ	UJ,i	7.9	0.652
541-73-1	*1,3-Dichlorobenzene	7.9 UJ	UJ,i	7.9	0.426
106-46-7	*1,4-Dichlorobenzene	7.9 UJ	UJ,i	7.9	1.13
78-93-3	Methyl Ethyl Ketone	32 U		32	7.95
591-78-6	2-Hexanone	16 U		16	3.59
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.32
67-64-1	***Acetone**	**37** J	B,Z	32	7.95
71-43-2	Benzene	7.9 U		7.9	0.838
74-97-5	Bromochloromethane	7.9 U		7.9	1.21
75-27-4	Dichlorobromomethane	7.9 U		7.9	0.797
75-25-2	Bromoform	7.9 U		7.9	0.919
74-83-9	Bromomethane	7.9 U		7.9	2.39
75-15-0	*Carbon Disulfide	7.9 UJ	UJ,M	7.9	2.31
56-23-5	Carbon Tetrachloride	7.9 U		7.9	0.741
108-90-7	Chlorobenzene	7.9 U		7.9	1.05
75-00-3	*Chloroethane	7.9 UJ		7.9	2.15
67-66-3	Chloroform	7.9 U		7.9	0.709

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2A**	QC Batch:	90038 -110
Sample #:	**345029**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.59

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.9 U		7.9	1.33
110-82-7	Cyclohexane	16 U		16	0.502
10061-01-5	cis-1,3-Dichloropropene	7.9 U		7.9	0.781
10061-02-6	trans-1,3-Dichloropropene	7.9 U		7.9	0.828
75-71-8	Dichlorodifluoromethane	7.9 U		7.9	1.06
124-48-1	Chlorodibromomethane	7.9 U		7.9	0.822
100-41-4	*Ethylbenzene	7.9 UJ	UJ,M	7.9	0.673
98-82-8	*Isopropylbenzene	7.9 UJ	UJ,I	7.9	0.868
79-20-9	Methyl Acetate	32 U	UJ,C	32	5.52
108-87-2	Methylcyclohexane	16 U		16	1.34
1634-04-4	*Methyl(tert)butyl Ether	7.9 UJ		7.9	1.02
75-09-2	~~*Methylene Chloride~~ 12/15/03	**10 J**	~~J~~ 12/19/03 J,C	32	4.47
100-42-5	*Styrene	7.9 UJ	UJ,M	7.9	0.703
127-18-4	Tetrachloroethene	7.9 U		7.9	0.975
108-88-3	*Toluene	7.9 UJ	UJ,M	7.9	0.738
79-01-6	Trichloroethene	7.9 U		7.9	1.08
75-69-4	Trichlorofluoromethane	7.9 U		7.9	1.18
75-01-4	Vinyl Chloride	7.9 U		7.9	0.588
1330-20-7	*Xylene (Total)	7.9 UJ	UJ,M	7.9	0.669

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2A**	QC Batch:	90038 -110
Sample #:	**345029**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/10/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**37SB2B**	QC Batch:	90038 -110
Sample #:	**345030**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	**cis-1,2-Dichloroethene**	**1.3 J**		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U	UJ,c	5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	**Methyl Ethyl Ketone**	**18 J**		24	5.90
591-78-6	2-Hexanone	12 U		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**25**	B,z	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U		5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U		5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2B**	QC Batch:	90038 -110
Sample #:	**345030**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	VJ,c	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**5.3 J**	J,c	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	**Toluene**	**1.0 J**		5.9	0.548
79-01-6	**Trichloroethene**	**6.8**		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2B**	QC Batch:	90038 -110
Sample #:	**345030**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2C**	QC Batch:	90038 -110
Sample #:	**345031**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.8 U		5.8	0.494
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.8 U		5.8	0.880
79-34-5	1,1,2,2-Tetrachloroethane	5.8 U		5.8	0.757
79-00-5	1,1,2-Trichloroethane	5.8 U		5.8	0.688
75-34-3	1,1-Dichloroethane	5.8 U		5.8	0.840
75-35-4	1,1-Dichloroethylene	5.8 U		5.8	0.850
106-93-4	1,2-Dibromoethane	5.8 U		5.8	0.795
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.41
95-50-1	1,2-Dichlorobenzene	5.8 U		5.8	0.561
107-06-2	1,2-Dichloroethane	5.8 U		5.8	0.500
156-59-2	cis-1,2-Dichloroethene	5.8 U		5.8	0.824
156-60-5	trans-1,2-Dichloroethene	5.8 U	UJ,c	5.8	0.815
78-87-5	1,2-Dichloropropane	5.8 U		5.8	0.680
87-61-6	1,2,3-Trichlorobenzene	5.8 U		5.8	0.631
120-82-1	1,2,4-Trichlorobenzene	5.8 U		5.8	0.476
541-73-1	1,3-Dichlorobenzene	5.8 U		5.8	0.311
106-46-7	1,4-Dichlorobenzene	5.8 U		5.8	0.824
78-93-3	Methyl Ethyl Ketone	24 U		24	5.80
591-78-6	2-Hexanone	12 U		12	2.62
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.69
67-64-1	**Acetone**	**19 J**	B,z	24	5.80
71-43-2	Benzene	5.8 U		5.8	0.611
74-97-5	Bromochloromethane	5.8 U		5.8	0.883
75-27-4	Dichlorobromomethane	5.8 U		5.8	0.581
75-25-2	Bromoform	5.8 U		5.8	0.670
74-83-9	Bromomethane	5.8 U		5.8	1.74
75-15-0	Carbon Disulfide	5.8 U		5.8	1.68
56-23-5	Carbon Tetrachloride	5.8 U		5.8	0.541
108-90-7	Chlorobenzene	5.8 U		5.8	0.767
75-00-3	Chloroethane	5.8 U		5.8	1.57
67-66-3	Chloroform	5.8 U		5.8	0.517

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2C**	QC Batch:	90038 -110
Sample #:	**345031**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.8 U		5.8	0.967
110-82-7	Cyclohexane	12 U		12	0.367
10061-01-5	cis-1,3-Dichloropropene	5.8 U		5.8	0.570
10061-02-6	trans-1,3-Dichloropropene	5.8 U		5.8	0.604
75-71-8	Dichlorodifluoromethane	5.8 U		5.8	0.775
124-48-1	Chlorodibromomethane	5.8 U		5.8	0.600
100-41-4	Ethylbenzene	5.8 U		5.8	0.491
98-82-8	Isopropylbenzene	5.8 U		5.8	0.633
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.03
108-87-2	Methylcyclohexane	12 U		12	0.980
1634-04-4	Methyl(tert)butyl Ether	5.8 U		5.8	0.744
75-09-2	**Methylene Chloride**	**5.2 J**	J,c	24	3.26
100-42-5	Styrene	5.8 U		5.8	0.513
127-18-4	Tetrachloroethene	5.8 U		5.8	0.711
108-88-3	Toluene	5.8 U		5.8	0.538
79-01-6	**Trichloroethene**	**63**		5.8	0.785
75-69-4	Trichlorofluoromethane	5.8 U		5.8	0.862
75-01-4	Vinyl Chloride	5.8 U		5.8	0.429
1330-20-7	Xylene (Total)	5.8 U		5.8	0.488

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB2C**	QC Batch:	90038 -110
Sample #:	**345031**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
2-Methyl-1-Propene	115-11-7	8.4	E	NJ,t

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3A**	QC Batch:	90038 -110
Sample #:	**345032**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.14

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.7 U		5.7	0.486
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.7 U		5.7	0.865
79-34-5	1,1,2,2-Tetrachloroethane	5.7 U		5.7	0.744
79-00-5	1,1,2-Trichloroethane	5.7 U		5.7	0.676
75-34-3	1,1-Dichloroethane	5.7 U		5.7	0.825
75-35-4	1,1-Dichloroethylene	5.7 U		5.7	0.836
106-93-4	1,2-Dibromoethane	5.7 U		5.7	0.781
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.37
95-50-1	1,2-Dichlorobenzene	5.7 U		5.7	0.552
107-06-2	1,2-Dichloroethane	5.7 U		5.7	0.491
156-59-2	cis-1,2-Dichloroethene	5.7 U		5.7	0.809
156-60-5	trans-1,2-Dichloroethene	5.7 U	UJ,C	5.7	0.801
78-87-5	1,2-Dichloropropane	5.7 U		5.7	0.668
87-61-6	1,2,3-Trichlorobenzene	5.7 U		5.7	0.620
120-82-1	1,2,4-Trichlorobenzene	5.7 U		5.7	0.467
541-73-1	1,3-Dichlorobenzene	5.7 U		5.7	0.306
106-46-7	1,4-Dichlorobenzene	5.7 U		5.7	0.809
78-93-3	**Methyl Ethyl Ketone**	**24**		22	5.70
591-78-6	2-Hexanone	11 U		11	2.58
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.66
67-64-1	**Acetone**	**66**	B,Z	22	5.70
71-43-2	Benzene	5.7 U		5.7	0.601
74-97-5	Bromochloromethane	5.7 U		5.7	0.868
75-27-4	Dichlorobromomethane	5.7 U		5.7	0.571
75-25-2	Bromoform	5.7 U		5.7	0.659
74-83-9	Bromomethane	5.7 U		5.7	1.71
75-15-0	Carbon Disulfide	5.7 U		5.7	1.65
56-23-5	Carbon Tetrachloride	5.7 U		5.7	0.531
108-90-7	Chlorobenzene	5.7 U		5.7	0.754
75-00-3	Chloroethane	5.7 U		5.7	1.54
67-66-3	Chloroform	5.7 U		5.7	0.508

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3A**	QC Batch:	90038 -110
Sample #:	**345032**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.14

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.7 U		5.7	0.951
110-82-7	Cyclohexane	11 U		11	0.360
10061-01-5	cis-1,3-Dichloropropene	5.7 U		5.7	0.560
10061-02-6	trans-1,3-Dichloropropene	5.7 U		5.7	0.594
75-71-8	Dichlorodifluoromethane	5.7 U		5.7	0.762
124-48-1	Chlorodibromomethane	5.7 U		5.7	0.589
100-41-4	Ethylbenzene	5.7 U		5.7	0.482
98-82-8	Isopropylbenzene	5.7 U		5.7	0.622
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.96
108-87-2	Methylcyclohexane	11 U		11	0.963
1634-04-4	Methyl(tert)butyl Ether	5.7 U		5.7	0.731
75-09-2	**Methylene Chloride**	**4.5 J**	J,c	22	3.20
100-42-5	Styrene	5.7 U		5.7	0.504
127-18-4	Tetrachloroethene	5.7 U		5.7	0.699
108-88-3	Toluene	5.7 U		5.7	0.529
79-01-6	Trichloroethene	5.7 U		5.7	0.772
75-69-4	Trichlorofluoromethane	5.7 U		5.7	0.847
75-01-4	Vinyl Chloride	5.7 U		5.7	0.422
1330-20-7	Xylene (Total)	5.7 U		5.7	0.480

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3A**	QC Batch:	90038 -110
Sample #:	**345032**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3B**	QC Batch:	90038 -110
Sample #:	**345033**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U	UJ,C	6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	Methyl Ethyl Ketone	24 U		24	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	***Acetone**	**31 J**	B,Z	24	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	*Carbon Disulfide	6.0 UJ	UJ,M	6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3B**	QC Batch:	90038 -110
Sample #:	**345033**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.13
108-87-2	**Methylcyclohexane**	**3.0 J**		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	**Methylene Chloride**	**5.0 J**	J,C	24	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	**Xylene (Total)**	**2.0 J**		6.0	0.501

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3B**	QC Batch:	90038 -110
Sample #:	**345033**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2,4-Trimethylbenzene	95-63-6	3.6	Q	NJ,+
1,3,5-Trimethylbenzene	108-67-8	1.8	Q	NJ,+
1,3-Dimethyl-,trans-cyclohexane	2207-03-6	5.7	E	NJ,+
Ethyl-cyclohexane	1678-91-7	6.4	E	NJ,+
Heptane, 2-methyl-	592-27-8	6.5	E	NJ,+
Nonane	111-84-2	5.1	E	NJ,+
Octane	111-65-9	8.3	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3C**	QC Batch:	90038 -110
Sample #:	**345034**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.4 U		5.4	0.460
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.4 U		5.4	0.820
79-34-5	1,1,2,2-Tetrachloroethane	5.4 U		5.4	0.705
79-00-5	1,1,2-Trichloroethane	5.4 U		5.4	0.640
75-34-3	1,1-Dichloroethane	5.4 U		5.4	0.782
75-35-4	1,1-Dichloroethylene	5.4 U		5.4	0.792
106-93-4	1,2-Dibromoethane	5.4 U		5.4	0.740
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.25
95-50-1	1,2-Dichlorobenzene	5.4 U		5.4	0.523
107-06-2	1,2-Dichloroethane	5.4 U		5.4	0.465
156-59-2	cis-1,2-Dichloroethene	5.4 U		5.4	0.767
156-60-5	trans-1,2-Dichloroethene	5.4 U	UJ,c	5.4	0.759
78-87-5	1,2-Dichloropropane	5.4 U		5.4	0.633
87-61-6	1,2,3-Trichlorobenzene	5.4 U		5.4	0.588
120-82-1	1,2,4-Trichlorobenzene	5.4 U		5.4	0.443
541-73-1	1,3-Dichlorobenzene	5.4 U		5.4	0.289
106-46-7	1,4-Dichlorobenzene	5.4 U		5.4	0.767
78-93-3	Methyl Ethyl Ketone	22 U		22	5.40
591-78-6	2-Hexanone	11 U		11	2.44
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.58
67-64-1	**Acetone**	**16 J**	B,Z	22	5.40
71-43-2	Benzene	5.4 U		5.4	0.569
74-97-5	Bromochloromethane	5.4 U		5.4	0.822
75-27-4	Dichlorobromomethane	5.4 U		5.4	0.541
75-25-2	Bromoform	5.4 U		5.4	0.624
74-83-9	Bromomethane	5.4 U		5.4	1.62
75-15-0	Carbon Disulfide	5.4 U		5.4	1.57
56-23-5	Carbon Tetrachloride	5.4 U		5.4	0.503
108-90-7	Chlorobenzene	5.4 U		5.4	0.714
75-00-3	Chloroethane	5.4 U		5.4	1.46
67-66-3	Chloroform	5.4 U		5.4	0.482

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3C**	QC Batch:	90038 -110
Sample #:	**345034**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.4 U		5.4	0.901
110-82-7	Cyclohexane	11 U		11	0.341
10061-01-5	cis-1,3-Dichloropropene	5.4 U		5.4	0.530
10061-02-6	trans-1,3-Dichloropropene	5.4 U		5.4	0.563
75-71-8	Dichlorodifluoromethane	5.4 U		5.4	0.721
124-48-1	Chlorodibromomethane	5.4 U		5.4	0.558
100-41-4	Ethylbenzene	5.4 U		5.4	0.457
98-82-8	Isopropylbenzene	5.4 U		5.4	0.590
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.75
108-87-2	Methylcyclohexane	11 U		11	0.913
1634-04-4	Methyl(tert)butyl Ether	5.4 U		5.4	0.692
75-09-2	**Methylene Chloride**	**4.7 J**	J,c	22	3.03
100-42-5	Styrene	5.4 U		5.4	0.477
127-18-4	Tetrachloroethene	5.4 U		5.4	0.662
108-88-3	Toluene	5.4 U		5.4	0.501
79-01-6	Trichloroethene	5.4 U		5.4	0.731
75-69-4	Trichlorofluoromethane	5.4 U		5.4	0.802
75-01-4	Vinyl Chloride	5.4 U		5.4	0.400
1330-20-7	Xylene (Total)	5.4 U		5.4	0.455

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB3C**	QC Batch:	90038 -110
Sample #:	**345034**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1A**	QC Batch:	90038 -110
Sample #:	**345035**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.524
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.934
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.803
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.729
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.891
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.902
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.843
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.56
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.595
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.530
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	0.873
156-60-5	trans-1,2-Dichloroethene	6.2 U	VJ,c	6.2	0.865
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.721
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.669
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.504
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.330
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.873
78-93-3	**Methyl Ethyl Ketone**	**25**		24	6.15
591-78-6	2-Hexanone	12 U		12	2.78
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.80
67-64-1	**Acetone**	**110**		24	6.15
71-43-2	Benzene	6.2 U		6.2	0.648
74-97-5	Bromochloromethane	6.2 U		6.2	0.936
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.616
75-25-2	Bromoform	6.2 U		6.2	0.711
74-83-9	Bromomethane	6.2 U		6.2	1.85
75-15-0	Carbon Disulfide	6.2 U		6.2	1.78
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.573
108-90-7	Chlorobenzene	6.2 U		6.2	0.813
75-00-3	Chloroethane	6.2 U		6.2	1.66
67-66-3	Chloroform	6.2 U		6.2	0.549

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1A**	QC Batch:	90038 -110
Sample #:	**345035**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U		6.2	1.03
110-82-7	**Cyclohexane**	**0.90 J**		12	0.389
10061-01-5	cis-1,3-Dichloropropene	6.2 U		6.2	0.604
10061-02-6	trans-1,3-Dichloropropene	6.2 U		6.2	0.641
75-71-8	Dichlorodifluoromethane	6.2 U		6.2	0.822
124-48-1	Chlorodibromomethane	6.2 U		6.2	0.636
100-41-4	**Ethylbenzene**	**0.75 J**		6.2	0.520
98-82-8	Isopropylbenzene	6.2 U		6.2	0.672
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.27
108-87-2	**Methylcyclohexane**	**4.2 J**		12	1.04
1634-04-4	Methyl(tert)butyl Ether	6.2 U		6.2	0.788
75-09-2	**Methylene Chloride**	**4.2 J**	J,c	24	3.46
100-42-5	Styrene	6.2 U		6.2	0.544
127-18-4	Tetrachloroethene	6.2 U		6.2	0.754
108-88-3	Toluene	6.2 U		6.2	0.571
79-01-6	Trichloroethene	6.2 U		6.2	0.833
75-69-4	Trichlorofluoromethane	6.2 U		6.2	0.914
75-01-4	Vinyl Chloride	6.2 U		6.2	0.455
1330-20-7	**Xylene (Total)**	**4.1 J**		6.2	0.518

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1A**	QC Batch:	90038 -110
Sample #:	**345035**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2,4-Trimethylbenzene	95-63-6	2.7	Q	NJ,+
2-Methyl-hexane	591-76-4	8.4	E	NJ,+
3-Methyl-hexane	589-34-4	7.0	E	NJ,+
Hexanal	66-25-1	11	E	NJ,+
Hexane	110-54-3	14	E	NJ,+
Pentane, 2-methyl-	107-83-5	11	E	NJ,+
Pentane, 3-ethyl-2,2-dimethyl-	16747-32-3	5.7	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD3**	QC Batch:	90038 -110
Sample #:	**345036**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.575
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.02
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.882
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.801
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.977
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	0.990
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.925
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.81
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.653
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.582
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.959
156-60-5	trans-1,2-Dichloroethene	6.8 U	UJ,c	6.8	0.949
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.791
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.734
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.554
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.362
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.959
78-93-3	**Methyl Ethyl Ketone**	**23 J**		28	6.75
591-78-6	2-Hexanone	14 U		14	3.05
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.97
67-64-1	**Acetone**	**57**	B,z	28	6.75
71-43-2	Benzene	6.8 U		6.8	0.711
74-97-5	Bromochloromethane	6.8 U		6.8	1.03
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.676
75-25-2	Bromoform	6.8 U		6.8	0.780
74-83-9	Bromomethane	6.8 U		6.8	2.03
75-15-0	Carbon Disulfide	6.8 U		6.8	1.96
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.629
108-90-7	Chlorobenzene	6.8 U		6.8	0.892
75-00-3	Chloroethane	6.8 U		6.8	1.82
67-66-3	Chloroform	6.8 U		6.8	0.602

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD3**	QC Batch:	90038 -110
Sample #:	**345036**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.13
110-82-7	Cyclohexane	14 U		14	0.427
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.663
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.703
75-71-8	Dichlorodifluoromethane	6.8 U		6.8	0.902
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.698
100-41-4	Ethylbenzene	6.8 U		6.8	0.571
98-82-8	Isopropylbenzene	6.8 U		6.8	0.737
79-20-9	Methyl Acetate	28 U	VJ,c	28	4.68
108-87-2	Methylcyclohexane	14 U		14	1.14
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.865
75-09-2	**Methylene Chloride**	**5.7 J**	J,c	28	3.79
100-42-5	Styrene	6.8 U		6.8	0.597
127-18-4	Tetrachloroethene	6.8 U		6.8	0.828
108-88-3	Toluene	6.8 U		6.8	0.626
79-01-6	Trichloroethene	6.8 U		6.8	0.914
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.00
75-01-4	Vinyl Chloride	6.8 U		6.8	0.500
1330-20-7	Xylene (Total)	6.8 U		6.8	0.568

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD3**	QC Batch:	90038 -110
Sample #:	**345036**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1B**	QC Batch:	90038 -110
Sample #:	**345037**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U	UJ,C	6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	Methyl Ethyl Ketone	24 U		24	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	**Acetone**	**36**	B,Z	24	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U		6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1B**	QC Batch:	90038 -110
Sample #:	**345037**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	24 U	VJ,C	24	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	**Methylene Chloride**	**4.8 J**	J,C	24	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1B**	QC Batch:	90038 -110
Sample #:	**345037**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/10/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**QSB1C**	QC Batch:	90038 -110
Sample #:	**345038**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.4 U		5.4	0.460
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.4 U		5.4	0.820
79-34-5	1,1,2,2-Tetrachloroethane	5.4 U		5.4	0.705
79-00-5	1,1,2-Trichloroethane	5.4 U		5.4	0.640
75-34-3	1,1-Dichloroethane	5.4 U		5.4	0.782
75-35-4	1,1-Dichloroethylene	5.4 U		5.4	0.792
106-93-4	1,2-Dibromoethane	5.4 U		5.4	0.740
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.25
95-50-1	1,2-Dichlorobenzene	5.4 U		5.4	0.523
107-06-2	1,2-Dichloroethane	5.4 U		5.4	0.465
156-59-2	cis-1,2-Dichloroethene	5.4 U		5.4	0.767
156-60-5	trans-1,2-Dichloroethene	5.4 U	UJ,C	5.4	0.759
78-87-5	1,2-Dichloropropane	5.4 U		5.4	0.633
87-61-6	1,2,3-Trichlorobenzene	5.4 U		5.4	0.588
120-82-1	1,2,4-Trichlorobenzene	5.4 U		5.4	0.443
541-73-1	1,3-Dichlorobenzene	5.4 U		5.4	0.289
106-46-7	1,4-Dichlorobenzene	5.4 U		5.4	0.767
78-93-3	**Methyl Ethyl Ketone**	**17 J**		22	5.40
591-78-6	2-Hexanone	11 U		11	2.44
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.58
67-64-1	**Acetone**	**36**	B,Z	22	5.40
71-43-2	Benzene	5.4 U		5.4	0.569
74-97-5	Bromochloromethane	5.4 U		5.4	0.822
75-27-4	Dichlorobromomethane	5.4 U		5.4	0.541
75-25-2	Bromoform	5.4 U		5.4	0.624
74-83-9	Bromomethane	5.4 U		5.4	1.62
75-15-0	Carbon Disulfide	5.4 U		5.4	1.57
56-23-5	Carbon Tetrachloride	5.4 U		5.4	0.503
108-90-7	Chlorobenzene	5.4 U		5.4	0.714
75-00-3	Chloroethane	5.4 U		5.4	1.46
67-66-3	Chloroform	5.4 U		5.4	0.482

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1C**	QC Batch:	90038 -110
Sample #:	**345038**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.4 U		5.4	0.901
110-82-7	Cyclohexane	11 U		11	0.341
10061-01-5	cis-1,3-Dichloropropene	5.4 U		5.4	0.530
10061-02-6	trans-1,3-Dichloropropene	5.4 U		5.4	0.563
75-71-8	Dichlorodifluoromethane	5.4 U		5.4	0.721
124-48-1	Chlorodibromomethane	5.4 U		5.4	0.558
100-41-4	Ethylbenzene	5.4 U		5.4	0.457
98-82-8	Isopropylbenzene	5.4 U		5.4	0.590
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.75
108-87-2	Methylcyclohexane	11 U		11	0.913
1634-04-4	Methyl(tert)butyl Ether	5.4 U		5.4	0.692
75-09-2	**Methylene Chloride**	**4.1 J**	J,c	22	3.03
100-42-5	Styrene	5.4 U		5.4	0.477
127-18-4	Tetrachloroethene	5.4 U		5.4	0.662
108-88-3	Toluene	5.4 U		5.4	0.501
79-01-6	Trichloroethene	5.4 U		5.4	0.731
75-69-4	Trichlorofluoromethane	5.4 U		5.4	0.802
75-01-4	Vinyl Chloride	5.4 U		5.4	0.400
1330-20-7	Xylene (Total)	5.4 U		5.4	0.455

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB1C**	QC Batch:	90038 -110
Sample #:	**345038**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/10/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**QSB3A**	QC Batch:	90038 -110
Sample #:	**345039**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.545
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.972
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.836
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.759
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.927
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.938
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.877
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.66
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.620
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.552
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.909
156-60-5	trans-1,2-Dichloroethene	6.4 U	UJ,e	6.4	0.900
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.750
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.696
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.525
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.343
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.909
78-93-3	**Methyl Ethyl Ketone**	**23 J**		26	6.40
591-78-6	2-Hexanone	13 U		13	2.89
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.87
67-64-1	**Acetone**	**56**	B,z	26	6.40
71-43-2	Benzene	6.4 U		6.4	0.675
74-97-5	Bromochloromethane	6.4 U		6.4	0.974
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.641
75-25-2	Bromoform	6.4 U		6.4	0.740
74-83-9	Bromomethane	6.4 U		6.4	1.92
75-15-0	Carbon Disulfide	6.4 U		6.4	1.86
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.596
108-90-7	Chlorobenzene	6.4 U		6.4	0.846
75-00-3	Chloroethane	6.4 U		6.4	1.73
67-66-3	Chloroform	6.4 U		6.4	0.571

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3A**	QC Batch:	90038 -110
Sample #:	**345039**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.07
110-82-7	Cyclohexane	13 U		13	0.404
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.628
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.667
75-71-8	Dichlorodifluoromethane	6.4 U		6.4	0.855
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.662
100-41-4	Ethylbenzene	6.4 U		6.4	0.541
98-82-8	Isopropylbenzene	6.4 U		6.4	0.699
79-20-9	Methyl Acetate	26 U	UJ/c	26	4.44
108-87-2	Methylcyclohexane	13 U		13	1.08
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.820
75-09-2	**Methylene Chloride**	**6.8 J**	J/c	26	3.60
100-42-5	Styrene	6.4 U		6.4	0.566
127-18-4	Tetrachloroethene	6.4 U		6.4	0.785
108-88-3	Toluene	6.4 U		6.4	0.594
79-01-6	Trichloroethene	6.4 U		6.4	0.867
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.951
75-01-4	Vinyl Chloride	6.4 U		6.4	0.474
1330-20-7	Xylene (Total)	6.4 U		6.4	0.539

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/10/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**QSB3A**	QC Batch:	90038 -110
Sample #:	**345039**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/10/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**QSB3B**	QC Batch:	90038 -110
Sample #:	**345040**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.15

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.7 U		5.7	0.490
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.7 U		5.7	0.873
79-34-5	1,1,2,2-Tetrachloroethane	5.7 U		5.7	0.751
79-00-5	1,1,2-Trichloroethane	5.7 U		5.7	0.682
75-34-3	1,1-Dichloroethane	5.7 U		5.7	0.833
75-35-4	1,1-Dichloroethylene	5.7 U		5.7	0.843
106-93-4	1,2-Dibromoethane	5.7 U		5.7	0.788
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.39
95-50-1	1,2-Dichlorobenzene	5.7 U		5.7	0.557
107-06-2	1,2-Dichloroethane	5.7 U		5.7	0.496
156-59-2	cis-1,2-Dichloroethene	5.7 U		5.7	0.817
156-60-5	trans-1,2-Dichloroethene	5.7 U	VJ,C	5.7	0.808
78-87-5	1,2-Dichloropropane	5.7 U		5.7	0.674
87-61-6	1,2,3-Trichlorobenzene	5.7 U		5.7	0.626
120-82-1	1,2,4-Trichlorobenzene	5.7 U		5.7	0.472
541-73-1	1,3-Dichlorobenzene	5.7 U		5.7	0.308
106-46-7	1,4-Dichlorobenzene	5.7 U		5.7	0.817
78-93-3	Methyl Ethyl Ketone	22 U		22	5.75
591-78-6	2-Hexanone	11 U		11	2.60
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.68
67-64-1	**Acetone**	**24**	B,Z	22	5.75
71-43-2	Benzene	5.7 U		5.7	0.606
74-97-5	Bromochloromethane	5.7 U		5.7	0.875
75-27-4	Dichlorobromomethane	5.7 U		5.7	0.576
75-25-2	Bromoform	5.7 U		5.7	0.665
74-83-9	Bromomethane	5.7 U		5.7	1.73
75-15-0	Carbon Disulfide	5.7 U		5.7	1.67
56-23-5	Carbon Tetrachloride	5.7 U		5.7	0.536
108-90-7	Chlorobenzene	5.7 U		5.7	0.760
75-00-3	Chloroethane	5.7 U		5.7	1.55
67-66-3	Chloroform	5.7 U		5.7	0.513

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3B**	QC Batch:	90038 -110
Sample #:	**345040**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.15

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.7 U		5.7	0.959
110-82-7	Cyclohexane	11 U		11	0.363
10061-01-5	cis-1,3-Dichloropropene	5.7 U		5.7	0.565
10061-02-6	trans-1,3-Dichloropropene	5.7 U		5.7	0.599
75-71-8	Dichlorodifluoromethane	5.7 U		5.7	0.768
124-48-1	Chlorodibromomethane	5.7 U		5.7	0.595
100-41-4	Ethylbenzene	5.7 U		5.7	0.486
98-82-8	Isopropylbenzene	5.7 U		5.7	0.628
79-20-9	Methyl Acetate	22 U	VJ,c	22	3.99
108-87-2	Methylcyclohexane	11 U		11	0.972
1634-04-4	Methyl(tert)butyl Ether	5.7 U		5.7	0.737
75-09-2	**Methylene Chloride**	**4.8 J**	J,c	22	3.23
100-42-5	Styrene	5.7 U		5.7	0.508
127-18-4	Tetrachloroethene	5.7 U		5.7	0.705
108-88-3	Toluene	5.7 U		5.7	0.534
79-01-6	Trichloroethene	5.7 U		5.7	0.779
75-69-4	Trichlorofluoromethane	5.7 U		5.7	0.854
75-01-4	Vinyl Chloride	5.7 U		5.7	0.426
1330-20-7	Xylene (Total)	5.7 U		5.7	0.484

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3B**	QC Batch:	90038 -110
Sample #:	**345040**	Anal. Batch:	207998
Matrix:	Soil	Percent Solids:	87
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3C**	QC Batch:	90038 -111
Sample #:	**345041**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.09

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.4 U		5.4	0.464
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.4 U		5.4	0.827
79-34-5	1,1,2,2-Tetrachloroethane	5.4 U		5.4	0.712
79-00-5	1,1,2-Trichloroethane	5.4 U		5.4	0.646
75-34-3	1,1-Dichloroethane	5.4 U		5.4	0.789
75-35-4	1,1-Dichloroethylene	5.4 U		5.4	0.799
106-93-4	1,2-Dibromoethane	5.4 U		5.4	0.747
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.27
95-50-1	1,2-Dichlorobenzene	5.4 U		5.4	0.528
107-06-2	1,2-Dichloroethane	5.4 U		5.4	0.470
156-59-2	cis-1,2-Dichloroethene	5.4 U		5.4	0.774
156-60-5	trans-1,2-Dichloroethene	5.4 U		5.4	0.766
78-87-5	1,2-Dichloropropane	5.4 U		5.4	0.639
87-61-6	1,2,3-Trichlorobenzene	5.4 U		5.4	0.593
120-82-1	1,2,4-Trichlorobenzene	5.4 U		5.4	0.447
541-73-1	1,3-Dichlorobenzene	5.4 U		5.4	0.292
106-46-7	1,4-Dichlorobenzene	5.4 U		5.4	0.774
78-93-3	Methyl Ethyl Ketone	22 U		22	5.45
591-78-6	2-Hexanone	11 U	UJ,c	11	2.46
108-10-1	4-Methyl-2-Pentanone	11 U	UJ,c	11	1.59
67-64-1	**Acetone**	**18 J**	B,z	22	5.45
71-43-2	Benzene	5.4 U		5.4	0.574
74-97-5	Bromochloromethane	5.4 U		5.4	0.829
75-27-4	Dichlorobromomethane	5.4 U		5.4	0.546
75-25-2	Bromoform	5.4 U		5.4	0.630
74-83-9	Bromomethane	5.4 U		5.4	1.64
75-15-0	Carbon Disulfide	5.4 U	UJ,c	5.4	1.58
56-23-5	Carbon Tetrachloride	5.4 U		5.4	0.508
108-90-7	Chlorobenzene	5.4 U		5.4	0.720
75-00-3	Chloroethane	5.4 U		5.4	1.47
67-66-3	Chloroform	5.4 U		5.4	0.486

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3C**	QC Batch:	90038 -111
Sample #:	**345041**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.09

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.4 U		5.4	0.909
110-82-7	Cyclohexane	11 U		11	0.344
10061-01-5	cis-1,3-Dichloropropene	5.4 U		5.4	0.535
10061-02-6	trans-1,3-Dichloropropene	5.4 U		5.4	0.568
75-71-8	Dichlorodifluoromethane	5.4 U		5.4	0.728
124-48-1	Chlorodibromomethane	5.4 U		5.4	0.564
100-41-4	Ethylbenzene	5.4 U		5.4	0.461
98-82-8	Isopropylbenzene	5.4 U		5.4	0.595
79-20-9	Methyl Acetate	22 U	UJ,c	22	3.78
108-87-2	Methylcyclohexane	11 U		11	0.921
1634-04-4	Methyl(tert)butyl Ether	5.4 U		5.4	0.699
75-09-2	**Methylene Chloride**	**5.6 J**	J,c	22	3.06
100-42-5	Styrene	5.4 U		5.4	0.482
127-18-4	Tetrachloroethene	5.4 U		5.4	0.668
108-88-3	Toluene	5.4 U		5.4	0.506
79-01-6	Trichloroethene	5.4 U		5.4	0.738
75-69-4	Trichlorofluoromethane	5.4 U		5.4	0.810
75-01-4	Vinyl Chloride	5.4 U		5.4	0.403
1330-20-7	Xylene (Total)	5.4 U		5.4	0.459

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5560 Corporate Exchange Court SE • Grand Rapids, MI 49512 • (616) 975-4500 • Fax (616) 942-7463

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB3C**	QC Batch:	90038 -111
Sample #:	**345041**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	92
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2A**	QC Batch:	90038 -111
Sample #:	**345042**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U		5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	Methyl Ethyl Ketone	24 U		24	5.90
591-78-6	2-Hexanone	12 U	UJ,C	12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U	UJ,C	12	1.72
67-64-1	**Acetone**	**42**	B,Z	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U	UJ,C	5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U		5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2A**	QC Batch:	90038 -111
Sample #:	**345042**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	**Methylene Chloride**	**4.5 J**	J,c	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2A**	QC Batch:	90038 -111
Sample #:	**345042**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2B**	QC Batch:	90038 -111
Sample #:	**345043**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	Methyl Ethyl Ketone	24 U		24	5.95
591-78-6	2-Hexanone	12 U	UJ,c	12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U	UJ,c	12	1.74
67-64-1	**Acetone**	**24**	B,Z	24	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U	UJ,c	6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2B**	QC Batch:	90038 -111
Sample #:	**345043**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	**Methylene Chloride**	**4.9 J**	J,c	24	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	**Toluene**	**0.65 J**		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2B**	QC Batch:	90038 -111
Sample #:	**345043**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2C**	QC Batch:	90038 -111
Sample #:	**345044**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.5 U		5.5	0.469
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.5 U		5.5	0.835
79-34-5	1,1,2,2-Tetrachloroethane	5.5 U		5.5	0.718
79-00-5	1,1,2-Trichloroethane	5.5 U		5.5	0.652
75-34-3	1,1-Dichloroethane	5.5 U		5.5	0.796
75-35-4	1,1-Dichloroethylene	5.5 U		5.5	0.806
106-93-4	1,2-Dibromoethane	5.5 U		5.5	0.754
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.29
95-50-1	1,2-Dichlorobenzene	5.5 U		5.5	0.532
107-06-2	1,2-Dichloroethane	5.5 U		5.5	0.474
156-59-2	cis-1,2-Dichloroethene	5.5 U		5.5	0.781
156-60-5	trans-1,2-Dichloroethene	5.5 U		5.5	0.773
78-87-5	1,2-Dichloropropane	5.5 U		5.5	0.645
87-61-6	1,2,3-Trichlorobenzene	5.5 U		5.5	0.598
120-82-1	1,2,4-Trichlorobenzene	5.5 U		5.5	0.451
541-73-1	1,3-Dichlorobenzene	5.5 U		5.5	0.295
106-46-7	1,4-Dichlorobenzene	5.5 U		5.5	0.781
78-93-3	Methyl Ethyl Ketone	22 U		22	5.50
591-78-6	2-Hexanone	11 U	UJ,c	11	2.49
108-10-1	4-Methyl-2-Pentanone	11 U	UJ,c	11	1.61
67-64-1	**Acetone**	**22**	B,z	22	5.50
71-43-2	Benzene	5.5 U		5.5	0.580
74-97-5	Bromochloromethane	5.5 U		5.5	0.837
75-27-4	Dichlorobromomethane	5.5 U		5.5	0.551
75-25-2	Bromoform	5.5 U		5.5	0.636
74-83-9	Bromomethane	5.5 U		5.5	1.65
75-15-0	Carbon Disulfide	5.5 U	UJ,c	5.5	1.60
56-23-5	Carbon Tetrachloride	5.5 U		5.5	0.513
108-90-7	Chlorobenzene	5.5 U		5.5	0.727
75-00-3	Chloroethane	5.5 U		5.5	1.49
67-66-3	Chloroform	5.5 U		5.5	0.491

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2C**	QC Batch:	90038 -111
Sample #:	**345044**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.5 U		5.5	0.917
110-82-7	Cyclohexane	11 U		11	0.348
10061-01-5	cis-1,3-Dichloropropene	5.5 U		5.5	0.540
10061-02-6	trans-1,3-Dichloropropene	5.5 U		5.5	0.573
75-71-8	Dichlorodifluoromethane	5.5 U		5.5	0.735
124-48-1	Chlorodibromomethane	5.5 U		5.5	0.569
100-41-4	Ethylbenzene	5.5 U		5.5	0.465
98-82-8	Isopropylbenzene	5.5 U		5.5	0.601
79-20-9	Methyl Acetate	22 U	VJc	22	3.82
108-87-2	Methylcyclohexane	11 U		11	0.930
1634-04-4	Methyl(tert)butyl Ether	5.5 U		5.5	0.705
75-09-2	**Methylene Chloride**	**4.0 J**	J,c	22	3.09
100-42-5	Styrene	5.5 U		5.5	0.486
127-18-4	Tetrachloroethene	5.5 U		5.5	0.674
108-88-3	Toluene	5.5 U		5.5	0.510
79-01-6	Trichloroethene	5.5 U		5.5	0.745
75-69-4	Trichlorofluoromethane	5.5 U		5.5	0.817
75-01-4	Vinyl Chloride	5.5 U		5.5	0.407
1330-20-7	Xylene (Total)	5.5 U		5.5	0.463

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**QSB2C**	QC Batch:	90038 -111
Sample #:	**345044**	Anal. Batch:	208001
Matrix:	Soil	Percent Solids:	91
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB1**	QC Batch:	89888 -115
Sample #:	**345045**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	**Acetone**	**2.9 J**	Bz	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,c	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB1**	QC Batch:	89888 -115
Sample #:	**345045**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.60 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB1**	QC Batch:	89888 -115
Sample #:	**345045**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345046**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,c	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345046**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U	1.0	0.103
110-82-7	Cyclohexane	5.0 U	5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U	1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U	1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U	1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U	1.0	0.108
100-41-4	Ethylbenzene	1.0 U	1.0	0.195
98-82-8	Isopropylbenzene	1.0 U	1.0	0.090
79-20-9	Methyl Acetate	10 U	10	0.231
108-87-2	Methylcyclohexane	5.0 U	5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U	1.0	0.077
75-09-2	**Methylene Chloride**	**1.0 J** B,2	4.0	0.117
100-42-5	Styrene	1.0 U	1.0	0.137
127-18-4	Tetrachloroethene	1.0 U	1.0	0.193
108-88-3	**Toluene**	**0.27 J**	1.0	0.214
79-01-6	Trichloroethene	1.0 U	1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U	1.0	0.051
75-01-4	Vinyl Chloride	1.0 U	1.0	0.119
1330-20-7	Xylene (Total)	3.0 U	3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	n/a
Submittal #:	**36440-2**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345046**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1C**	QC Batch:	89845 -109
Sample #:	**345028**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	170 U		170	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	170 U		170	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	170 U		170	1.58
95-95-4	2,4,5-Trichlorophenol	170 U		170	4.01
88-06-2	2,4,6-Trichlorophenol	170 U		170	3.14
120-83-2	2,4-Dichlorophenol	170 U		170	4.22
105-67-9	2,4-Dimethylphenol	170 U		170	9.53
51-28-5	2,4-Dinitrophenol	330 U		330	3.84
121-14-2	2,4-Dinitrotoluene	170 U		170	3.78
606-20-2	2,6-Dinitrotoluene	170 U		170	33.2
91-58-7	2-Chloronaphthalene	170 U		170	2.76
95-57-8	2-Chlorophenol	170 U		170	2.41
91-57-6	2-Methylnaphthalene	170 U		170	3.29
95-48-7	2-Methylphenol	170 U		170	5.81
88-74-4	2-Nitroaniline	170 U		170	5.52
88-75-5	2-Nitrophenol	170 U		170	2.04
91-94-1	3,3'-Dichlorobenzidine	170 U		170	80.0
99-09-2	3-Nitroaniline	170 U		170	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	170 U		170	5.41
101-55-3	4-Bromophenyl Phenylether	170 U		170	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**21 J**		170	6.25
106-47-8	4-Chloroaniline	170 U	UJ,c	170	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	170 U		170	3.92
106-44-5	4-Methylphenol	170 U		170	7.64
100-01-6	4-Nitroaniline	170 U		170	8.70
100-02-7	4-Nitrophenol	330 U		330	3.40
83-32-9	Acenaphthene	170 U		170	2.06
208-96-8	Acenaphthylene	170 U		170	1.80
98-86-2	Acetophenone	170 U		170	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1C**	QC Batch:	89845 -109
Sample #:	**345028**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	170 U		170	5.54
1912-24-9	Atrazine	170 U		170	8.26
100-52-7	Benzaldehyde	170 U	UJ,c	170	4.86
56-55-3	Benzo (a) Anthracene	170 U		170	16.0
50-32-8	Benzo (a) Pyrene	170 U		170	6.85
205-99-2	Benzo (b) Fluoranthene	170 U		170	11.7
191-24-2	Benzo (g,h,i,) Perylene	170 U		170	10.5
207-08-9	Benzo (k) Fluoranthene	170 U		170	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	170 U		170	3.77
111-44-4	Bis (2-Chloroethyl) Ether	170 U		170	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**45 J**		170	2.48
85-68-7	Butyl Benzyl Phthalate	170 U		170	5.38
105-60-2	Caprolactam	330 U		330	7.66
86-74-8	Carbazole	170 U		170	7.32
218-01-9	Chrysene	170 U		170	12.2
53-70-3	Dibenzo (a,h) Anthracene	170 U		170	7.08
132-64-9	Dibenzofuran	170 U		170	3.79
84-66-2	**Diethylphthalate**	**26 J**		170	2.28
131-11-3	Dimethylphthalate	170 U		170	3.97
84-74-2	**Di-n-Butylphthalate**	**30 J**		170	4.58
117-84-0	Di-n-Octylphthalate	170 U		170	3.72
206-44-0	Fluoranthene	170 U		170	2.82
86-73-7	Fluorene	170 U		170	2.02
118-74-1	Hexachlorobenzene	170 U		170	3.01
87-68-3	Hexachlorobutadiene	170 U		170	4.64
77-47-4	Hexachlorocyclopentadiene	170 U		170	2.38
67-72-1	Hexachloroethane	170 U		170	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	170 U		170	4.70
78-59-1	Isophorone	170 U		170	2.08
91-20-3	Naphthalene	170 U		170	3.30
98-95-3	Nitrobenzene	170 U		170	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1C**	QC Batch:	89845 -109
Sample #:	**345028**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	170 U	170	3.95
86-30-6	N-Nitroso-di-Phenylamine	170 U	170	5.70
87-86-5	Pentachlorophenol	330 U	330	5.27
85-01-8	Phenanthrene	170 U	170	2.76
108-95-2	Phenol	170 U	170	4.75
129-00-0	Pyrene	170 U	170	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB1C**	QC Batch:	89845 -109
Sample #:	**345028**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	52	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	39	E	B,x
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	86	E	B,x
2-Ethyl-1-Hexanol	104-76-7	25	E	NJ,+
3-Hexene-2,5-dione	4436-75-3	200	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	39	E	NJ,+
Erucylamide	112-84-5	220	E	NJ,+
Hexadecanoic acid, butyl ester	111-06-8	28	E	NJ,+
Octadecanoic acid, 2-methylpropyl ester	646-13-9	30	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	24

CAS Number	Semivolatile Organics *OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	4000 U		4000	59.0
95-94-3	1,2,4,5-Tetrachloro-benzene	4000 U		4000	689
108-60-1	Bis (2-Chloroisopropyl)-Ether	4000 U		4000	31.7
95-95-4	2,4,5-Trichlorophenol	4000 U	UJ,S	4000	80.2
88-06-2	2,4,6-Trichlorophenol	4000 U	UJ,S	4000	62.9
120-83-2	2,4-Dichlorophenol	4000 U	UJ,S	4000	84.5
105-67-9	2,4-Dimethylphenol	4000 U	UJ,S	4000	191
51-28-5	2,4-Dinitrophenol	8000 U	UJ,S	8000	76.8
121-14-2	**2,4-Dinitrotoluene**	**1800 J**	J,M	4000	75.6
606-20-2	2,6-Dinitrotoluene	4000 U		4000	665
91-58-7	2-Chloronaphthalene	4000 U		4000	55.2
95-57-8	2-Chlorophenol	4000 U	UJ,S	4000	48.2
91-57-6	2-Methylnaphthalene	4000 U		4000	65.8
95-48-7	2-Methylphenol	4000 U	UJ,S	4000	116
88-74-4	2-Nitroaniline	4000 U	R,M	4000	110
88-75-5	2-Nitrophenol	4000 U	UJ,S	4000	40.8
91-94-1	3,3'-Dichlorobenzidine	4000 U	R,M	4000	1600
99-09-2	3-Nitroaniline	4000 U	R,M	4000	799
534-52-1	4,6-Dinitro-2-Methylphenol	4000 U	UJ,S	4000	108
101-55-3	4-Bromophenyl Phenylether	4000 U		4000	81.1
59-50-7	4-Chloro-3-Methylphenol	4000 U	UJ,S	4000	125
106-47-8	4-Chloroaniline	4000 U	R,M	4000	30.2
7005-72-3	4-Chlorophenylphenyl-Ether	4000 U		4000	78.5
106-44-5	4-Methylphenol	4000 U	UJ,S	4000	153
100-01-6	4-Nitroaniline	4000 U	R,M	4000	174
100-02-7	4-Nitrophenol	8000 U	UJ,S	8000	67.9
83-32-9	Acenaphthene	4000 U		4000	41.3
208-96-8	Acenaphthylene	4000 U		4000	36.0
98-86-2	Acetophenone	4000 U		4000	45.6

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	24

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	4000 U		4000	111
1912-24-9	Atrazine	4000 U	UJ,e	4000	165
100-52-7	Benzaldehyde	4000 U	UJ,e	4000	97.2
56-55-3	Benzo (a) Anthracene	4000 U		4000	319
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~137~~
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~234~~
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~209~~
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~322~~
111-91-1	Bis (2-Chloroethoxy)-Methane	4000 U		4000	75.4
111-44-4	Bis (2-Chloroethyl) Ether	4000 U		4000	41.5
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1000 J**	J,e	4000	49.7
85-68-7	Butyl Benzyl Phthalate	4000 U		4000	108
105-60-2	Caprolactam	8000 U		8000	153
86-74-8	Carbazole	4000 U		4000	146
218-01-9	Chrysene	4000 U		4000	245
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~142~~
132-64-9	Dibenzofuran	4000 U		4000	75.8
84-66-2	**Diethylphthalate**	**120 J**	J,i	4000	45.6
131-11-3	Dimethylphthalate	4000 U		4000	79.4
84-74-2	**Di-n-Butylphthalate**	**26000**	J,M	4000	91.7
117-84-0	Di-n-Octylphthalate	4000 U	UJ,e	4000	74.4
206-44-0	**Fluoranthene**	**190 J**	J,M	4000	56.4
86-73-7	Fluorene	4000 U		4000	40.3
118-74-1	Hexachlorobenzene	4000 U		4000	60.2
87-68-3	Hexachlorobutadiene	4000 U		4000	92.9
77-47-4	Hexachlorocyclopentadiene	4000 U		4000	47.5
67-72-1	Hexachloroethane	4000 U		4000	56.0
~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~4000 UR~~	~~R,i~~	~~4000~~	~~94.1~~
78-59-1	Isophorone	4000 U		4000	41.5
91-20-3	Naphthalene	4000 U		4000	66.0
98-95-3	Nitrobenzene	4000 U		4000	76.8

* See attached Statement of Data Qualifications.

* See dilution analysis for these results, AS 12/15/03

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	24

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	4000 U		4000	79.0
86-30-6	**N-Nitroso-di-Phenylamine**	**300 J**	J,M	4000	114
87-86-5	Pentachlorophenol	8000 U	UJ,S	8000	105
85-01-8	Phenanthrene	4000 U		4000	55.2
108-95-2	Phenol	4000 U	UJ,S	4000	95.0
129-00-0	**Pyrene**	**110 J**		4000	35.5

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -109
Sample #:	**345029**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
3-Hexene-2,5-dione	4436-75-3	400	E NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029DL**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	240

Do not use. See neat analysis -JS 12/15/03

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	40000 U		40000	590
95-94-3	1,2,4,5-Tetrachloro-benzene	40000 U		40000	6890
108-60-1	Bis (2-Chloroisopropyl)-Ether	40000 U		40000	317
95-95-4	2,4,5-Trichlorophenol	40000 U		40000	802
88-06-2	2,4,6-Trichlorophenol	40000 U		40000	629
120-83-2	2,4-Dichlorophenol	40000 U		40000	845
105-67-9	2,4-Dimethylphenol	40000 U		40000	1910
51-28-5	2,4-Dinitrophenol	80000 U		80000	768
121-14-2	2,4-Dinitrotoluene	40000 U		40000	756
606-20-2	2,6-Dinitrotoluene	40000 U		40000	6650
91-58-7	2-Chloronaphthalene	40000 U		40000	552
95-57-8	2-Chlorophenol	40000 U		40000	482
91-57-6	2-Methylnaphthalene	40000 U		40000	658
95-48-7	2-Methylphenol	40000 U		40000	1160
88-74-4	2-Nitroaniline	40000 U		40000	1100
88-75-5	2-Nitrophenol	40000 U		40000	408
91-94-1	3,3'-Dichlorobenzidine	40000 U	UJ,c	40000	16000
99-09-2	3-Nitroaniline	40000 U		40000	7990
534-52-1	4,6-Dinitro-2-Methylphenol	40000 U		40000	1080
101-55-3	4-Bromophenyl Phenylether	40000 U		40000	811
59-50-7	4-Chloro-3-Methylphenol	40000 U		40000	1250
106-47-8	4-Chloroaniline	40000 U	UJ,c	40000	302
7005-72-3	4-Chlorophenylphenyl-Ether	40000 U		40000	785
106-44-5	4-Methylphenol	40000 U		40000	1530
100-01-6	4-Nitroaniline	40000 U		40000	1740
100-02-7	4-Nitrophenol	80000 U		80000	679
83-32-9	Acenaphthene	40000 U		40000	413
208-96-8	Acenaphthylene	40000 U		40000	360
98-86-2	Acetophenone	40000 U		40000	456

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029DL**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	240

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	40000 U		40000	1110
1912-24-9	Atrazine	40000 U	UJ,c	40000	1650
100-52-7	Benzaldehyde	40000 U	UJ,c	40000	972
56-55-3	Benzo (a) Anthracene	40000 U		40000	3190
50-32-8	Benzo (a) Pyrene	40000 U		40000	1370
205-99-2	Benzo (b) Fluoranthene	40000 U		40000	2340
191-24-2	Benzo (g,h,i,) Perylene	40000 U		40000	2090
207-08-9	Benzo (k) Fluoranthene	40000 U		40000	3220
111-91-1	Bis (2-Chloroethoxy)-Methane	40000 U		40000	754
111-44-4	Bis (2-Chloroethyl) Ether	40000 U		40000	415
117-81-7	Bis (2-ethylhexyl)-Phthalate	40000 U	UJ,c	40000	497
85-68-7	Butyl Benzyl Phthalate	40000 U		40000	1080
105-60-2	Caprolactam	80000 U		80000	1530
86-74-8	Carbazole	40000 U		40000	1460
218-01-9	Chrysene	40000 U		40000	2450
53-70-3	Dibenzo (a,h) Anthracene	40000 U		40000	1420
132-64-9	Dibenzofuran	40000 U		40000	758
84-66-2	**Diethylphthalate**	**860 J**		40000	456
131-11-3	Dimethylphthalate	40000 U		40000	794
84-74-2	**Di-n-Butylphthalate**	**21000 J**		40000	917
117-84-0	Di-n-Octylphthalate	40000 U	UJ,c	40000	744
206-44-0	Fluoranthene	40000 U		40000	564
86-73-7	Fluorene	40000 U		40000	403
118-74-1	Hexachlorobenzene	40000 U		40000	602
87-68-3	Hexachlorobutadiene	40000 U		40000	929
77-47-4	Hexachlorocyclopentadiene	40000 U		40000	475
67-72-1	Hexachloroethane	40000 U		40000	560
193-39-5	Indeno (1,2,3-cd) Pyrene	40000 U		40000	941
78-59-1	Isophorone	40000 U		40000	415
91-20-3	Naphthalene	40000 U		40000	660
98-95-3	Nitrobenzene	40000 U		40000	768

* Use only these results from this dilution, * 12/15/03

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2A**	QC Batch:	90209 -116
Sample #:	**345029DL**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	240

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	40000 U	40000	790
86-30-6	N-Nitroso-di-Phenylamine	40000 U	40000	1140
87-86-5	Pentachlorophenol	80000 U	80000	1050
85-01-8	Phenanthrene	40000 U	40000	552
108-95-2	Phenol	40000 U	40000	950
129-00-0	Pyrene	40000 U	40000	355

Do not use,
See neat analysis
12/15/03

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2B**	QC Batch:	90209 -109
Sample #:	**345030**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	4-Chloro-3-Methylphenol	200 U		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,c	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2B**	QC Batch:	90209 -109
Sample #:	**345030**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**44 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**20 J**	B,z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**18 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2B**	QC Batch:	90209 -109
Sample #:	**345030**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2B**	QC Batch:	90209 -109
Sample #:	**345030**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	45	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	24	E	B,x
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	67	E	B,x
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	25	E	NJ,+
Erucylamide	112-84-5	150	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2C**	QC Batch:	90209 -109
Sample #:	**345031**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	380 U		380	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**15 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	VJ,c	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	380 U		380	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2C**	QC Batch:	90209 -109
Sample #:	**345031**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**41 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	380 U		380	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**18 J**	B,z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**25 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2C**	QC Batch:	90209 -109
Sample #:	**345031**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	380 U	380	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB2C**	QC Batch:	90209 -109
Sample #:	**345031**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	CAS Number	Result (ug/kg dr	Qualifier	
(Z)-9-Octadecenamide	301-02-0	62	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	24	E	B,X
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	30	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3A**	QC Batch:	90209 -109
Sample #:	**345032**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	190 U		190	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	190 U		190	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	190 U		190	1.45
95-95-4	2,4,5-Trichlorophenol	190 U		190	3.67
88-06-2	2,4,6-Trichlorophenol	190 U		190	2.88
120-83-2	2,4-Dichlorophenol	190 U		190	3.87
105-67-9	2,4-Dimethylphenol	190 U		190	8.73
51-28-5	2,4-Dinitrophenol	380 U		380	3.52
121-14-2	2,4-Dinitrotoluene	190 U		190	3.47
606-20-2	2,6-Dinitrotoluene	190 U		190	30.5
91-58-7	2-Chloronaphthalene	190 U		190	2.53
95-57-8	2-Chlorophenol	190 U		190	2.21
91-57-6	2-Methylnaphthalene	190 U		190	3.01
95-48-7	2-Methylphenol	190 U		190	5.32
88-74-4	2-Nitroaniline	190 U		190	5.06
88-75-5	2-Nitrophenol	190 U		190	1.87
91-94-1	3,3'-Dichlorobenzidine	190 U		190	73.4
99-09-2	3-Nitroaniline	190 U		190	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	190 U		190	4.96
101-55-3	4-Bromophenyl Phenylether	190 U		190	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**12 J**		190	5.73
106-47-8	4-Chloroaniline	190 U	UJ,e	190	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	190 U		190	3.60
106-44-5	4-Methylphenol	190 U		190	7.01
100-01-6	4-Nitroaniline	190 U		190	7.98
100-02-7	4-Nitrophenol	380 U		380	3.11
83-32-9	Acenaphthene	190 U		190	1.89
208-96-8	Acenaphthylene	190 U		190	1.65
98-86-2	Acetophenone	190 U		190	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3A**	QC Batch:	90209 -109
Sample #:	**345032**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	190 U		190	5.08
1912-24-9	Atrazine	190 U		190	7.57
100-52-7	Benzaldehyde	190 U	VJ,c	190	4.46
56-55-3	Benzo (a) Anthracene	190 U		190	14.6
50-32-8	Benzo (a) Pyrene	190 U		190	6.28
205-99-2	Benzo (b) Fluoranthene	190 U		190	10.7
191-24-2	Benzo (g,h,i,) Perylene	190 U		190	9.59
207-08-9	Benzo (k) Fluoranthene	190 U		190	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	190 U		190	3.45
111-44-4	Bis (2-Chloroethyl) Ether	190 U		190	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**46 J**		190	2.28
85-68-7	Butyl Benzyl Phthalate	190 U		190	4.93
105-60-2	Caprolactam	380 U		380	7.02
86-74-8	Carbazole	190 U		190	6.71
218-01-9	Chrysene	190 U		190	11.2
53-70-3	Dibenzo (a,h) Anthracene	190 U		190	6.49
132-64-9	Dibenzofuran	190 U		190	3.48
84-66-2	**Diethylphthalate**	**18 J**	B,Z	190	2.09
131-11-3	Dimethylphthalate	190 U		190	3.64
84-74-2	**Di-n-Butylphthalate**	**59 J**		190	4.20
117-84-0	Di-n-Octylphthalate	190 U		190	3.41
206-44-0	Fluoranthene	190 U		190	2.59
86-73-7	Fluorene	190 U		190	1.85
118-74-1	Hexachlorobenzene	190 U		190	2.76
87-68-3	Hexachlorobutadiene	190 U		190	4.26
77-47-4	Hexachlorocyclopentadiene	190 U		190	2.18
67-72-1	Hexachloroethane	190 U		190	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	190 U		190	4.31
78-59-1	Isophorone	190 U		190	1.90
91-20-3	Naphthalene	190 U		190	3.03
98-95-3	Nitrobenzene	190 U		190	3.52

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3A**	QC Batch:	90209 -109
Sample #:	**345032**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	190 U	190	3.62
86-30-6	N-Nitroso-di-Phenylamine	190 U	190	5.23
87-86-5	Pentachlorophenol	380 U	380	4.83
85-01-8	Phenanthrene	190 U	190	2.53
108-95-2	Phenol	190 U	190	4.36
129-00-0	Pyrene	190 U	190	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3A**	QC Batch:	90209 -109
Sample #:	**345032**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	46	E	B,X
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	21	E	NJ,+
Tetratetracontane	7098-22-8	27	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3B**	QC Batch:	90210 -110
Sample #:	**345033**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	UJ,M	200	80.0
99-09-2	3-Nitroaniline	200 U	UJ,M	200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**14 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,C	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U	UJ,C	200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3B**	QC Batch:	90210 -110
Sample #:	**345033**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**47 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U	UJ,c	390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**11 J**		200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**23 J**	J,M	200	4.58
117-84-0	**Di-n-Octylphthalate**	**38 J**		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3B**	QC Batch:	90210 -110
Sample #:	**345033**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB3B**	QC Batch:	90210 -110
Sample #:	**345033**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	120	E	B,X
1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	84-64-0	26	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	26	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB3C**	QC Batch:	90209 -109
Sample #:	**345034**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	180 U		180	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	180 U		180	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	180 U		180	1.45
95-95-4	2,4,5-Trichlorophenol	180 U		180	3.67
88-06-2	2,4,6-Trichlorophenol	180 U		180	2.88
120-83-2	2,4-Dichlorophenol	180 U		180	3.87
105-67-9	2,4-Dimethylphenol	180 U		180	8.73
51-28-5	2,4-Dinitrophenol	350 U		350	3.52
121-14-2	2,4-Dinitrotoluene	180 U		180	3.47
606-20-2	2,6-Dinitrotoluene	180 U		180	30.5
91-58-7	2-Chloronaphthalene	180 U		180	2.53
95-57-8	2-Chlorophenol	180 U		180	2.21
91-57-6	2-Methylnaphthalene	180 U		180	3.01
95-48-7	2-Methylphenol	180 U		180	5.32
88-74-4	2-Nitroaniline	180 U		180	5.06
88-75-5	2-Nitrophenol	180 U		180	1.87
91-94-1	3,3'-Dichlorobenzidine	180 U		180	73.4
99-09-2	3-Nitroaniline	180 U		180	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	180 U		180	4.96
101-55-3	4-Bromophenyl Phenylether	180 U		180	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**		180	5.73
106-47-8	4-Chloroaniline	180 U	UJ,c	180	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	180 U		180	3.60
106-44-5	4-Methylphenol	180 U		180	7.01
100-01-6	4-Nitroaniline	180 U		180	7.98
100-02-7	4-Nitrophenol	350 U		350	3.11
83-32-9	Acenaphthene	180 U		180	1.89
208-96-8	Acenaphthylene	180 U		180	1.65
98-86-2	Acetophenone	180 U		180	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**37SB3C**	QC Batch:	90209 -109
Sample #:	**345034**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	180 U		180	5.08
1912-24-9	Atrazine	180 U		180	7.57
100-52-7	Benzaldehyde	180 U	VJc	180	4.46
56-55-3	Benzo (a) Anthracene	180 U		180	14.6
50-32-8	Benzo (a) Pyrene	180 U		180	6.28
205-99-2	Benzo (b) Fluoranthene	180 U		180	10.7
191-24-2	Benzo (g,h,i,) Perylene	180 U		180	9.59
207-08-9	Benzo (k) Fluoranthene	180 U		180	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	180 U		180	3.45
111-44-4	Bis (2-Chloroethyl) Ether	180 U		180	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**44 J**		180	2.28
85-68-7	Butyl Benzyl Phthalate	180 U		180	4.93
105-60-2	Caprolactam	350 U		350	7.02
86-74-8	Carbazole	180 U		180	6.71
218-01-9	Chrysene	180 U		180	11.2
53-70-3	Dibenzo (a,h) Anthracene	180 U		180	6.49
132-64-9	Dibenzofuran	180 U		180	3.48
84-66-2	**Diethylphthalate**	**17 J**	Bz	180	2.09
131-11-3	Dimethylphthalate	180 U		180	3.64
84-74-2	**Di-n-Butylphthalate**	**20 J**		180	4.20
117-84-0	Di-n-Octylphthalate	180 U		180	3.41
206-44-0	Fluoranthene	180 U		180	2.59
86-73-7	Fluorene	180 U		180	1.85
118-74-1	Hexachlorobenzene	180 U		180	2.76
87-68-3	Hexachlorobutadiene	180 U		180	4.26
77-47-4	Hexachlorocyclopentadiene	180 U		180	2.18
67-72-1	Hexachloroethane	180 U		180	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	180 U		180	4.31
78-59-1	Isophorone	180 U		180	1.90
91-20-3	Naphthalene	180 U		180	3.03
98-95-3	Nitrobenzene	180 U		180	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3C**	QC Batch:	90209 -109
Sample #:	**345034**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	180 U	180	3.62
86-30-6	N-Nitroso-di-Phenylamine	180 U	180	5.23
87-86-5	Pentachlorophenol	350 U	350	4.83
85-01-8	Phenanthrene	180 U	180	2.53
108-95-2	Phenol	180 U	180	4.36
129-00-0	Pyrene	180 U	180	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**37SB3C**	QC Batch:	90209 -109
Sample #:	**345034**	Anal. Batch:	207828
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	110	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	26	E	B,x
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	72	E	B,x
Erucylamide	112-84-5	450	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	270 U		270	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	410 U		410	3.84
121-14-2	**2,4-Dinitrotoluene**	**77 J**		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	270 U		270	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	80.0
99-09-2	3-Nitroaniline	210 U		210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,c	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U	UJ,c	210	8.70
100-02-7	4-Nitrophenol	410 U		410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U	UJ,c	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~210 UR~~	R,i	~~210~~	~~6.85~~
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~210 UR~~	R,i	~~210~~	~~11.7~~
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~210 UR~~	R,i	~~210~~	~~10.5~~
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~210 UR~~	R,i	~~210~~	~~16.1~~
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**86 J**		210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U	UJ,c	410	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~210 UR~~	R,i	~~210~~	~~7.08~~
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**21 J**	B,z	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**1100**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**4.0 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~210 UR~~	R,i	~~210~~	~~4.70~~
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

* See attached Statement of Data Qualifications.

* See dilution for these results, AB 12/10/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	**N-Nitroso-di-Phenylamine**	**21 J**	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**2.0 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	32	E	B,X
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-42-4)	24	E	NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 00:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90208 -109
Sample #:	**345035DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	6.2

Do not use. See neat analysis JS 12/15/03

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1000 U		1000	15.3
95-94-3	1,2,4,5-Tetrachloro-benzene	1000 U		1000	178
108-60-1	Bis (2-Chloroisopropyl)-Ether	1000 U		1000	8.18
95-95-4	2,4,5-Trichlorophenol	1000 U		1000	20.7
88-06-2	2,4,6-Trichlorophenol	1000 U		1000	16.2
120-83-2	2,4-Dichlorophenol	1000 U		1000	21.8
105-67-9	2,4-Dimethylphenol	1000 U		1000	49.2
51-28-5	2,4-Dinitrophenol	2100 U		2100	19.8
121-14-2	2,4-Dinitrotoluene	1000 U		1000	19.5
606-20-2	2,6-Dinitrotoluene	1000 U		1000	172
91-58-7	2-Chloronaphthalene	1000 U		1000	14.3
95-57-8	2-Chlorophenol	1000 U		1000	12.5
91-57-6	2-Methylnaphthalene	1000 U		1000	17.0
95-48-7	2-Methylphenol	1000 U		1000	30.0
88-74-4	2-Nitroaniline	1000 U		1000	28.5
88-75-5	2-Nitrophenol	1000 U		1000	10.5
91-94-1	3,3'-Dichlorobenzidine	1000 U		1000	414
99-09-2	3-Nitroaniline	1000 U		1000	206
534-52-1	4,6-Dinitro-2-Methylphenol	1000 U		1000	28.0
101-55-3	4-Bromophenyl Phenylether	1000 U		1000	21.0
59-50-7	4-Chloro-3-Methylphenol	1000 U		1000	32.3
106-47-8	4-Chloroaniline	1000 U	UJ,c	1000	7.81
7005-72-3	4-Chlorophenylphenyl-Ether	1000 U		1000	20.3
106-44-5	4-Methylphenol	1000 U		1000	39.5
100-01-6	4-Nitroaniline	1000 U	UJ,c	1000	45.0
100-02-7	4-Nitrophenol	2100 U		2100	17.5
83-32-9	Acenaphthene	1000 U		1000	10.7
208-96-8	Acenaphthylene	1000 U		1000	9.30
98-86-2	Acetophenone	1000 U		1000	11.8

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	6.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	1000 U		1000	28.6
1912-24-9	Atrazine	1000 U		1000	42.7
100-52-7	Benzaldehyde	1000 U	UJ,c	1000	25.1
56-55-3	Benzo (a) Anthracene	1000 U		1000	82.5
50-32-8	Benzo (a) Pyrene	1000 U		1000	35.4
205-99-2	Benzo (b) Fluoranthene	1000 U		1000	60.5
191-24-2	Benzo (g,h,i,) Perylene	1000 U		1000	54.1
207-08-9	Benzo (k) Fluoranthene	1000 U		1000	83.1
111-91-1	Bis (2-Chloroethoxy)-Methane	1000 U		1000	19.5
111-44-4	Bis (2-Chloroethyl) Ether	1000 U		1000	10.7
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**160 J**		1000	12.8
85-68-7	Butyl Benzyl Phthalate	1000 U		1000	27.8
105-60-2	Caprolactam	2100 U	UJ,c	2100	39.6
86-74-8	Carbazole	1000 U		1000	37.8
218-01-9	Chrysene	1000 U		1000	63.2
53-70-3	Dibenzo (a,h) Anthracene	1000 U		1000	36.6
132-64-9	Dibenzofuran	1000 U		1000	19.6
84-66-2	Diethylphthalate	1000 U		1000	11.8
131-11-3	Dimethylphthalate	1000 U		1000	20.5
84-74-2	**Di-n-Butylphthalate**	**330 J**		1000	23.7
117-84-0	Di-n-Octylphthalate	1000 U		1000	19.2
206-44-0	Fluoranthene	1000 U		1000	14.6
86-73-7	Fluorene	1000 U		1000	10.4
118-74-1	Hexachlorobenzene	1000 U		1000	15.6
87-68-3	Hexachlorobutadiene	1000 U		1000	24.0
77-47-4	Hexachlorocyclopentadiene	1000 U		1000	12.3
67-72-1	Hexachloroethane	1000 U		1000	14.5
193-39-5	Indeno (1,2,3-cd) Pyrene	1000 U		1000	24.3
78-59-1	Isophorone	1000 U		1000	10.7
91-20-3	Naphthalene	1000 U		1000	17.1
98-95-3	Nitrobenzene	1000 U		1000	19.8

* Use only these results, * 12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 08:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1A**	QC Batch:	90209 -109
Sample #:	**345035DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	6.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	1000 U	1000	20.4
86-30-6	N-Nitroso-di-Phenylamine	1000 U	1000	29.5
87-86-5	Pentachlorophenol	2100 U	2100	27.2
85-01-8	Phenanthrene	1000 U	1000	14.3
108-95-2	Phenol	1000 U	1000	24.6
129-00-0	Pyrene	1000 U	1000	9.18

Do not use
See neat analysis
12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U	UL,S	230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U	UL,S	230	3.67
120-83-2	2,4-Dichlorophenol	230 U	UL,S	230	4.93
105-67-9	2,4-Dimethylphenol	230 U	UL,S	230	11.1
51-28-5	2,4-Dinitrophenol	440 U	UL,S	440	4.48
121-14-2	**2,4-Dinitrotoluene**	**120 J**		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U	UL,S	230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U	UL,S	230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U	UL,S	230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	93.4
99-09-2	3-Nitroaniline	230 U		230	46.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U	UL,S	230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U	UL,S	230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U	UL,S	230	8.92
100-01-6	4-Nitroaniline	230 U	UJ,C	230	10.2
100-02-7	4-Nitrophenol	440 U	UL,S	440	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

	CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
	120-12-7	Anthracene	230 U		230	6.47
	1912-24-9	Atrazine	230 U		230	9.63
	100-52-7	Benzaldehyde	230 U	UJ,c	230	5.67
	56-55-3	Benzo (a) Anthracene	230 U		230	18.6
★	~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~230 UR~~	R,i	~~230~~	~~7.99~~
★	~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~230 UR~~	R,i	~~230~~	~~13.7~~
★	~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~230 UR~~	R,i	~~230~~	~~12.2~~
★	~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~230 UR~~	R,i	~~230~~	~~18.8~~
	111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
	111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
	117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**160 J**		230	2.90
	85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
	105-60-2	Caprolactam	440 U	UJ,c	440	8.93
	86-74-8	Carbazole	230 U		230	8.54
	218-01-9	Chrysene	230 U		230	14.3
★	~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~230 UR~~	R,i	~~230~~	~~8.26~~
	132-64-9	Dibenzofuran	230 U		230	4.42
	84-66-2	**Diethylphthalate**	**16 J**	B,Z	230	2.66
	131-11-3	Dimethylphthalate	230 U		230	4.63
	84-74-2	**Di-n-Butylphthalate**	**1800**		230	5.35
	117-84-0	Di-n-Octylphthalate	230 U		230	4.34
	206-44-0	Fluoranthene	230 U		230	3.29
	86-73-7	Fluorene	230 U		230	2.35
	118-74-1	Hexachlorobenzene	230 U		230	3.51
	87-68-3	Hexachlorobutadiene	230 U		230	5.42
	77-47-4	Hexachlorocyclopentadiene	230 U		230	2.77
	67-72-1	Hexachloroethane	230 U		230	3.27
★	~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~230 UR~~	R,i	~~230~~	~~5.49~~
	78-59-1	Isophorone	230 U		230	2.42
	91-20-3	Naphthalene	230 U		230	3.85
	98-95-3	Nitrobenzene	230 U		230	4.48

* See attached Statement of Data Qualifications.

★ See dilution analysis for these results, AS 12/15/03

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U		230	4.61
86-30-6	**N-Nitroso-di-Phenylamine**	**16 J**		230	6.65
87-86-5	Pentachlorophenol	440 U	UL,S	440	6.15
85-01-8	Phenanthrene	230 U		230	3.22
108-95-2	Phenol	230 U	UL,S	230	5.54
129-00-0	**Pyrene**	**3.0 J**		230	2.07

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	27	E	B,X
2 (5H)-Furanone	497-23-4	63	E	NJ,+
2-Fluoro-4-nitrophenol	403-19-0	25	E	NJ,+
2-Pentadecanone, 6,10,14-trimethyl-	502-69-2	40	E	NJ,+
Heneicosane	629-94-7	30	E	B,X
Hentriacontane	630-04-6	220	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	6.8

Do not use
See neat analysis
12/15/03

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1200 U		1200	16.7
95-94-3	1,2,4,5-Tetrachloro-benzene	1200 U		1200	195
108-60-1	Bis (2-Chloroisopropyl)-Ether	1200 U		1200	8.98
95-95-4	2,4,5-Trichlorophenol	1200 U		1200	22.7
88-06-2	2,4,6-Trichlorophenol	1200 U		1200	17.8
120-83-2	2,4-Dichlorophenol	1200 U		1200	23.9
105-67-9	2,4-Dimethylphenol	1200 U		1200	54.0
51-28-5	2,4-Dinitrophenol	2300 U		2300	21.8
121-14-2	2,4-Dinitrotoluene	1200 U		1200	21.4
606-20-2	2,6-Dinitrotoluene	1200 U		1200	188
91-58-7	2-Chloronaphthalene	1200 U		1200	15.6
95-57-8	2-Chlorophenol	1200 U		1200	13.7
91-57-6	2-Methylnaphthalene	1200 U		1200	18.6
95-48-7	2-Methylphenol	1200 U		1200	32.9
88-74-4	2-Nitroaniline	1200 U		1200	31.3
88-75-5	2-Nitrophenol	1200 U		1200	11.6
91-94-1	3,3'-Dichlorobenzidine	1200 U		1200	454
99-09-2	3-Nitroaniline	1200 U		1200	226
534-52-1	4,6-Dinitro-2-Methylphenol	1200 U		1200	30.7
101-55-3	4-Bromophenyl Phenylether	1200 U		1200	23.0
59-50-7	4-Chloro-3-Methylphenol	1200 U		1200	35.4
106-47-8	4-Chloroaniline	1200 U	UJ,C	1200	8.57
7005-72-3	4-Chlorophenylphenyl-Ether	1200 U		1200	22.2
106-44-5	4-Methylphenol	1200 U		1200	43.3
100-01-6	4-Nitroaniline	1200 U	UJ,C	1200	49.3
100-02-7	4-Nitrophenol	2300 U		2300	19.2
83-32-9	Acenaphthene	1200 U		1200	11.7
208-96-8	Acenaphthylene	1200 U		1200	10.2
98-86-2	Acetophenone	1200 U		1200	12.9

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	6.8

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	1200 U		1200	31.4
1912-24-9	Atrazine	1200 U		1200	46.8
100-52-7	Benzaldehyde	1200 U	UJ,c	1200	27.5
56-55-3	Benzo (a) Anthracene	1200 U		1200	90.4
50-32-8	Benzo (a) Pyrene	1200 U	UJ,i	1200	38.8
205-99-2	Benzo (b) Fluoranthene	1200 U	UJ,i	1200	66.4
191-24-2	Benzo (g,h,i,) Perylene	1200 U	UJ,i	1200	59.3
207-08-9	Benzo (k) Fluoranthene	1200 U	UJ,i	1200	91.1
111-91-1	Bis (2-Chloroethoxy)-Methane	1200 U		1200	21.4
111-44-4	Bis (2-Chloroethyl) Ether	1200 U		1200	11.8
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**270 J**		1200	14.1
85-68-7	Butyl Benzyl Phthalate	1200 U		1200	30.5
105-60-2	Caprolactam	2300 U	UJ,c	2300	43.4
86-74-8	Carbazole	1200 U		1200	41.5
218-01-9	Chrysene	1200 U		1200	69.4
53-70-3	Dibenzo (a,h) Anthracene	1200 U	UJ,i	1200	40.1
132-64-9	Dibenzofuran	1200 U		1200	21.5
84-66-2	**Diethylphthalate**	**40 J**	B,z	1200	12.9
131-11-3	Dimethylphthalate	1200 U		1200	22.5
84-74-2	**Di-n-Butylphthalate**	**2000**		1200	26.0
117-84-0	Di-n-Octylphthalate	1200 U		1200	21.1
206-44-0	Fluoranthene	1200 U		1200	16.0
86-73-7	Fluorene	1200 U		1200	11.4
118-74-1	Hexachlorobenzene	1200 U		1200	17.1
87-68-3	Hexachlorobutadiene	1200 U		1200	26.3
77-47-4	Hexachlorocyclopentadiene	1200 U		1200	13.5
67-72-1	Hexachloroethane	1200 U		1200	15.9
193-39-5	Indeno (1,2,3-cd) Pyrene	1200 U	UJ,i	1200	26.7
78-59-1	Isophorone	1200 U		1200	11.8
91-20-3	Naphthalene	1200 U		1200	18.7
98-95-3	Nitrobenzene	1200 U		1200	21.8

* Use only these results, * 12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD3**	QC Batch:	90209 -109
Sample #:	**345036DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	6.8

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	1200 U	1200	22.4
86-30-6	N-Nitroso-di-Phenylamine	1200 U	1200	32.3
87-86-5	Pentachlorophenol	2300 U	2300	29.9
85-01-8	Phenanthrene	1200 U	1200	15.6
108-95-2	Phenol	1200 U	1200	26.9
129-00-0	Pyrene	1200 U	1200	10.1

Do not use
See next analysis
12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1B**	QC Batch:	90209 -109
Sample #:	**345037**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**29 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	UJc	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U	UJc	200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1B**	QC Batch:	90209 -109
Sample #:	**345037**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**49 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U	UJ,c	390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**18 J**	B,Z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**38 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1B**	QC Batch:	90209 -109
Sample #:	**345037**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1B**	QC Batch:	90209 -109
Sample #:	**345037**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	120	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	51	E	B,x
2-Ethyl-1-Hexanol	104-76-7	27	E	NJ,+
3-Hexene-2,5-dione	4436-75-3	210	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	42	E	NJ,+
Eicosane	112-95-8	27	E	B,x
Erucylamide	112-84-5	540	E	NJ,+
Hexatriacontane	630-06-8	42	E	NJ,+
Nonadecane, 9-methyl-	13287-24-6	23	E	NJ,+
Octacosane	630-02-4	36	E	NJ,+
Octadecane, 3-ethyl-5-(2-ethylbutyl)-	55282-12-7	29	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1C**	QC Batch:	90209 -109
Sample #:	**345038**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	180 U		180	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	180 U		180	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	180 U		180	1.45
95-95-4	2,4,5-Trichlorophenol	180 U		180	3.67
88-06-2	2,4,6-Trichlorophenol	180 U		180	2.88
120-83-2	2,4-Dichlorophenol	180 U		180	3.87
105-67-9	2,4-Dimethylphenol	180 U		180	8.73
51-28-5	2,4-Dinitrophenol	350 U		350	3.52
121-14-2	2,4-Dinitrotoluene	180 U		180	3.47
606-20-2	2,6-Dinitrotoluene	180 U		180	30.5
91-58-7	2-Chloronaphthalene	180 U		180	2.53
95-57-8	2-Chlorophenol	180 U		180	2.21
91-57-6	2-Methylnaphthalene	180 U		180	3.01
95-48-7	2-Methylphenol	180 U		180	5.32
88-74-4	2-Nitroaniline	180 U		180	5.06
88-75-5	2-Nitrophenol	180 U		180	1.87
91-94-1	3,3'-Dichlorobenzidine	180 U		180	73.4
99-09-2	3-Nitroaniline	180 U		180	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	180 U		180	4.96
101-55-3	4-Bromophenyl Phenylether	180 U		180	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**12 J**		180	5.73
106-47-8	4-Chloroaniline	180 U	UJ,c	180	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	180 U		180	3.60
106-44-5	4-Methylphenol	180 U		180	7.01
100-01-6	4-Nitroaniline	180 U	UJ,c	180	7.98
100-02-7	4-Nitrophenol	350 U		350	3.11
83-32-9	Acenaphthene	180 U		180	1.89
208-96-8	Acenaphthylene	180 U		180	1.65
98-86-2	Acetophenone	180 U		180	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1C**	QC Batch:	90209 -109
Sample #:	**345038**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	180 U		180	5.08
1912-24-9	Atrazine	180 U		180	7.57
100-52-7	Benzaldehyde	180 U	UJ,c	180	4.46
56-55-3	Benzo (a) Anthracene	180 U		180	14.6
50-32-8	Benzo (a) Pyrene	180 U		180	6.28
205-99-2	Benzo (b) Fluoranthene	180 U		180	10.7
191-24-2	Benzo (g,h,i,) Perylene	180 U		180	9.59
207-08-9	Benzo (k) Fluoranthene	180 U		180	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	180 U		180	3.45
111-44-4	Bis (2-Chloroethyl) Ether	180 U		180	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**42 J**		180	2.28
85-68-7	Butyl Benzyl Phthalate	180 U		180	4.93
105-60-2	Caprolactam	350 U	UJ,c	350	7.02
86-74-8	Carbazole	180 U		180	6.71
218-01-9	Chrysene	180 U		180	11.2
53-70-3	Dibenzo (a,h) Anthracene	180 U		180	6.49
132-64-9	Dibenzofuran	180 U		180	3.48
84-66-2	**Diethylphthalate**	**13 J**	B,z	180	2.09
131-11-3	Dimethylphthalate	180 U		180	3.64
84-74-2	**Di-n-Butylphthalate**	**31 J**		180	4.20
117-84-0	Di-n-Octylphthalate	180 U		180	3.41
206-44-0	Fluoranthene	180 U		180	2.59
86-73-7	Fluorene	180 U		180	1.85
118-74-1	Hexachlorobenzene	180 U		180	2.76
87-68-3	Hexachlorobutadiene	180 U		180	4.26
77-47-4	Hexachlorocyclopentadiene	180 U		180	2.18
67-72-1	Hexachloroethane	180 U		180	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	180 U		180	4.31
78-59-1	Isophorone	180 U		180	1.90
91-20-3	Naphthalene	180 U		180	3.03
98-95-3	Nitrobenzene	180 U		180	3.52

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB1C**	QC Batch:	90209 -109
Sample #:	**345038**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	180 U	180	3.62
86-30-6	N-Nitroso-di-Phenylamine	180 U	180	5.23
87-86-5	Pentachlorophenol	350 U	350	4.83
85-01-8	Phenanthrene	180 U	180	2.53
108-95-2	Phenol	180 U	180	4.36
129-00-0	Pyrene	180 U	180	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB1C**	QC Batch:	90209 -109
Sample #:	**345038**	Anal. Batch:	208293
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	80	E	B,x
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	30	E	B,x
2,6,10,14,18,22-Tetracosahexaene,2,6,10,15,19,23-h	111-02-4	55	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	21	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	26	E	NJ,+
Eicosane	112-95-8	29	E	B,x
Erucylamide	112-84-5	380	E	NJ,+
Heneicosane	629-94-7	39	E	B,x
Heptacosane	593-49-7	31	E	NJ,+
Nonadecane, 9-methyl-	13287-24-6	45	E	NJ,+
Octacosane	630-02-4	42	E	NJ,+
Tetratriacontane	14167-59-0	34	E	B,x

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U		420	4.16
121-14-2	**2,4-Dinitrotoluene**	**120 J**		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U	UJ,c	220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,C	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~220 UR~~	~~R,1~~	~~220~~	~~7.42~~
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~220 UR~~	~~R,1~~	~~220~~	~~12.7~~
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~220 UR~~	~~R,1~~	~~220~~	~~11.3~~
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~220 UR~~	~~R,1~~	~~220~~	~~17.4~~
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**290**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**44 J**	B,X	220	5.82
105-60-2	Caprolactam	420 U	UJ,C	420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~220 UR~~	~~R,1~~	~~220~~	~~7.67~~
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**18 J**	B,Z	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**1700**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**8.0 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~220 UR~~	~~R,1~~	~~220~~	~~5.10~~
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

* See attached Statement of Data Qualifications.

★ See dilution analysis results, ★ 12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**32 J**	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	**Phenanthrene**	**3.0 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**4.0 J**	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	28	E	B,X
2-Cyclopenten-1-one, 3-methyl-2-(1,3-pentadienyl)-,	22610-80-6	23	E	NJ,+
Docosane	629-97-0	230	E	NJ,+
Eicosane	112-95-8	180	E	B,X
Octacosane	630-02-4	410	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	6.4

Do not use
See neat analysis

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1100 U		1100	15.7
95-94-3	1,2,4,5-Tetrachloro-benzene	1100 U		1100	184
108-60-1	Bis (2-Chloroisopropyl)-Ether	1100 U		1100	8.45
95-95-4	2,4,5-Trichlorophenol	1100 U		1100	21.4
88-06-2	2,4,6-Trichlorophenol	1100 U		1100	16.8
120-83-2	2,4-Dichlorophenol	1100 U		1100	22.5
105-67-9	2,4-Dimethylphenol	1100 U		1100	50.8
51-28-5	2,4-Dinitrophenol	2200 U		2200	20.5
121-14-2	2,4-Dinitrotoluene	1100 U		1100	20.2
606-20-2	2,6-Dinitrotoluene	1100 U		1100	177
91-58-7	2-Chloronaphthalene	1100 U		1100	14.7
95-57-8	2-Chlorophenol	1100 U		1100	12.9
91-57-6	2-Methylnaphthalene	1100 U		1100	17.5
95-48-7	2-Methylphenol	1100 U		1100	31.0
88-74-4	2-Nitroaniline	1100 U		1100	29.4
88-75-5	2-Nitrophenol	1100 U		1100	10.9
91-94-1	3,3'-Dichlorobenzidine	1100 U		1100	427
99-09-2	3-Nitroaniline	1100 U		1100	213
534-52-1	4,6-Dinitro-2-Methylphenol	1100 U		1100	28.9
101-55-3	4-Bromophenyl Phenylether	1100 U		1100	21.6
59-50-7	4-Chloro-3-Methylphenol	1100 U		1100	33.3
106-47-8	4-Chloroaniline	1100 U	UJ,c	1100	8.06
7005-72-3	4-Chlorophenylphenyl-Ether	1100 U		1100	20.9
106-44-5	4-Methylphenol	1100 U		1100	40.8
100-01-6	4-Nitroaniline	1100 U	UJ,c	1100	46.4
100-02-7	4-Nitrophenol	2200 U		2200	18.1
83-32-9	Acenaphthene	1100 U		1100	11.0
208-96-8	Acenaphthylene	1100 U		1100	9.60
98-86-2	Acetophenone	1100 U		1100	12.2

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	6.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	1100 U		1100	29.6
1912-24-9	Atrazine	1100 U		1100	44.0
100-52-7	Benzaldehyde	1100 U	U,c	1100	25.9
56-55-3	Benzo (a) Anthracene	1100 U		1100	85.1
50-32-8	Benzo (a) Pyrene	1100 U		1100	36.5
205-99-2	Benzo (b) Fluoranthene	1100 U		1100	62.5
191-24-2	Benzo (g,h,i,) Perylene	1100 U		1100	55.8
207-08-9	Benzo (k) Fluoranthene	1100 U		1100	85.8
111-91-1	Bis (2-Chloroethoxy)-Methane	1100 U		1100	20.1
111-44-4	Bis (2-Chloroethyl) Ether	1100 U		1100	11.1
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**320 J**		1100	13.2
85-68-7	Butyl Benzyl Phthalate	1100 U		1100	28.7
105-60-2	Caprolactam	2200 U	U,c	2200	40.8
86-74-8	Carbazole	1100 U		1100	39.0
218-01-9	Chrysene	1100 U		1100	65.3
53-70-3	Dibenzo (a,h) Anthracene	1100 U		1100	37.8
132-64-9	Dibenzofuran	1100 U		1100	20.2
84-66-2	**Diethylphthalate**	**20 J**	B,z	1100	12.2
131-11-3	Dimethylphthalate	1100 U		1100	21.2
84-74-2	**Di-n-Butylphthalate**	**1300**		1100	24.4
117-84-0	Di-n-Octylphthalate	1100 U		1100	19.8
206-44-0	Fluoranthene	1100 U		1100	15.0
86-73-7	Fluorene	1100 U		1100	10.8
118-74-1	Hexachlorobenzene	1100 U		1100	16.1
87-68-3	Hexachlorobutadiene	1100 U		1100	24.8
77-47-4	Hexachlorocyclopentadiene	1100 U		1100	12.7
67-72-1	Hexachloroethane	1100 U		1100	14.9
193-39-5	Indeno (1,2,3-cd) Pyrene	1100 U		1100	25.1
78-59-1	Isophorone	1100 U		1100	11.1
91-20-3	Naphthalene	1100 U		1100	17.6
98-95-3	Nitrobenzene	1100 U		1100	20.5

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3A**	QC Batch:	90209 -109
Sample #:	**345039DL**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	6.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	1100 U	1100	21.1
86-30-6	N-Nitroso-di-Phenylamine	1100 U	1100	30.4
87-86-5	Pentachlorophenol	2200 U	2200	28.1
85-01-8	Phenanthrene	1100 U	1100	14.7
108-95-2	Phenol	1100 U	1100	25.3
129-00-0	Pyrene	1100 U	1100	9.47

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See neat analysis
12/15/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3B**	QC Batch:	90209 -109
Sample #:	**345040**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.45
95-95-4	2,4,5-Trichlorophenol	200 U		200	3.67
88-06-2	2,4,6-Trichlorophenol	200 U		200	2.88
120-83-2	2,4-Dichlorophenol	200 U		200	3.87
105-67-9	2,4-Dimethylphenol	200 U		200	8.73
51-28-5	2,4-Dinitrophenol	380 U		380	3.52
121-14-2	2,4-Dinitrotoluene	200 U		200	3.47
606-20-2	2,6-Dinitrotoluene	200 U		200	30.5
91-58-7	2-Chloronaphthalene	200 U		200	2.53
95-57-8	2-Chlorophenol	200 U		200	2.21
91-57-6	2-Methylnaphthalene	200 U		200	3.01
95-48-7	2-Methylphenol	200 U		200	5.32
88-74-4	2-Nitroaniline	200 U		200	5.06
88-75-5	2-Nitrophenol	200 U		200	1.87
91-94-1	3,3'-Dichlorobenzidine	200 U		200	73.4
99-09-2	3-Nitroaniline	200 U		200	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	4.96
101-55-3	4-Bromophenyl Phenylether	200 U		200	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**9.0 J**		200	5.73
106-47-8	4-Chloroaniline	200 U	UJ,c	200	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.60
106-44-5	4-Methylphenol	200 U		200	7.01
100-01-6	4-Nitroaniline	200 U	UJ,c	200	7.98
100-02-7	4-Nitrophenol	380 U		380	3.11
83-32-9	Acenaphthene	200 U		200	1.89
208-96-8	Acenaphthylene	200 U		200	1.65
98-86-2	Acetophenone	200 U		200	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3B**	QC Batch:	90209 -109
Sample #:	**345040**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.08
1912-24-9	Atrazine	200 U		200	7.57
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.46
56-55-3	Benzo (a) Anthracene	200 U		200	14.6
50-32-8	Benzo (a) Pyrene	200 U		200	6.28
205-99-2	Benzo (b) Fluoranthene	200 U		200	10.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	9.59
207-08-9	Benzo (k) Fluoranthene	200 U		200	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.45
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**45 J**		200	2.28
85-68-7	Butyl Benzyl Phthalate	200 U		200	4.93
105-60-2	Caprolactam	380 U	UJ,c	380	7.02
86-74-8	Carbazole	200 U		200	6.71
218-01-9	Chrysene	200 U		200	11.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	6.49
132-64-9	Dibenzofuran	200 U		200	3.48
84-66-2	**Diethylphthalate**	**14 J**	B,z	200	2.09
131-11-3	Dimethylphthalate	200 U		200	3.64
84-74-2	**Di-n-Butylphthalate**	**27 J**		200	4.20
117-84-0	Di-n-Octylphthalate	200 U		200	3.41
206-44-0	Fluoranthene	200 U		200	2.59
86-73-7	Fluorene	200 U		200	1.85
118-74-1	Hexachlorobenzene	200 U		200	2.76
87-68-3	Hexachlorobutadiene	200 U		200	4.26
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.18
67-72-1	Hexachloroethane	200 U		200	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.31
78-59-1	Isophorone	200 U		200	1.90
91-20-3	Naphthalene	200 U		200	3.03
98-95-3	Nitrobenzene	200 U		200	3.52

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3B**	QC Batch:	90209 -109
Sample #:	**345040**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.62
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.23
87-86-5	Pentachlorophenol	380 U	380	4.83
85-01-8	Phenanthrene	200 U	200	2.53
108-95-2	Phenol	200 U	200	4.36
129-00-0	Pyrene	200 U	200	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3B**	QC Batch:	90209 -109
Sample #:	**345040**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	87
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	62	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	35	E	B,X
2,6,10-Dodecatriene-1-ol, 3,7,11-trimethyl-	4602-84-0	40	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	23	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	21	E	NJ,+
Docosane	629-97-0	33	E	NJ,+
Erucylamide	112-84-5	310	E	NJ,+
Heneicosane	629-94-7	21	E	B,X
Tetratriacontane	14167-59-0	33	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3C**	QC Batch:	90209 -109
Sample #:	**345041**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	180 U		180	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	180 U		180	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	180 U		180	1.45
95-95-4	2,4,5-Trichlorophenol	180 U		180	3.67
88-06-2	2,4,6-Trichlorophenol	180 U		180	2.88
120-83-2	2,4-Dichlorophenol	180 U		180	3.87
105-67-9	2,4-Dimethylphenol	180 U		180	8.73
51-28-5	2,4-Dinitrophenol	360 U		360	3.52
121-14-2	2,4-Dinitrotoluene	180 U		180	3.47
606-20-2	2,6-Dinitrotoluene	180 U		180	30.5
91-58-7	2-Chloronaphthalene	180 U		180	2.53
95-57-8	2-Chlorophenol	180 U		180	2.21
91-57-6	2-Methylnaphthalene	180 U		180	3.01
95-48-7	2-Methylphenol	180 U		180	5.32
88-74-4	2-Nitroaniline	180 U		180	5.06
88-75-5	2-Nitrophenol	180 U		180	1.87
91-94-1	3,3'-Dichlorobenzidine	180 U		180	73.4
99-09-2	3-Nitroaniline	180 U		180	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	180 U		180	4.96
101-55-3	4-Bromophenyl Phenylether	180 U		180	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**17 J**		180	5.73
106-47-8	4-Chloroaniline	180 U	UJ,c	180	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	180 U		180	3.60
106-44-5	4-Methylphenol	180 U		180	7.01
100-01-6	4-Nitroaniline	180 U	UJ,c	180	7.98
100-02-7	4-Nitrophenol	360 U		360	3.11
83-32-9	Acenaphthene	180 U		180	1.89
208-96-8	Acenaphthylene	180 U		180	1.65
98-86-2	Acetophenone	180 U		180	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3C**	QC Batch:	90209 -109
Sample #:	**345041**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	180 U		180	5.08
1912-24-9	Atrazine	180 U		180	7.57
100-52-7	Benzaldehyde	180 U	VJ,c	180	4.46
56-55-3	Benzo (a) Anthracene	180 U		180	14.6
50-32-8	Benzo (a) Pyrene	180 U		180	6.28
205-99-2	Benzo (b) Fluoranthene	180 U		180	10.7
191-24-2	Benzo (g,h,i,) Perylene	180 U		180	9.59
207-08-9	Benzo (k) Fluoranthene	180 U		180	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	180 U		180	3.45
111-44-4	Bis (2-Chloroethyl) Ether	180 U		180	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**43 J**		180	2.28
85-68-7	Butyl Benzyl Phthalate	180 U		180	4.93
105-60-2	Caprolactam	360 U	VJ,c	360	7.02
86-74-8	Carbazole	180 U		180	6.71
218-01-9	Chrysene	180 U		180	11.2
53-70-3	Dibenzo (a,h) Anthracene	180 U		180	6.49
132-64-9	Dibenzofuran	180 U		180	3.48
84-66-2	**Diethylphthalate**	**13 J**	B,z	180	2.09
131-11-3	Dimethylphthalate	180 U		180	3.64
84-74-2	**Di-n-Butylphthalate**	**24 J**		180	4.20
117-84-0	Di-n-Octylphthalate	180 U		180	3.41
206-44-0	Fluoranthene	180 U		180	2.59
86-73-7	Fluorene	180 U		180	1.85
118-74-1	Hexachlorobenzene	180 U		180	2.76
87-68-3	Hexachlorobutadiene	180 U		180	4.26
77-47-4	Hexachlorocyclopentadiene	180 U		180	2.18
67-72-1	Hexachloroethane	180 U		180	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	180 U		180	4.31
78-59-1	Isophorone	180 U		180	1.90
91-20-3	Naphthalene	180 U		180	3.03
98-95-3	Nitrobenzene	180 U		180	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB3C**	QC Batch:	90209 -109
Sample #:	**345041**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	180 U	180	3.62
86-30-6	N-Nitroso-di-Phenylamine	180 U	180	5.23
87-86-5	Pentachlorophenol	360 U	360	4.83
85-01-8	Phenanthrene	180 U	180	2.53
108-95-2	Phenol	180 U	180	4.36
129-00-0	Pyrene	180 U	180	1.63

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB3C**	QC Batch:	90209 -109
Sample #:	**345041**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	92
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	79	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	36	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	70	E	B,X
3-Hexene-2,5-dione	4436-75-3	85	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	25	E	NJ,+
Ditriacontane	544-85-4	23	E	NJ,+
Docosane	629-97-0	32	E	NJ,+
Heneicosane	629-94-7	27	E	B,X
Tetratriacontane	14167-59-0	31	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB2A**	QC Batch:	90209 -109
Sample #:	**345042**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**15 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,c	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U	UJ,c	200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB2A**	QC Batch:	90209 -109
Sample #:	**345042**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**46 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U	UJ,c	390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**14 J**	B,z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**26 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2A**	QC Batch:	90209 -109
Sample #:	**345042**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB2A**	QC Batch:	90209 -109
Sample #:	**345042**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	300	E	B,X
1-Phenanthrenecarboxylic acid, 1,2,3,4,4a,9,10,10	1235-74-1	120	E	NJ,+
1R-.alpha.-Pinene	7785-70-8	70	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-42-4)	22	E	NJ,+
Ditriacontane	544-85-4	24	E	NJ,+
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10,15,18-pen	1000163047 (1000163-04-7)	47	E	NJ,+
Eicosane	112-95-8	28	E	B,X
Tetratriacontane	14167-59-0	29	E	B,X
a-Pinene	80-56-8	230	E	NJ,+
beta-Pinene	127-91-3	35	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**QSB2B**	QC Batch:	90209 -109
Sample #:	**345043**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**15 J**		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,c	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U	UJ,c	200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2B**	QC Batch:	90209 -109
Sample #:	**345043**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**45 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U	UJ,c	390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**13 J**	B,z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**26 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2B**	QC Batch:	90209 -109
Sample #:	**345043**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2B**	QC Batch:	90209 -109
Sample #:	**345043**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	40	E	B,X
10-Methylnonadecane	56862-62-5	27	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	67	E	B,X
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (1000143-92-4)	23	E	NJ,+
7-Nonenamide	90949-53-4	77	E	NJ,+
Docosa-2,6,10,14,18-pentaen-22-al,2,6,10,15,18-pen	1000163047 (1000163-04-7)	49	E	NJ,+
Erucylamide	112-84-5	400	E	NJ,+
Heneicosane	629-94-7	29	E	B,X
Heptadecane, 9-octyl-	7225-64-1	36	E	NJ,+
Octacosane	630-02-4	45	E	NJ,+
Tetratriacontane	14167-59-0	42	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2C**	QC Batch:	90209 -109
Sample #:	**345044**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	190 U		190	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	190 U		190	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	190 U		190	1.45
95-95-4	2,4,5-Trichlorophenol	190 U		190	3.67
88-06-2	2,4,6-Trichlorophenol	190 U		190	2.88
120-83-2	2,4-Dichlorophenol	190 U		190	3.87
105-67-9	2,4-Dimethylphenol	190 U		190	8.73
51-28-5	2,4-Dinitrophenol	360 U		360	3.52
121-14-2	2,4-Dinitrotoluene	190 U		190	3.47
606-20-2	2,6-Dinitrotoluene	190 U		190	30.5
91-58-7	2-Chloronaphthalene	190 U		190	2.53
95-57-8	2-Chlorophenol	190 U		190	2.21
91-57-6	2-Methylnaphthalene	190 U		190	3.01
95-48-7	2-Methylphenol	190 U		190	5.32
88-74-4	2-Nitroaniline	190 U		190	5.06
88-75-5	2-Nitrophenol	190 U		190	1.87
91-94-1	3,3'-Dichlorobenzidine	190 U		190	73.4
99-09-2	3-Nitroaniline	190 U		190	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	190 U		190	4.96
101-55-3	4-Bromophenyl Phenylether	190 U		190	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**10 J**		190	5.73
106-47-8	4-Chloroaniline	190 U	UJ,c	190	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	190 U		190	3.60
106-44-5	4-Methylphenol	190 U		190	7.01
100-01-6	4-Nitroaniline	190 U	UJ,c	190	7.98
100-02-7	4-Nitrophenol	360 U		360	3.11
83-32-9	Acenaphthene	190 U		190	1.89
208-96-8	Acenaphthylene	190 U		190	1.65
98-86-2	Acetophenone	190 U		190	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2C**	QC Batch:	90209 -109
Sample #:	**345044**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	190 U		190	5.08
1912-24-9	Atrazine	190 U		190	7.57
100-52-7	Benzaldehyde	190 U	UJ,C	190	4.46
56-55-3	Benzo (a) Anthracene	190 U		190	14.6
50-32-8	Benzo (a) Pyrene	190 U		190	6.28
205-99-2	Benzo (b) Fluoranthene	190 U		190	10.7
191-24-2	Benzo (g,h,i,) Perylene	190 U		190	9.59
207-08-9	Benzo (k) Fluoranthene	190 U		190	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	190 U		190	3.45
111-44-4	Bis (2-Chloroethyl) Ether	190 U		190	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**44 J**		190	2.28
85-68-7	Butyl Benzyl Phthalate	190 U		190	4.93
105-60-2	Caprolactam	360 U	UJ,C	360	7.02
86-74-8	Carbazole	190 U		190	6.71
218-01-9	Chrysene	190 U		190	11.2
53-70-3	Dibenzo (a,h) Anthracene	190 U		190	6.49
132-64-9	Dibenzofuran	190 U		190	3.48
84-66-2	**Diethylphthalate**	**11 J**	B,Z	190	2.09
131-11-3	Dimethylphthalate	190 U		190	3.64
84-74-2	**Di-n-Butylphthalate**	**23 J**		190	4.20
117-84-0	Di-n-Octylphthalate	190 U		190	3.41
206-44-0	Fluoranthene	190 U		190	2.59
86-73-7	Fluorene	190 U		190	1.85
118-74-1	Hexachlorobenzene	190 U		190	2.76
87-68-3	Hexachlorobutadiene	190 U		190	4.26
77-47-4	Hexachlorocyclopentadiene	190 U		190	2.18
67-72-1	Hexachloroethane	190 U		190	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	190 U		190	4.31
78-59-1	Isophorone	190 U		190	1.90
91-20-3	Naphthalene	190 U		190	3.03
98-95-3	Nitrobenzene	190 U		190	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**QSB2C**	QC Batch:	90209 -109
Sample #:	**345044**	Anal. Batch:	208294
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	190 U	190	3.62
86-30-6	N-Nitroso-di-Phenylamine	190 U	190	5.23
87-86-5	Pentachlorophenol	360 U	360	4.83
85-01-8	Phenanthrene	190 U	190	2.53
108-95-2	Phenol	190 U	190	4.36
129-00-0	Pyrene	190 U	190	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
		Prep. Method:	
Submittal #:	**36440-2**	Analyzed:	10/16/03 JMK1
Submittal:	Delivery Order 0046 RAAP	Anal. Method:	USEPA-8270C
		QC Batch:	90209 -109
Sample ID:	**QSB2C**	Anal. Batch:	208294
Sample #:	**345044**	Percent Solids:	91
Matrix:	Soil	Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	69	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	33	E	B,X
2,6,10-Dodecatrien-1-ol, 3,7,11-trimethyl-, acetate	4128-17-0	40	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (10001143-92-4)	19	E	NJ,+
Erucylamide	112-84-5	360	E	NJ,+
Heneicosane	629-94-7	23	E	B,X
Heptadecane	629-78-7	24	E	NJ,+
Hexatriacontane	630-06-8	27	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**EQB1**	QC Batch:	89818 -108
Sample #:	**345045**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U	5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U	5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U	5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U	5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U	5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U	5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U	5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U	5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U	5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U	5.0	0.005
95-57-8	2-Chlorophenol	5.0 U	5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U	5.0	0.084
95-48-7	2-Methylphenol	5.0 U	5.0	0.007
88-74-4	2-Nitroaniline	5.0 U	5.0	0.010
88-75-5	2-Nitrophenol	5.0 U	5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U	5.0	0.058
99-09-2	3-Nitroaniline	5.0 U	5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U	5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U	5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U	5.0	0.018
106-47-8	4-Chloroaniline	5.0 U	5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U	5.0	0.015
106-44-5	4-Methylphenol	5.0 U	5.0	0.014
100-01-6	4-Nitroaniline	5.0 U	5.0	0.070
100-02-7	4-Nitrophenol	10 U	10	0.134
83-32-9	Acenaphthene	5.0 U	5.0	0.008
208-96-8	Acenaphthylene	5.0 U	5.0	0.007
98-86-2	Acetophenone	5.0 U	5.0	0.011

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**EQB1**	QC Batch:	89818 -108
Sample #:	**345045**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U	UJ,c	5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1.0 J**	B,z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.96 J**		5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,l	5.0	0.024
86-74-8	Carbazole	5.0 U		5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	**Diethylphthalate**	**0.10 J**	B,z	5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U		5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB1**	QC Batch:	89818 -108
Sample #:	**345045**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**	Prepared:	10/08/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	
		Analyzed:	10/17/03 JMK1
Sample ID:	**EQB1**	Anal. Method:	USEPA-8270C
Sample #:	**345045**	QC Batch:	89818 -108
Matrix:	QC Water	Anal. Batch:	207854
		Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	7.08	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.60	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	1.34	E	NJ,+
Eicosane	112-95-8	0.80	E	NJ,+
Heneicosane	629-94-7	0.59	E	NJ,+
Nonacosane	630-03-5	0.86	E	NJ,+
Pentadecane, 8-heptyl-	71005-15-7	0.53	E	NJ,+
Tetratriacontane	14167-59-0	0.64	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/13/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB1C**	QC Batch:	90138 -110
Sample #:	**345028**	Anal. Batch:	208174
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	240 U		240	13.9
120-12-7	Anthracene	24 U		24	0.840
56-55-3	Benzo (a) Anthracene	24 U	UJ,1	24	0.960
50-32-8	Benzo (a) Pyrene	24 U		24	1.20
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.56
191-24-2	Benzo (g,h,i,) Perylene	24 U		24	15.0
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.20
218-01-9	Chrysene	24 U		24	1.44
53-70-3	Dibenzo (a,h) Anthracene	24 U	UJ,1	24	1.68
206-44-0	Fluoranthene	24 U		24	2.04
86-73-7	Fluorene	24 U		24	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	24 U		24	0.720
129-00-0	Pyrene	24 U	UJ,1	24	1.08

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Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**	Prepared:	10/13/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8310
		Analyzed:	10/24/03 by TAJ
Sample ID:	**37SB2A**	Anal. Method:	USEPA-8310
Sample #:	**345029**	QC Batch:	90708 -113
Matrix:	Soil	Anal. Batch:	209020
Unit:	ug/kg dry	Percent Solids:	63
		Dilution Factor:	1.6

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	160 U	UJ,s	160	15.0
208-96-8	Acenaphthylene	330 U	UJ,s	330	18.6
120-12-7	**Anthracene**	**2.4 J**	J,s	33	1.12
56-55-3	Benzo (a) Anthracene	33 U	UJ,s	33	1.28
50-32-8	Benzo (a) Pyrene	33 U	UJ,s	33	1.60
205-99-2	**Benzo (b) Fluoranthene**	**7.6 J**	J,d	33	2.08
191-24-2	Benzo (g,h,i,) Perylene	33 U	UJ,s	33	20.0
207-08-9	**Benzo (k) Fluoranthene**	**5.5 J**	J,d	33	1.60
218-01-9	**Chrysene**	**12 J**	J,s	33	1.92
53-70-3	Dibenzo (a,h) Anthracene	33 U	UJ,m	33	2.24
206-44-0	**Fluoranthene**	**70**	J,m	33	2.72
86-73-7	Fluorene	33 U	UJ,s	33	2.08
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**8.1 J**	J,s	33	1.12
91-20-3	Naphthalene	160 U	UJ,s	160	12.6
85-01-8	**Phenanthrene**	**18 J**	J,s	33	0.960
129-00-0	**Pyrene**	**59**	J,m	33	1.44

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-2**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**37SB2B**
Sample #:	**345030**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/02/03 @ 09:45
Sampler:	B.F. & J.S.
Received:	10/03/03 @ 09:10
Prepared:	10/13/03 by DJM
Prep. Method:	USEPA-8310
Analyzed:	10/24/03 by TAJ
Anal. Method:	USEPA-8310
QC Batch:	90708 -113
Anal. Batch:	209020
Percent Solids:	85
Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U	UJ,I	25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**	Prepared:	10/13/03 by DJM
Submittal:	Delivery Order 0046	Prep. Method:	USEPA-8310
	RAAP	Analyzed:	10/24/03 by TAJ
Sample ID:	**37SB2C**	Anal. Method:	USEPA-8310
Sample #:	**345031**	QC Batch:	90708 -113
Matrix:	Soil	Anal. Batch:	209020
Unit:	ug/kg dry	Percent Solids:	86
		Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	240 U		240	13.9
120-12-7	Anthracene	24 U		24	0.840
56-55-3	Benzo (a) Anthracene	24 U		24	0.960
50-32-8	Benzo (a) Pyrene	24 U		24	1.20
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.56
191-24-2	Benzo (g,h,i,) Perylene	24 U		24	15.0
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.20
218-01-9	Chrysene	24 U		24	1.44
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.68
206-44-0	Fluoranthene	24 U	UJ,1	24	2.04
86-73-7	Fluorene	24 U		24	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	24 U		24	0.720
129-00-0	Pyrene	24 U		24	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB3A**	QC Batch:	90708 -113
Sample #:	**345032**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.3
208-96-8	Acenaphthylene	240 U		240	12.8
120-12-7	Anthracene	24 U		24	0.770
56-55-3	Benzo (a) Anthracene	24 U		24	0.880
50-32-8	Benzo (a) Pyrene	24 U		24	1.10
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.43
191-24-2	Benzo (g,h,i,) Perylene	24 U		24	13.8
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.10
218-01-9	Chrysene	24 U		24	1.32
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.54
206-44-0	**Fluoranthene**	**2.2 J**	J,1	24	1.87
86-73-7	Fluorene	24 U		24	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	24 U		24	0.660
129-00-0	**Pyrene**	**1.8 J**		24	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB3B**	QC Batch:	90709 -114
Sample #:	**345033**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	250 U	250	13.9
120-12-7	Anthracene	25 U	25	0.840
56-55-3	Benzo (a) Anthracene	25 U	25	0.960
50-32-8	Benzo (a) Pyrene	25 U	25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U	25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U	25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U	25	1.20
218-01-9	Chrysene	25 U	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	25	1.68
206-44-0	Fluoranthene	25 U	25	2.04
86-73-7	Fluorene	25 U	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U	25	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	Phenanthrene	25 U	25	0.720
129-00-0	Pyrene	21 U	21	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**37SB3C**	QC Batch:	90708 -113
Sample #:	**345034**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	UJ,S	110	10.3
208-96-8	Acenaphthylene	230 U		230	12.8
120-12-7	Anthracene	23 U		23	0.770
56-55-3	Benzo (a) Anthracene	23 U		23	0.880
50-32-8	Benzo (a) Pyrene	23 U		23	1.10
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.43
191-24-2	Benzo (g,h,i,) Perylene	23 U		23	13.8
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.10
218-01-9	Chrysene	23 U		23	1.32
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.54
206-44-0	Fluoranthene	23 U	UJ,I	23	1.87
86-73-7	Fluorene	23 U	UJ,S	23	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	23 U		23	0.660
129-00-0	**Pyrene**	**1.2 J**	J,S	23	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB1A**	QC Batch:	90708 -113
Sample #:	**345035**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	260 U		260	13.9
120-12-7	Anthracene	26 U		26	0.840
56-55-3	Benzo (a) Anthracene	26 U		26	0.960
50-32-8	Benzo (a) Pyrene	26 U		26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U		26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.20
218-01-9	Chrysene	26 U		26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.68
206-44-0	Fluoranthene	26 U	UJ,I	26	2.04
86-73-7	Fluorene	26 U		26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	26 U		26	0.720
129-00-0	Pyrene	26 U		26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD3**	QC Batch:	90708 -113
Sample #:	**345036**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U		140	13.2
208-96-8	Acenaphthylene	290 U		290	16.2
120-12-7	Anthracene	29 U		29	0.980
56-55-3	Benzo (a) Anthracene	29 U		29	1.12
50-32-8	Benzo (a) Pyrene	29 U		29	1.40
205-99-2	Benzo (b) Fluoranthene	29 U		29	1.82
191-24-2	Benzo (g,h,i,) Perylene	29 U		29	17.5
207-08-9	Benzo (k) Fluoranthene	29 U		29	1.40
218-01-9	Chrysene	29 U		29	1.68
53-70-3	Dibenzo (a,h) Anthracene	29 U		29	1.96
206-44-0	**Fluoranthene**	**7.8 J**	J,1	29	2.38
86-73-7	Fluorene	29 U		29	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	29 U		29	0.980
91-20-3	Naphthalene	140 U		140	11.1
85-01-8	**Phenanthrene**	**1.6 J**		29	0.840
129-00-0	**Pyrene**	**3.8 J**		29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB1B**	QC Batch:	90708 -113
Sample #:	**345037**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	UJ,S	120	11.3
208-96-8	Acenaphthylene	570 U		570	13.9
120-12-7	Anthracene	57 U		57	0.840
56-55-3	Benzo (a) Anthracene	57 U		57	0.960
50-32-8	Benzo (a) Pyrene	57 U		57	1.20
205-99-2	Benzo (b) Fluoranthene	57 U		57	1.56
191-24-2	Benzo (g,h,i,) Perylene	57 U		57	15.0
207-08-9	Benzo (k) Fluoranthene	57 U		57	1.20
218-01-9	Chrysene	57 U		57	1.44
53-70-3	Dibenzo (a,h) Anthracene	57 U		57	1.68
206-44-0	Fluoranthene	57 U	UJ,I	57	2.04
86-73-7	Fluorene	57 U	UJ,S	57	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	57 U		57	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	57 U		57	0.720
129-00-0	Pyrene	57 U		57	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB1C**	QC Batch:	90708 -113
Sample #:	**345038**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.3
208-96-8	Acenaphthylene	230 U		230	12.8
120-12-7	Anthracene	23 U		23	0.770
56-55-3	Benzo (a) Anthracene	23 U		23	0.880
50-32-8	Benzo (a) Pyrene	23 U		23	1.10
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.43
191-24-2	Benzo (g,h,i,) Perylene	23 U		23	13.8
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.10
218-01-9	Chrysene	23 U		23	1.32
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.54
206-44-0	Fluoranthene	23 U	UJ, I	23	1.87
86-73-7	Fluorene	23 U		23	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	23 U		23	0.660
129-00-0	Pyrene	23 U		23	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB3A**	QC Batch:	90708 -113
Sample #:	**345039**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UJ,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	21 U		21	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	**Fluoranthene**	**6.4 J**	J,I	27	2.21
86-73-7	Fluorene	27 U	UJ,S	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	21 U		21	0.780
129-00-0	**Pyrene**	**3.0 J**	J,S	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB3B**	QC Batch:	90708 -113
Sample #:	**345040**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	87
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	UJ,S	120	11.3
208-96-8	Acenaphthylene	240 U		240	13.9
120-12-7	Anthracene	24 U		24	0.840
56-55-3	Benzo (a) Anthracene	24 U		24	0.960
50-32-8	Benzo (a) Pyrene	24 U		24	1.20
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.56
191-24-2	Benzo (g,h,i,) Perylene	24 U		24	15.0
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.20
218-01-9	Chrysene	24 U		24	1.44
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.68
206-44-0	Fluoranthene	24 U	UJ,I	24	2.04
86-73-7	Fluorene	24 U	UJ,S	24	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	24 U		24	0.720
129-00-0	Pyrene	24 U		24	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB3C**	QC Batch:	90708 -113
Sample #:	**345041**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	92
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	UJ,S	110	10.3
208-96-8	Acenaphthylene	230 U		230	12.8
120-12-7	Anthracene	23 U		23	0.770
56-55-3	Benzo (a) Anthracene	23 U		23	0.880
50-32-8	Benzo (a) Pyrene	23 U		23	1.10
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.43
191-24-2	Benzo (g,h,i,) Perylene	23 U		23	13.8
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.10
218-01-9	Chrysene	23 U		23	1.32
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.54
206-44-0	Fluoranthene	23 U	UJ,I	23	1.87
86-73-7	Fluorene	23 U	UJ,S	23	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	23 U		23	0.660
129-00-0	Pyrene	23 U		23	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**QSB2A**	QC Batch:	90708 -113
Sample #:	**345042**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U	UJ,I	25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**QSB2B**	QC Batch:	90708 -113
Sample #:	**345043**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U	UJ,I	25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**QSB2C**	QC Batch:	90708 -113
Sample #:	**345044**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	91
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U		110	10.3
208-96-8	Acenaphthylene	230 U		230	12.8
120-12-7	Anthracene	23 U		23	0.770
56-55-3	Benzo (a) Anthracene	23 U		23	0.880
50-32-8	Benzo (a) Pyrene	23 U		23	1.10
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.43
191-24-2	Benzo (g,h,i,) Perylene	23 U		23	13.8
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.10
218-01-9	Chrysene	23 U		23	1.32
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.54
206-44-0	Fluoranthene	23 U	UJ,1	23	1.87
86-73-7	Fluorene	23 U		23	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	23 U		23	0.660
129-00-0	Pyrene	23 U		23	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**EQB1**	QC Batch:	90710 -108
Sample #:	**345045**	Anal. Batch:	208174
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB1C**	QC Batch:	89967 -113
Sample #:	**345028**	Anal. Batch:	207866
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U	UJ,C	1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB2A**	QC Batch:	90258 -114
Sample #:	**345029**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	63
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.63**	J,M	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB2B**	QC Batch:	90258 -114
Sample #:	**345030**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB2C**	QC Batch:	90258 -114
Sample #:	**345031**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	86
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB3A**	QC Batch:	90258 -114
Sample #:	**345032**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	88
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB3B**	QC Batch:	90259 -115
Sample #:	**345033**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**37SB3C**	QC Batch:	90258 -114
Sample #:	**345034**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	93
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB1A**	QC Batch:	90258 -114
Sample #:	**345035**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	81
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.31 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD3**	QC Batch:	90258 -114
Sample #:	**345036**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	74
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.20 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	UJ,C	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB1B**	QC Batch:	90258 -114
Sample #:	**345037**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

004119

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB1C**	QC Batch:	90258 -114
Sample #:	**345038**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	93
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB3A**	QC Batch:	90258 -114
Sample #:	**345039**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

004129

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB3B**	QC Batch:	90258 -114
Sample #:	**345040**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	87
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB3C**	QC Batch:	90258 -114
Sample #:	**345041**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	92
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB2A**	QC Batch:	90258 -114
Sample #:	**345042**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ, c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB2B**	QC Batch:	90258 -114
Sample #:	**345043**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**QSB2C**	QC Batch:	90258 -114
Sample #:	**345044**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	91
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitrotoluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitrotoluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitrophenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**EQB1**	QC Batch:	89804 -109
Sample #:	**345045**	Anal. Batch:	207913
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U		0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U		0.65	0.121
118-96-7	Benzene-2-methyl-1,3,5-trinitro-	0.65 U		0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U		0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U		0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U		1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U		0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	UJ,c	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U		1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U		2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	UJ,c	1.0	0.277
98-95-3	Nitrobenzene	0.65 U		0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U		0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U		2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**QSB1A**	QC Batch:	90181 -109
Sample #:	**345035**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	25 U	25	0.286
72-55-9	4,4'-DDE	25 U	25	0.210
50-29-3	4,4'-DDT	25 U	25	0.216
309-00-2	Aldrin	25 U	25	0.365
319-84-6	Alpha-BHC	25 U	25	0.364
57-74-9	A-Chlordane	25 U	25	0.521
5103-74-2	G-Chlordane	25 U	25	0.844
319-85-7	Beta-BHC	25 U	25	1.36
319-86-8	Delta-BHC	25 U	25	0.982
60-57-1	Dieldrin	25 U	25	0.371
115-29-7	Endosulfan I	25 U	25	1.09
33213-65-9	Endosulfan II	25 U	25	0.257
1031-07-8	Endosulfan Sulfate	25 U	25	0.604
72-20-8	Endrin	25 U	25	0.358
7421-93-4	Endrin Aldehyde	25 U	25	1.33
53494-70-5	Endrin Ketone	25 U	25	0.330
58-89-9	Lindane	25 U	25	0.233
76-44-8	Heptachlor	25 U	25	0.846
1024-57-3	Heptachlor Epoxide	25 U	25	0.546
72-43-5	Methoxychlor	25 U	25	0.336
8001-35-2	Toxaphene	210 U	210	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**SBD3**	QC Batch:	90181 -109
Sample #:	**345036**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	27 U	27	0.333
72-55-9	4,4'-DDE	27 U	27	0.245
50-29-3	4,4'-DDT	27 U	27	0.252
309-00-2	Aldrin	27 U	27	0.426
319-84-6	Alpha-BHC	27 U	27	0.424
57-74-9	A-Chlordane	27 U	27	0.608
5103-74-2	G-Chlordane	27 U	27	0.984
319-85-7	Beta-BHC	27 U	27	1.58
319-86-8	Delta-BHC	27 U	27	1.15
60-57-1	Dieldrin	27 U	27	0.433
115-29-7	Endosulfan I	27 U	27	1.27
33213-65-9	Endosulfan II	27 U	27	0.300
1031-07-8	Endosulfan Sulfate	27 U	27	0.704
72-20-8	Endrin	27 U	27	0.417
7421-93-4	Endrin Aldehyde	27 U	27	1.55
53494-70-5	Endrin Ketone	27 U	27	0.385
58-89-9	Lindane	27 U	27	0.272
76-44-8	Heptachlor	27 U	27	0.987
1024-57-3	Heptachlor Epoxide	27 U	27	0.637
72-43-5	Methoxychlor	27 U	27	0.392
8001-35-2	Toxaphene	230 U	230	32.6

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**EQB1**	QC Batch:	90180 ~108
Sample #:	**345045**	Anal. Batch:	208237
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	0.10 U	0.10	0.0016
72-55-9	4,4'-DDE	0.10 U	0.10	0.0025
50-29-3	4,4'-DDT	0.10 U	0.10	0.0018
309-00-2	Aldrin	0.050 U	0.050	0.0019
319-84-6	Alpha-BHC	0.050 U	0.050	0.0014
57-74-9	A-Chlordane	0.050 U	0.050	0.0024
5103-74-2	G-Chlordane	0.050 U	0.050	0.0023
319-85-7	Beta-BHC	0.050 U	0.050	0.0039
319-86-8	Delta-BHC	0.050 U	0.050	0.0025
60-57-1	Dieldrin	0.10 U	0.10	0.0034
115-29-7	Endosulfan I	0.050 U	0.050	0.0026
33213-65-9	Endosulfan II	0.10 U	0.10	0.0021
1031-07-8	Endosulfan Sulfate	0.10 U	0.10	0.0022
72-20-8	Endrin	0.10 U	0.10	0.0038
7421-93-4	Endrin Aldehyde	0.10 U	0.10	0.0053
53494-70-5	Endrin Ketone	0.10 U	0.10	0.0020
58-89-9	Lindane	0.050 U	0.050	0.0016
76-44-8	Heptachlor	0.050 U	0.050	0.0021
1024-57-3	Heptachlor Epoxide	0.050 U	0.050	0.0022
72-43-5	Methoxychlor	0.50 U	0.50	0.0032
8001-35-2	Toxaphene	1.0 U	1.0	0.118

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**QSB1A**	QC Batch:	89881 -109
Sample #:	**345035**	Anal. Batch:	207778
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	81 U	81	19.2
11104-28-2	PCB-1221	41 U	41	2.40
11141-16-5	PCB-1232	41 U	41	6.00
53469-21-9	PCB-1242	41 U	41	3.60
12672-29-6	PCB-1248	41 U	41	6.00
11097-69-1	**PCB-1254**	**53**	41	3.60
11096-82-5	PCB-1260	41 U	41	8.40

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-2**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**SBD3**	QC Batch:	89881 -109
Sample #:	**345036**	Anal. Batch:	207778
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	89 U	89	22.4
11104-28-2	PCB-1221	45 U	45	2.80
11141-16-5	PCB-1232	45 U	45	7.00
53469-21-9	PCB-1242	45 U	45	4.20
12672-29-6	PCB-1248	45 U	45	7.00
11097-69-1	**PCB-1254**	**51**	45	4.20
11096-82-5	PCB-1260	45 U	45	9.80

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**	Prepared:	10/08/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-3510C
		Analyzed:	10/16/03 by JLRM
Sample ID:	**EQB1**	Anal. Method:	USEPA-8082
Sample #:	**345045**	QC Batch:	89851 -108
Matrix:	QC Water	Anal. Batch:	207778
Unit:	ug/L	Percent Solids:	n/a
		Dilution Factor:	1

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	0.30 U	0.30	0.0753
11104-28-2	PCB-1221	0.50 U	0.50	0.0504
11141-16-5	PCB-1232	0.30 U	0.30	0.0794
53469-21-9	PCB-1242	0.30 U	0.30	0.0809
12672-29-6	PCB-1248	0.25 U	0.25	0.0828
11097-69-1	PCB-1254	0.10 U	0.10	0.0341
11096-82-5	PCB-1260	0.20 U	0.20	0.0481

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by MSN
		Anal. Method:	USEPA-8151A
Sample ID:	**QSB1A**	QC Batch:	90218 -110
Sample #:	**345035**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	62	2.40
93-72-1	2,4,5-TP (Silvex)	62 U	62	4.80
94-75-7	2,4-D	250 U	250	19.2
94-82-6	2,4-DB	250 U	250	74.4
75-99-0	Dalapon	310 U	310	68.4
1918-00-9	Dicamba	250 U	250	2.40
120-36-5	Dichlorprop	250 U	250	20.4
~~88-85-7~~	~~*Dinoseb~~ *JC 12/16/03	~~250 UR~~ R,1	~~250~~	~~25.2~~ see re-extraction
94-74-6	MCPA	25000 U	25000	1680
93-65-2	MCPP	25000 U	25000	6070

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/29/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**QSB1A**	QC Batch:	90218 -110
Sample #:	**345035DL**	Anal. Batch:	208404
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	*Herbicides	Analytical Result		Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	UJ,h	62	2.40
93-72-1	2,4,5-TP (Silvex)	62 U		62	4.80
94-75-7	2,4-D	250 U		250	19.2
94-82-6	2,4-DB	250 U		250	74.4
75-99-0	Dalapon	310 U		310	68.4
1918-00-9	Dicamba	250 U		250	2.40
120-36-5	Dichlorprop	250 U		250	20.4
88-85-7	Dinoseb	250 U	UJ,h	250	25.2
94-74-6	MCPA	25000 U	UJ,h	25000	1680
93-65-2	MCPP	25000 U		25000	6070

* See attached Statement of Data Qualifications.

Use only the dinoseb result from this analysis, ts 12/16/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by MSN
		Anal. Method:	USEPA-8151A
Sample ID:	**SBD3**	QC Batch:	90218 -110
Sample #:	**345036**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	68 U	68	2.80
93-72-1	2,4,5-TP (Silvex)	68 U	68	5.60
94-75-7	2,4-D	270 U	270	22.4
94-82-6	2,4-DB	270 U	270	86.8
75-99-0	Dalapon	340 U	340	79.8
1918-00-9	Dicamba	270 U	270	2.80
120-36-5	Dichlorprop	270 U	270	23.8
~~88-85-7~~	~~*Dinoseb~~	~~270 UR~~	~~270~~	~~29.4~~
94-74-6	MCPA	27000 U	27000	1950
93-65-2	MCPP	27000 U	27000	7080

~~*~~ 12/16/03 R,1 see re-extraction

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by JLRM
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**SBD3**	QC Batch:	90218 -110
Sample #:	**345036DL**	Anal. Batch:	208404
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	*Herbicides	Analytical Result		Reporting Limit	MDL
93-76-5	2,4,5-T	68 U	UJ,h	68	2.80
93-72-1	2,4,5-TP (Silvex)	68 U		68	5.60
94-75-7	2,4-D	270 U		270	22.4
94-82-6	2,4-DB	270 U		270	86.8
75-99-0	Dalapon	340 U		340	79.8
1918-00-9	Dicamba	270 U		270	2.80
120-36-5	Dichlorprop	270 U		270	23.8
88-85-7	Dinoseb	270 U	UJ,h	270	29.4
94-74-6	MCPA	27000 U	UJ,h	27000	1950
93-65-2	MCPP	27000 U		27000	7080

* See attached Statement of Data Qualifications.

Use only the dinoseb result from this analysis, ✱ 12/16/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-2**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**EQB1**	QC Batch:	90447 -109
Sample #:	**345045**	Anal. Batch:	208309
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	0.50 U	0.50	0.053
93-72-1	2,4,5-TP (Silvex)	0.50 U	0.50	0.104
94-75-7	2,4-D	5.0 U	5.0	0.670
94-82-6	2,4-DB	5.0 U	5.0	0.955
75-99-0	Dalapon	5.0 U	5.0	0.862
1918-00-9	Dicamba	0.50 U	0.50	0.104
120-36-5	Dichlorprop	5.0 U	5.0	0.195
88-85-7	Dinoseb	1.0 U	1.0	0.168
94-74-6	MCPA	250 U	250	76.8
93-65-2	MCPP	250 U	250	74.8

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 08:45
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB1C**
Sample #: **345028**
Matrix: Soil

Percent Solids: 85

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	13800		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.24 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.7		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	85		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.52 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.59 J	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1700		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	8.1		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	10		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	27700		1000	212.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.6		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3230	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	503		10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1600		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.58 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.047 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	93 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.15 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	33		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB2A**		
Sample #:	**345029**		
Matrix:	Soil	Percent Solids:	63

Parameter	Analytical Result	Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17000	500	91.50	10	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	1.2	0.50	0.0518	1	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	5.0	0.40	0.0232	1	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	50	1.0	0.106	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.72 J	1.0	0.0391	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.6	1.0	0.182	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	106000	12500	4150.0	50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Chromium, Total	114 J,S	25	4.560	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Cobalt, Total	3.1	1.0	0.208	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	193	5.0	1.840	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Iron, Total	19500	1000	212.000	100	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	277	50	1.0900	50	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3780 K,M	250	16.05	1	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	164	5.0	1.320	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
* Mercury, Total	0.60 J,M	0.10	0.0077	1	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	50	5.0	0.3560	10	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	677	20	5.00	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Selenium, Total	0.43 J	1.0	0.0502	1	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.24 J	3.0	0.0044	1	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	87 J B,P	100	8.92	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.064 J	0.50	0.0270	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	19	1.0	0.207	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	129	20	2.585	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB2B**		
Sample #:	**345030**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result		Reporting Limit	MDL	DF	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17500		500	91.50	10	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.23 J	B,P	0.50	0.0518	1	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.3		0.40	0.0232	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	103		5.0	5.300	5	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.61 J		1.0	0.0391	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.6	B,P	1.0	0.182	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2610		250	16.6	1	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	20		5.0	0.912	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	11		1.0	0.208	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	11		1.0	0.368	1	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	28200		1000	212.000	100	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.8		1.0	0.0218	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	4790	K,M	500	32.10	2	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	419		10	2.640	10	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	1	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2140		100	25.00	1	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.53 J		1.0	0.0502		mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.051 J		3.0	0.0044		mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	80 J	B,P	100	8.92	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.19 J		0.50	0.0270	1	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	43		1.0	0.207	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	65		4.0	0.517	1	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB2C**
Sample #: **345031**
Matrix: Soil
Percent Solids: 86

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12700		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.22 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	73		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.36 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.75 J	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2040		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	6.9		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	10		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	17500		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.9		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3430	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	252		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1650		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.45 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.042 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	72 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.16 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	27		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	38		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB3A**		
Sample #:	**345032**		
Matrix:	Soil	Percent Solids:	88

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	10600		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.18 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.0		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	103		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.48 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.1	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1480		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	15		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	5.6		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	6.9		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	15900		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	15		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	2600	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	403		10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.013 J		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	8.4		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1290		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.42 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.045 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	83 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.12 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	21		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	77		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 10:30
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **37SB3B**
Sample #: **345033**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	15300		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.17 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.0		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	98		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.46 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.3	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1030		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	7.4		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	9.6		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	22900		1000	212.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.4		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
* Magnesium, Total	3550	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	267		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1820		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.42 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.037 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	69 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.15 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	33		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	55		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB3C**		
Sample #:	**345034**		
Matrix:	Soil	Percent Solids:	93

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12400		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.26 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	2.1		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	113		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.34 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.82 J	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1590		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	9.0		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	7.7		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	26000		1000	212.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	9.2		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3170	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	381		10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1480		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.50 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.060 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	67 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.13 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	27		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	56		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **QSB1A**
Sample #: **345035**
Matrix: Soil

Percent Solids: 81

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	16000	500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.19 J B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.2	0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	148	5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.82 J	1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.88 J B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	10100 J,f	250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	21	5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	7.6	1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	10	1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	22600	1000	212.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	15 J,f	1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3530 K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	519	10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.015 J	0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	13	0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	2180	100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.59 J	1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.067 J	3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	64 J B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.14 J	0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	29	1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	67	4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD3**
Sample #: **345036**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12600		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.20 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	113		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.57 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.1	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	36300	J,f	2500	166.0	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	17		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	5.9		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	13		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	16700		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	32	J,f	1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	2880	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	415		10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.025 J		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1810		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.63 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.075 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	65 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.13 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	23		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	55		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB1B**		
Sample #:	**345037**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14000	500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.15 J B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.97	0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	110	10	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.66 J	1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.3 B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2260	250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	18	5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	8.1	1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	7.6	1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	19600	500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.2	1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3280 K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	372	10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U	0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	13	0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1580	100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.49 J	1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.051 J	3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	59 J B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.15 J	0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	29	1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	55	4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB1C**		
Sample #:	**345038**		
Matrix:	Soil	Percent Solids:	93

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	3360		100	18.30	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.15 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.54		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	27		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.18 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.4	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	622		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	6.0		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	3.3		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	1.5		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	6530		200	42.400	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	2.6		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	855	K,M	50	3.21	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Manganese, Total	81		1.0	0.264	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	4.4		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	439		20	5.00	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Selenium, Total	0.24 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.026 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	31 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.039 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	8.3		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	17		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **QSB3A**
Sample #: **345039**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14500		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.17 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	1.4		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	137		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.89 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.6	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	25600		2500	166.0	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	19		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	8.4		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	12		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	20600		1000	212.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	21		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3380	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	511		10	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.019 J		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	15		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1330		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.063 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	60 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.16 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	28		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	65		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 14:45
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **QSB3B**
Sample #: **345040**
Matrix: Soil

Percent Solids: 87

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	9890		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.15 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.76		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	75		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.62 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.2	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	2000		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	14		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	6.7		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	6.5		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	15500		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	5.5		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	2730	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	273		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	9.6		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1270		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.41 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.033 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	56 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.11 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB3C**		
Sample #:	**345041**		
Matrix:	Soil	Percent Solids:	92

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	5130		250	45.75	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.11	J B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.63		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	42		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.28	J	1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.3	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1080		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	8.8		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	4.4		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	3.3		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	8730		200	42.400	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	3.5		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	1280	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	151		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10	U	0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	5.9		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	651		20	5.00	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Selenium, Total	0.31	J	1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.028	J	3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	49	J B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.058	J	0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	12		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	25		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 15:10
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **QSB2A**
Sample #: **345042**
Matrix: Soil

Percent Solids: 85

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	7820		250	45.75	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.13 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.64		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	96		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.58 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.95 J	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	943		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	12		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	5.9		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	6.0		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	12700		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	9.6		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	2220	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	319		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	8.5		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1070		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.35 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.036 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	63 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.10 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	17		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	58		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/02/03 @ 15:20
Sampler: B.F. & J.S.
Received: 10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **QSB2B**
Sample #: **345043**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14200		500	91.50	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.28 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.90		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	116		5.0	0.530	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Beryllium, Total	0.74 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	1.6	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1900		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	17		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	8.4		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	8.3		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	20000		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	7.6		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	3370	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	441		100	2.640	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	1230		100	25.00	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Selenium, Total	0.47 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.055 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	67 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.15 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	30		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	61		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB2C**		
Sample #:	**345044**		
Matrix:	Soil	Percent Solids:	91

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	7970		250	45.75	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Antimony, Total	0.16 J	B,P	0.50	0.0518	mg/kg dry	10/10/03	JMF	USEPA-6020
Arsenic, Total	0.70		0.40	0.0232	mg/kg dry	10/09/03	JMF	USEPA-6020
Barium, Total	66		1.0	0.106	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Beryllium, Total	0.41 J		1.0	0.0391	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cadmium, Total	0.88 J	B,P	1.0	0.182	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Calcium, Total	1230		250	16.6	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Chromium, Total	10		5.0	0.912	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Cobalt, Total	5.6		1.0	0.208	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Copper, Total	5.3		1.0	0.368	mg/kg dry	10/17/03	DWJ	USEPA-6010B
Iron, Total	12500		500	106.000	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Lead, Total	4.4		1.0	0.0218	mg/kg dry	10/09/03	JMF	USEPA-6020
Magnesium, Total	1890	K,M	250	16.05	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Manganese, Total	222		5.0	1.320	mg/kg dry	10/15/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/09/03	MSS	USEPA-7471A
Nickel, Total	7.1		0.50	0.0356	mg/kg dry	10/09/03	JMF	USEPA-6020
Potassium, Total	876		20	5.00	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Selenium, Total	0.33 J		1.0	0.0502	mg/kg dry	10/09/03	JMF	USEPA-6020
Silver, Total	0.032 J		3.0	0.0044	mg/kg dry	10/09/03	JMF	USEPA-6020
Sodium, Total	55 J	B,P	100	8.92	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Thallium, Total	0.080 J		0.50	0.0270	mg/kg dry	10/09/03	JMF	USEPA-6020
Vanadium, Total	18		1.0	0.207	mg/kg dry	10/13/03	KLVM	USEPA-6010B
Zinc, Total	33		4.0	0.517	mg/kg dry	10/13/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10

Submittal #: **36440-2**
Submittal: Delivery Order 0046
RAAP
Sample ID: **EQB1**
Sample #: **345045**
Matrix: QC Water
Percent Solids: n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	100 U	100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U	1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Total	1.0 U	1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Barium, Total	10 U	10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Total	0.3 J	4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U	0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Calcium, Total	500 U	500	33.9000	ug/L	10/17/03	DSC	EPA-200.7/6010B
Chromium, Total	1.0 U	1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Cobalt, Total	10 U	10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Total	10 U	10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Total	100 U	100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Lead, Total	0.3 J	1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Magnesium, Total	500 U	500	57.4000	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Total	10 U	10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U	0.4	0.0584	ug/L	10/13/03	MSS	USEPA-7470A
Nickel, Total	1.0 U	1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Potassium, Total	200 U	200	59.7000	ug/L	10/17/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U	2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Total	0.5 U	0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Sodium, Total	220 J B,P	500	76.9000	ug/L	10/17/03	DSC	EPA-200.7/6010B
Thallium, Total	1.0 U	1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Vanadium, Total	10 U	10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Total	20 U	20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB1C**		
Sample #:	**345028**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.09 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

005441

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB2A**		
Sample #:	**345029**		
Matrix:	Soil	Percent Solids:	63

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	63	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB2B**		
Sample #:	**345030**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.04 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB2C**		
Sample #:	**345031**		
Matrix:	Soil	Percent Solids:	86

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	86	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB3A**		
Sample #:	**345032**		
Matrix:	Soil	Percent Solids:	88

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	88	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB3B**		
Sample #:	**345033**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**37SB3C**		
Sample #:	**345034**		
Matrix:	Soil	Percent Solids:	93

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	93	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

005450

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB1A**		
Sample #:	**345035**		
Matrix:	Soil	Percent Solids:	81

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	81	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.81	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD3**		
Sample #:	**345036**		
Matrix:	Soil	Percent Solids:	74

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	74	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	1.3	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB1B**		
Sample #:	**345037**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB1C**		
Sample #:	**345038**		
Matrix:	Soil	Percent Solids:	93

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	93	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB3A**		
Sample #:	**345039**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	2.2	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB3B**		
Sample #:	**345040**		
Matrix:	Soil	Percent Solids:	87

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	87	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB3C**		
Sample #:	**345041**		
Matrix:	Soil	Percent Solids:	92

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	92	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB2A**		
Sample #:	**345042**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB2B**		
Sample #:	**345043**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.06 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**QSB2C**		
Sample #:	**345044**		
Matrix:	Soil	Percent Solids:	91

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	91	0.1	0.1	%	10/09/03	TAM	SW-846 3550B
Cyanide, Total	0.04 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/02/03 @ 16:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/03/03 @ 09:10
Submittal #:	**36440-2**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**EQB1**		
Sample #:	**345045**		
Matrix:	QC Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40000	ug/L	10/16/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 ^{O}C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV			

Notes:
1. four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
2. 37SB1B was cancelled by client.

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.			x
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.			x

Notes: acetone

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ± 15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery							Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?						x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?						x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?								x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.								
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.								x
		1 or more <10%	1 high/low	2 or 3 high/low	2 or 3 all low	2 or 3 all high			
	Positives	L	J	J	L	K			
	Non-detects	R	UJ	UJ	UL	NONE			
	Note: The B qualifier remains over surrogate flagging.								

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively idenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 19			
	Number of target compounds in each analysis: 50			
	Number of results rejected and not reported: 1			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 99.9%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{O}C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV			

Notes: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Holding Times

		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes: sampled on 10/2/03.
extracted: 89845-109 on 10/9/03, 90209-116 on 10/16/03, 90209-109 on 10/09/03, 90210-110 on 10/10/03, 89818-108 on 10/08/03
analyzed on 10/15/03-10/17/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: $r \geq 0.99$, %RSD $\leq$ 15%, ICV %D < 30%, and CCV %D $\leq$ 20%.		x	
	For initial Calibration: for %RSD > $\pm$ 15%, but < $\pm$ 50%, J(+) only. for %RSD > $\pm$ 50%, but < $\pm$ 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine, hexachlorocyclopentadiene, 2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	X		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	X		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	X		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	X		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	X		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?		x	
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?	at dilution	x	
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		x	
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

X Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. %		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	18			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. %		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	X		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	X		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	X		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		X		
	Number of samples:	18			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: AS
Date: December-03
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
___ CLP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: PEST/PCB
Method No.: 8081A/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		X	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		X	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		X	

Notes: sampled on 10/2/03, extracted on 10/8-9/03, analyzed 10/10-30/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	X		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		X	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		X	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	X		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	X		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	X		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%		X	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	X		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.				x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?				x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?						x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)						x
	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance			
	1 out	high/low	No action	No action			
	2 out	2 high same column	K	No action			
		2 low same column	L, UL	No action			
		mixed same column	J, UJ	No action			
		2 high diff columns	J	Not applicable			
		2 low diff columns	J, UJ	Not applicable			
		mixed diff columns	Professional judgement	Not applicable			
	3 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		2 high, 1 low	K (2 high)	J (1 low 2nd column)			
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)			
		other mixed	J, UJ	Not applicable			
	4 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		Mixed	J, UJ	Not applicable			
	If any recovery is >0% and <10% then L(+)/R(-).						
	If any recovery is 0% then R(+/-).						

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?	aqueous pest	soil all & aqueous PCBs	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?	x		
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A/SBD1 submitted in SDG 36440-2, BDL for pest and 0.053/0.051 for Aroclor 1254.

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).	x		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	3	3			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: December-03
DV Level: II III IV

Review Document:

X Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-2
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. %		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).	x		
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes: re-extraction for Dinoseb occured outside the 14 day extraction holding time, but less than 28 days
collected on 10/02/03, re-extracted on 10/17/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	X		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		X	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		X	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	X		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	X		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	X		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	X		
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	X		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	X		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?	X		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		X	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		X	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A and SDB-3 submitted in SDG 36440-2 were both non-detect.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	X		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	X		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	X		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		X		
	Number of samples:	3			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-2
Project No.: 15291974.30000

Project Name: Radford SSP
Reviewer: AS
Date: December-03

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{O}C $\pm$ 2 ^{O}C)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: four coolers @ 3.3C, 0.7C, 1.9C, & 0.9C
37SB1B was cancelled by client.

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x			x			x	

Note:

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7+BLK			4+BLK			5+BLK			6+BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	x					x	x			x		
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%			passed within 80-120%		

Note: batch 207811 has a new high point added to Al, Ba, Ca, Fe, Mg, Mn, & K, an elevated RL by 5

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes: < -IDL L(+)/UL(-); > IDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	X			X			X			X		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		X			X			X			X	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note: _____

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	X			X			X			X		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	X			X			X			X		

Note: _____

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?	x			x			x			x		
	%R > 125% 30%< %R < 74% < 30%												
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: 37SB3B 6010B MS/MSD calcium 131%/115% (111%), Hg MS at 63% (73%) MSD passed at 99%, 6020 & CN passed.

37SB2A 6010B, 6020, Hg, & CN passed

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: 6010B: 37SB2A - chromium 14.9%.

11.0 Field Duplicate Samples

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report		x			x							

Note: _____

12.0 Result Verification/ Internal Standards/ Tune

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: _____

Several metals by 6010B and lead by 6020 were analyzed straight and then at dilution due to the presence of high target concentrations

13.0 Completeness Calculation

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: _____												
13.1.2	Number of target compounds in each analysis: _____												
13.1.3	Number of results rejected and not reported: _____												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = _____	100%			100%			100%			100%		

Note: _____

JM0188 Volatile Soil Cart 7

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1045

000056

Project Number	Project Name
97604-317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804)765-7000

Samplers: Brett Lee / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [illegible])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[illegible] HERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
* 37561 B	10/2/03 830	5		X	5	F	/	5	X	X	X			X		X		DISCARD					37562 A has sludge in it. Collected MS/MSD because of sludge matrix.
37561 C	10/2/03 845	5		X	5	F	/	5	X	X	X			X		X							
37562 A	10/2/03 930	5		X	5	F	/	5	X	X	X			X		X							
37562 B	10/2/03 945	5		X	5	F	/	5	X	X	X			X		X							
37562 C	10/2/03 1000	5		X	5	F	/	5	X	X	X			X		X							
37563 A	10/2/03 1015	5		X	5	F	/	5	X	X	X			X		X							
37563 B	10/2/03 1030	5		X	5	F	/	5	X	X	X			X		X							
37563 BMS	10/2/03 1030	5		X	5	F	/	5	X	X	X			X		X							—
37563 BMSD	10/2/03 1030	5		X	5	F	/	5	X	X	X			X		X							—
37563 C	10/2/03 1045	5		X	5	F	/	5	X	X	X			X		X							
37562 A MS	10/2/03 930	5		X	5	F	/	5	X	X	X			X		X							—
37562 A MSD	10/2/03 930	5		X	5	F	/	5	X	X	X			X		X							—

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Lee	10/2/03 1800				
Relinquished by:	Date/time	Received by: (for lab)	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	
			10/3/03 9:10		

* DISCARD Per Client 10/3/03 —WR 10/3/03

36440-2

TM0086 Cart. 7 Volatile Soil

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1072

Project Number	Project Name
07604-317	RFAAP

Project Contact (Name and Phone Number): Doreen Renne (804) 765-9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) / CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	HERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
QSB1A	10/2/03 1300	S		X	S	F	/	7	X	X	X	X	X	X		X						X	
SBD3 QC	10/2/03 —	S		X	S	F	/	7	X	X	X	X	X	X		X						X	
QSB1B	10/2/03 1315	S		X	S	F	/	5	X	X	X			X		X							
QSB1C	10/2/03 1330	S		X	S	F	/	5	X	X	X			X		X							
QSB3A	10/2/03 1430	S		X	S	F	/	5	X	X	X			X		X							
QSB3B	10/2/03 1445	S		X	S	F	/	5	X	X	X			X		X							
QSB3C	10/2/03 1500	S		X	S	F	/	5	X	X	X			X		X							

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/2/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/3/03 9:10	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-2

Volatile soil Cart 7 TM0336

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1079

Project Number	Project Name
0760/317	RFAAP

Project Contact (Name and Phone Number): Darren Rowe (804) 786 7086

Samplers: Brett Fisher / John Spangler

LAB:

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
QSB2A	10/2/03 1510	5		X	5	F	/	5	X	X	X			X		X							
QSB2B	10/2/03 1520	5		X	5	F	/	5	X	X	X			X		X							
QSB2C	10/2/03 1530	5		X	5	F	/	5	X	X	X			X		X							

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/2/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/3/03 9:10	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-2

TM036 Cart 8 LP
655-6-10 ~~537-R-12~~

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1156

Project Number	Project Name
97604.317	RFAAP

Project Contact (Name and Phone Number): Darren Rowe (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Hardness	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB1	10/2/03 1620	5		X	5	F	~~F~~	14	X	X	X	X	X	X		X						X	
Trip Blank	10/2/03							2	X														

↑ Assign a time of 1620 to TB -WR

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/2/03 1800				
Relinquished by:	Date/time	Received by (for lab): [signature]	Date/Time 10/3/03 9:10	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-2

9-8

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-3 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** January 2, 2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: For the SVOC analyses, the initial analyses of samples 38SB1A, 38SB3A, and 38SB3B displayed internal standard area counts less than the lower control limit (i.e., 50%) for perylene-d_{10} at 16.8%, 6.2%, and 3.3%, respectively. The associated field sample results were non-detect and were flagged "R,i". The samples were re-analyzed at dilutions with acceptable internal standard area counts. The associated results from the dilutions should be used for data interpretation.

Minor Anomalies: For the VOC analyses, the method blank for batch 90050-114 contained acetone at 10 ug/Kg. The method blank for batch 90050-214 contained acetone at 20 ug/Kg. The method blank for batch 90050-115 contained acetone at 21 ug/Kg. The method blank for batch 89888-115 contained acetone at 13.0 ug/L and methylene chloride at 0.410 ug/L. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The equipment blank EQB2 displayed positive detections for acetone at 2.2 ug/L and methylene chloride at 0.57 ug/L. The associated trip blank displayed a positive detection for methylene chloride at 1.1 ug/L. The equipment blank EQB3 displayed positive detections for acetone at 2.3 ug/L and methylene chloride at 0.67 ug/L. The associated trip blank displayed a positive detection for methylene chloride at 0.91 ug/L. The field blank detections for methylene chloride and acetone were previously qualified due to method blank detections. No further data qualifying action was required.

The continuing calibration analyzed on 10/14/03 at 0840 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for acetone at 27.7%, methylene chloride at 23.8%, and methyl acetate at 21.9%. The continuing calibration analyzed on 10/14/03 at 2100 displayed percent differences greater than the control limit with a negative bias for carbon disulfide at 21.5%, methyl acetate at 26.0%, 4-methyl-2-pentanone at 22.1%, and 2-hexanone at 24.3%. The continuing calibration analyzed on 10/15/03 at 0921 displayed percent differences greater than the control limit with a negative bias for dichlorodifluoromethane at 20.8%, carbon disulfide at 22.0%, methylene chloride at 24.2%, methyl acetate at 26.0%, and 1,4-dichlorobenzene at 21.2%. The continuing calibration analyzed on 10/15/03 at 0919 displayed a percent difference greater than the control limit with a negative bias for carbon disulfide at 27.5%. Non-detect associated field sample results were flagged "UJ,c"

while positive associated field sample results were flagged "J,c", unless previously qualified for a method blank detection for acetone.

The matrix spike pair for sample 68SB2A displayed percent recoveries less than the laboratory generated lower control limits for acetone (2%/35%), carbon disulfide (42%/37%), and chloroethane (78%). All associated acetone results were positive and primarily previously qualified as non-detect due to method blank detections. These poor matrix spike recoveries for acetone appear to be associated with laboratory contamination. Based on professional judgement, no further data qualifying action was taken based on the matrix spike recovery anomalies for acetone. The parent sample result for carbon disulfide was previously qualified for a low bias displayed in the continuing calibration percent difference and no further data qualifying action was taken. Since the matrix spike recovery was acceptable and the matrix spike duplicate recovery was only marginally low for chloroethane, no data qualifying action was taken. This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 20%) for methyl acetate at 25% and a matrix spike duplicate recovery greater than the laboratory generated upper control limit (i.e., 122%) for methyl-tert-butyl ether at 132%. Methyl-tert-butyl ether and methyl acetate displayed a positive bias or imprecision while the parent sample results were non-detect, thus, no data qualifying action was taken.

For the SVOC analyses, the method blank for extraction batch 89818-108 displayed positive detections for bis(2-ethylhexyl)phthalate at 1.10 ug/L and diethylphthalate at 0.150 ug/L. The method blank for extraction batch 90209-109 displayed a positive detection for diethyl-phthalate at 16 ug/Kg. The method blank for extraction batch 90070-113 displayed positive detections for bis(2-ethylhexyl)phthalate at 1.20 ug/L and butylbenzylphthalate at 0.980 ug/L. The method blank for extraction batch 90482-114 displayed positive detections for bis(2-ethylhexyl)phthalate at 26 ug/Kg and di-n-butylphthalate at 11 ug/Kg. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The equipment blank EQB2 contained bis(2-ethylhexyl)phthalate at 1.1 ug/L, butyl benzyl phthalate at 0.96 ug/L, diethylphthalate at 0.12 ug/L, and several tentatively identified compounds (TICs). The equipment blank detections for bis(2-ethylhexyl) phthalate and diethylphthalate were previously flagged due to method blank detections and no further data qualifying action was taken. The equipment blank EQB3 contained 4-chloro-3-methylphenol at 0.14 ug/L, bis(2-ethylhexyl)phthalate at 1.4 ug/L, butyl benzyl phthalate at 1.0 ug/L, diethylphthalate at 0.11 ug/L, and several tentatively identified compounds (TICs). The equipment blank detections for bis(2-ethylhexyl) phthalate and butyl benzyl phthalate were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than ten times the blank concentration for the remaining positive phthalates and less than five times the blank concentration of the TICs or 4-chloro-3-methylphenol were flagged "B,x" in the associated samples.

The continuing calibration analyzed on 10/16/03 at 2111 displayed percent differences greater than the control limit with a negative bias for atrazine at 38.6%, benzaldehyde at 34.4%, 4-chloroaniline at 21.9%, bis(2-ethylhexyl)phthalate at 27.9%, 3,3'-dichlorobenzidine at 20.6%, and di-n-octylphthalate at 24.9%. All associated non-detect field sample results were flagged "UJ,c" while positive field sample results were flagged "J,c", unless previously flagged for a matrix spike anomaly. This continuing calibration displayed percent differences greater than the control limit with a positive bias for 2,4-dinitrophenol at 25.6% and pentachlorophenol at 28.3%. All associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/17/03 at 1307 displayed percent differences greater than the control limit with a negative bias for benzaldehyde at 21.9% and with a positive bias for hexachlorocyclopentadiene at 21.4% and di-n-octylphthalate at 21.1%. The associated field sample results were non-detect for benzaldehyde and were flagged "UJ,c". The associated field sample results were non-detect for the other anomalous compounds while the continuing calibration displayed a positive bias, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/18/03 at 0632 displayed percent differences greater than the control limit with a negative bias for benzaldehyde at 26.4% and 4-chloroaniline at 26.2% and with a positive bias for 2,4,5-trichlorophenol at 25.0%. The associated field sample results were non-detect for benzaldehyde and 4-chloroaniline and were flagged "UJ,c". The associated field sample results were non-detect for 2,4,5-trichlorophenol while the continuing calibration displayed a positive bias, thus, no data qualifying action was required.

The laboratory control spike pair for batch 89818-108 displayed recoveries less than the laboratory generated lower control limit (i.e., 50%) but greater than the QAPP lower control limit (i.e., 10%) for caprolactam (40%/37%). The laboratory control spike for batch 90209-109 displayed a recovery less than the laboratory generated lower control limit (i.e., 16%) but greater than the QAPP lower control limit (i.e., 10%) for 4-chloroaniline at 14%. The laboratory control spike pair for batch 90070-113 displayed recoveries less than the laboratory generated lower control limits but greater than the QAPP lower control limit (i.e., 10%) for 2,4-dinitrophenol (24%) and caprolactam (24%/27%). The associated field sample results were non-detect and were flagged "UJ,l", unless previously flagged for a negative bias in the continuing calibration.

The laboratory control spike duplicate for batch 89818-108 displayed recoveries greater than the laboratory generated upper control limits for benzo(g,h,i) perylene at 127% and pentachlorophenol at 122%. The laboratory control spike for batch 90209-109 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 122%, 2,6-dinitrotoluene at 119%, benzo(b)fluoranthene at 121%, carbazole at 127%, diethylphthalate at 123%, dimethylphthalate at 117%, and fluorene at 117%. The laboratory control spike for batch 90482-114 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 128%, 2,6-dinitrotoluene at 123%, 2-nitroaniline at 127%, 3,3'-dichlorobenzidine at 117%, acenaphthylene at 118%, benzo(b)fluoranthene at 125%, benzo(g,h,i)perylene at 130%, carbazole at 127%, dibenzo(a,h)anthracene at 126%, diethylphthalate at 119%, dimethylphthalate at 118%, fluorene at 121%, hexachlorocyclopentadiene at 115%, and indeno(1,2,3-cd)pyrene at 125%. Sample 68SB2A displayed positive detections for benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene that were flagged "J,l". All other associated field sample results were non-detect or previously flagged for a method blank detection while the laboratory control spike displayed a positive bias. No data qualifying action was taken.

The matrix spike pair for sample 68SB2A displayed percent recoveries outside the laboratory generated control limits for 4-chloroaniline (16%/18%) and di-n-octylphthalate (125%/125%). This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for 3-nitroaniline at 28% and di-n-butylphthalate at 20%. The parent sample result for 4-chloroaniline was non-detect and previously qualified for a continuing calibration anomaly. The parent sample result for di-n-butylphthalate was positive and previously qualified as non-detect due to blank contamination. The parent sample results for di-n-octylphthalate and 3-nitroaniline were non-detect while the matrix spike pair displayed a

positive bias or imprecision, respectively. Based on professional judgement, no data qualifying action was taken based on these matrix spike results.

The initial analysis of sample 38SB1A displayed two acid fraction surrogate recoveries less than the laboratory generated lower control limits for phenol-d_6 at 27% and 2,4,5-tribromophenol at 11%. The initial analysis of sample 38SB3A displayed two acid fraction surrogate recoveries less than the laboratory generated lower control limits for phenol-d_6 at 21% and 2,4,5-tribromophenol at 20%. The associated acid fraction constituents were non-detect and were flagged "UL,s". The acid fraction surrogate phenol-d_6 displayed a percent recovery less than the laboratory generated lower control limit (i.e., 38%) for sample 38SB3B at 29%. Sample SBD5 displayed a base/neutral fraction surrogate recovery less than the laboratory generated lower control limit (i.e., 50%) for 2-fluorobiphenyl at 47%. Since only one surrogate recovery was outside the control limits, no data qualifying action was required.

For the PAH analyses, the laboratory control spike for batch 90708-113 displayed a recovery less than the laboratory generated lower control limit (i.e., 87%) but greater than the project QAPP lower control limit (i.e., 40%) for fluoranthene at 77%. Positive associated field sample results were flagged "J,l" while non-detects were flagged "UJ,l".

The surrogate, 2-fluorobiphenyl, percent recoveries were less than the laboratory lower control limit (i.e., 49%) for SBD4 at 41%, 38SB2C at 48%, 38SB1A at 47%, 38SB1B at 21%, 38SB3B at 29%, 68SB2A at 33%, 68SB2B at 34%, 68SB2C at 31%, 68SB1A at 34%, 68SB1B at 34%, and 68SB1C at 31%. Positive associated field sample results were flagged "L,s" while non-detects were flagged "UL,s", unless previously qualified for laboratory control spike anomalies.

The matrix spike pair for sample 68SB2A displayed percent recoveries less than the laboratory generated lower control limits for all target compounds. The laboratory performed an analytical spike that displayed acceptable recoveries. The low recoveries may be attributable to extraction efficiency. Since most of the associated field sample results were qualified as biased low due to surrogate recovery anomalies, no further data qualifying action was taken.

For the explosive analyses, the continuing calibration analyzed on 10/21/03 at 2100 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 3-nitrotoluene at 16.0%. The continuing calibration analyzed on 10/22/03 at 0227 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 19.9%. The continuing calibration analyzed on 10/27/03 at 1217 displayed a percent difference greater than the control limit with a negative bias for RDX at 16.9%. The continuing calibration analyzed on 10/27/03 at 1244 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 17.2%. All associated sample results were non-detect and were flagged "UJ,c".

The matrix spike pair for sample 68SB2A displayed relative percent differences greater than the laboratory generated control limits (i.e., 40%) for 2-amino-4,6-dinitrotoluene at 42% and RDX at 44%. The parent sample results were non-detect for 2-amino-4,6-dinitrotoluene and RDX while the matrix spike pair results displayed imprecision, thus, no data qualifying action was taken.

For the pesticide analyses, the opening continuing calibration analyzed on 10/10/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for delta BHC at 18.6%, 4,4'-DDD at 19.73%, endosulfan II at 15.76%, methoxychlor at

19.24%, and endosulfan sulfate at 15.16%. The closing continuing calibration displayed a percent difference greater than the control limit with a positive bias on column one for delta BHC at 15.11%. The associated field sample results were non-detect or did not confirm on the passing alternate analytical column. No data qualifying action was taken based on these anomalies.

The closing continuing calibration analyzed on 10/18/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for delta BHC at 16.89%, 4,4'-DDD at 23.75%, 4,4'-DDT at 18.77%, methoxychlor at 28.37%, and endosulfan sulfate at 15.85%. This closing continuing calibration displayed percent differences greater than the control limit with a positive bias on column two for 4,4'-DDD at 17.38% and methoxychlor at 20.16%. The associated field sample results were non-detect on one or both columns while the continuing calibration displayed a positive bias. No data qualifying action was taken based on these anomalies.

The laboratory control spike pair for batch 90180-108 displayed recoveries greater than the laboratory generated upper control limits for a-chlordane (111%), endosulfan sulfate (145%), endrin aldehyde (139%), and methoxychlor (148%/133%). The associated field sample, EQB1, was non-detect for these compounds while the laboratory control spikes displayed a positive bias. No data qualifying action was taken based on these anomalies.

For the herbicide analyses, the laboratory control spike pair for batch 90447-109 displayed recoveries greater than the laboratory generated upper control limits for dicamba (130%), dichlorprop (109%), MCPA (98%), and MCPP (122%/106%). The associated field sample, EQB2, was non-detect for these constituents while the laboratory control spike displayed a positive bias. No data qualifying action was taken. The laboratory control spike for batch 90218-110 displayed a recovery less than the laboratory generated lower control limit (i.e., 50%) for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (i.e., 91%) for MCPP at 117%. The associated field sample results were non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. Only dinoseb results from the re-extraction used be used for data interpretation. The surrogate recoveries were greater than the upper laboratory generated control limit (i.e., 114%) for all samples of the re-extraction. Since the associated field sample results were non-detect, no data qualifying action was required.

For the metal analyses by 6020, the method blank for batch 89972-109 contained selenium at 0.0629 mg/Kg and silver at 0.00964 mg/Kg. The associated positive field sample results less than five times the blank concentration were flagged "B,p". The method blank for batch 89970-113 contained chromium at 0.58 ug/L. The associated field sample results for chromium were non-detect and no data qualifying action was required. The equipment blank EQB3 contained lead at 0.3 ug/L. The associated field sample results were positive and greater than five times the equipment blank concentration. No data qualifying action was required.

For the metal analyses by 6010B, the method blank for batch 89966-113 contained iron at 7.12 ug/L, potassium at 88 ug/L, and sodium at 421 ug/L. Positive results less than five times the blank concentration for iron and sodium were flagged "B,p" in the associated field samples EQB2 and EQB3. The field sample results for potassium were non-detect and no data qualifying action was required. The equipment blank EQB2 contained iron at 25 ug/L, sodium

at 180 ug/L, and zinc at 5.7 ug/L. The equipment blank EQB3 contained iron at 4.8 ug/L and sodium at 160 ug/L. The equipment blank results for iron and sodium were previously qualified due to method blank detections. All associated positive field sample results were less than five times the equipment blank concentration for zinc and were flagged "B,x".

The matrix spike performed on sample 68SB2A displayed a percent recovery greater than the laboratory generated upper control limit (i.e., 121%) for calcium at 127%. All associated positive field sample results were flagged "K,m". This matrix spike pair displayed percent recoveries less than the laboratory generated lower control limit (i.e., 65%) for barium (50%/37%). All associated field sample results were positive and were flagged "L,m". The serial dilution performed on sample 68SB2A displayed a percent difference greater than the control limit (i.e., 10%) for cobalt at 12.5%. All associated field sample results were positive and were flagged "J,s". The field duplicate pair (68SB2C and SBD5) displayed a relative percent difference greater than the control limit (i.e., 35%) for potassium at 36.1%. The positive results for potassium were flagged "J,f" in these two samples.

For the cyanide analyses, sample 38SB2C was analyzed outside the holding time (i.e., 14 days) on the 18th day. Since the holding time was not exceed by more than two times, the associated non-detect field sample result was flagged "UL,h".

Correctable Anomalies: The client cancelled the field samples 68SB2A matrix spike, 68SB2A matrix spike duplicate, and EQB3 for herbicide, pesticide, and polychlorinated biphenyl analyses.

Comments: Samples 38SB1A and 38SB3A were initially analyzed for SVOCs at a dilution factor of 10 due to non-target matrix interference during the concentration step of the extraction. Sample 38SB1A was analyzed at dilution due to analytical interference for herbicides. Due to the abundance of target compounds, most of the samples were analyzed at dilutions for the metals analyses. Therefore, the reporting limits for these constituents were elevated.

Field coolers were received at the laboratory with internal temperatures less than the lower control limit (i.e., 2°C) at 0.9°C and 1.1 °C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken. A cooler containing the equipment blank EQB3 and trip blank associated with the equipment blank was received at the laboratory with an internal temperature greater than the upper control limit (i.e., 6°C) at 8.6 °C. Based on professional judgement no data qualifying action was required since this temperature did not exceed 10°C.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. The GIS-Key format is limited to 12 characters for a TIC CAS number. One or two SVOC TIC detections exceeded this limitation for 38SB2A, 38SB3C, 68SB2B, and 68SB1A. The laboratory reported the CAS number without the dashes. The reviewer manually entered the dashes for evaluation purposes on the hardcopy result forms included in this report.

No anomalies were encountered if a given fraction was not mentioned. Except for data flagged "R", all data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-3	345184	EQB2	WQ	10/03/03
36440-3	345185	Trip Blank	WQ	10/03/03
36440-3	345186	38SB2A	SO	10/03/03
36440-3	345187	38SB2B	SO	10/03/03
36440-3	345188	SBD4	SO	10/03/03
36440-3	345189	38SB2C	SO	10/03/03
36440-3	345196	38SB1A	SO	10/03/03
36440-3	345197	38SB1B	SO	10/03/03
36440-3	345198	38SB1C	SO	10/03/03
36440-3	345199	38SB3A	SO	10/03/03
36440-3	345200	38SB3B	SO	10/03/03
36440-3	345201	38SB3C	SO	10/03/03
36440-3	345408	68SB2A	SO	10/06/03
36440-3	345409	68SB2B	SO	10/06/03
36440-3	345410	68SB2C	SO	10/06/03
36440-3	345411	SBD5	SO	10/06/03
36440-3	345412	68SB1A	SO	10/06/03
36440-3	345413	68SB1B	SO	10/06/03
36440-3	345414	68SB1C	SO	10/06/03
36440-3	345617	EQB3	WQ	10/07/03
36440-3	345618	Trip Blank	WQ	10/07/03

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB2**	QC Batch:	89888 -115
Sample #:	**345184**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	**Acetone**	**2.2 J**	B,Z	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	VJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB2**	QC Batch:	89888 -115
Sample #:	**345184**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.57 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB2**	QC Batch:	89888 -115
Sample #:	**345184**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345185**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,c	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345185**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**1.1 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345185**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2A**	QC Batch:	90050 -114
Sample #:	**345186**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.8 U		5.8	0.494
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.8 U		5.8	0.880
79-34-5	1,1,2,2-Tetrachloroethane	5.8 U		5.8	0.757
79-00-5	1,1,2-Trichloroethane	5.8 U		5.8	0.688
75-34-3	1,1-Dichloroethane	5.8 U		5.8	0.840
75-35-4	1,1-Dichloroethylene	5.8 U		5.8	0.850
106-93-4	1,2-Dibromoethane	5.8 U		5.8	0.795
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.41
95-50-1	1,2-Dichlorobenzene	5.8 U		5.8	0.561
107-06-2	1,2-Dichloroethane	5.8 U		5.8	0.500
156-59-2	cis-1,2-Dichloroethene	5.8 U		5.8	0.824
156-60-5	trans-1,2-Dichloroethene	5.8 U		5.8	0.815
78-87-5	1,2-Dichloropropane	5.8 U		5.8	0.680
87-61-6	1,2,3-Trichlorobenzene	5.8 U		5.8	0.631
120-82-1	1,2,4-Trichlorobenzene	5.8 U		5.8	0.476
541-73-1	1,3-Dichlorobenzene	5.8 U		5.8	0.311
106-46-7	1,4-Dichlorobenzene	5.8 U		5.8	0.824
78-93-3	**Methyl Ethyl Ketone**	**26**		24	5.80
591-78-6	2-Hexanone	12 U		12	2.62
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.69
67-64-1	**Acetone**	**200**	J,C	24	5.80
71-43-2	Benzene	5.8 U		5.8	0.611
74-97-5	Bromochloromethane	5.8 U		5.8	0.883
75-27-4	Dichlorobromomethane	5.8 U		5.8	0.581
75-25-2	Bromoform	5.8 U		5.8	0.670
74-83-9	Bromomethane	5.8 U		5.8	1.74
75-15-0	Carbon Disulfide	5.8 U		5.8	1.68
56-23-5	Carbon Tetrachloride	5.8 U		5.8	0.541
108-90-7	Chlorobenzene	5.8 U		5.8	0.767
75-00-3	Chloroethane	5.8 U		5.8	1.57
67-66-3	Chloroform	5.8 U		5.8	0.517

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2A**	QC Batch:	90050 -114
Sample #:	**345186**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.8 U		5.8	0.967
110-82-7	Cyclohexane	12 U		12	0.367
10061-01-5	cis-1,3-Dichloropropene	5.8 U		5.8	0.570
10061-02-6	trans-1,3-Dichloropropene	5.8 U		5.8	0.604
75-71-8	Dichlorodifluoromethane	5.8 U		5.8	0.775
124-48-1	Chlorodibromomethane	5.8 U		5.8	0.600
100-41-4	Ethylbenzene	5.8 U		5.8	0.491
98-82-8	Isopropylbenzene	5.8 U		5.8	0.633
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.03
108-87-2	Methylcyclohexane	12 U		12	0.980
1634-04-4	Methyl(tert)butyl Ether	5.8 U		5.8	0.744
75-09-2	Methylene Chloride	24 U	UJ,c	24	3.26
100-42-5	Styrene	5.8 U		5.8	0.513
127-18-4	Tetrachloroethene	5.8 U		5.8	0.711
108-88-3	**Toluene**	**3.0 J**		5.8	0.538
79-01-6	Trichloroethene	5.8 U		5.8	0.785
75-69-4	Trichlorofluoromethane	5.8 U		5.8	0.862
75-01-4	Vinyl Chloride	5.8 U		5.8	0.429
1330-20-7	Xylene (Total)	5.8 U		5.8	0.488

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2A**	QC Batch:	90050 -114
Sample #:	**345186**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
4-Isopropyltoluene	99-87-6	4.4	Q	NJ,+
7,7-Dimethyl-2-methylene-bicyclo[2.2.1]heptane	471-84-1	11	E	NJ,+
Camphene	79-92-5	13	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2B**	QC Batch:	90050 -114
Sample #:	**345187**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.9 U		5.9	0.503
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.9 U		5.9	0.896
79-34-5	1,1,2,2-Tetrachloroethane	5.9 U		5.9	0.771
79-00-5	1,1,2-Trichloroethane	5.9 U		5.9	0.700
75-34-3	1,1-Dichloroethane	5.9 U		5.9	0.854
75-35-4	1,1-Dichloroethylene	5.9 U		5.9	0.865
106-93-4	1,2-Dibromoethane	5.9 U		5.9	0.808
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.45
95-50-1	1,2-Dichlorobenzene	5.9 U		5.9	0.571
107-06-2	1,2-Dichloroethane	5.9 U		5.9	0.509
156-59-2	cis-1,2-Dichloroethene	5.9 U		5.9	0.838
156-60-5	trans-1,2-Dichloroethene	5.9 U		5.9	0.830
78-87-5	1,2-Dichloropropane	5.9 U		5.9	0.691
87-61-6	1,2,3-Trichlorobenzene	5.9 U		5.9	0.642
120-82-1	1,2,4-Trichlorobenzene	5.9 U		5.9	0.484
541-73-1	1,3-Dichlorobenzene	5.9 U		5.9	0.316
106-46-7	1,4-Dichlorobenzene	5.9 U		5.9	0.838
78-93-3	Methyl Ethyl Ketone	24 U		24	5.90
591-78-6	2-Hexanone	12 U		12	2.67
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.72
67-64-1	**Acetone**	**34**	B,Z	24	5.90
71-43-2	Benzene	5.9 U		5.9	0.622
74-97-5	Bromochloromethane	5.9 U		5.9	0.898
75-27-4	Dichlorobromomethane	5.9 U		5.9	0.591
75-25-2	Bromoform	5.9 U		5.9	0.682
74-83-9	Bromomethane	5.9 U		5.9	1.77
75-15-0	Carbon Disulfide	5.9 U		5.9	1.71
56-23-5	Carbon Tetrachloride	5.9 U		5.9	0.550
108-90-7	Chlorobenzene	5.9 U		5.9	0.780
75-00-3	Chloroethane	5.9 U		5.9	1.59
67-66-3	Chloroform	5.9 U		5.9	0.526

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2B**	QC Batch:	90050 -114
Sample #:	**345187**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.18

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.9 U		5.9	0.984
110-82-7	Cyclohexane	12 U		12	0.373
10061-01-5	cis-1,3-Dichloropropene	5.9 U		5.9	0.579
10061-02-6	trans-1,3-Dichloropropene	5.9 U		5.9	0.615
75-71-8	Dichlorodifluoromethane	5.9 U		5.9	0.788
124-48-1	Chlorodibromomethane	5.9 U		5.9	0.610
100-41-4	Ethylbenzene	5.9 U		5.9	0.499
98-82-8	Isopropylbenzene	5.9 U		5.9	0.644
79-20-9	Methyl Acetate	24 U	VJ,C	24	4.09
108-87-2	Methylcyclohexane	12 U		12	0.997
1634-04-4	Methyl(tert)butyl Ether	5.9 U		5.9	0.756
75-09-2	Methylene Chloride	24 U	VJ,C	24	3.32
100-42-5	Styrene	5.9 U		5.9	0.522
127-18-4	Tetrachloroethene	5.9 U		5.9	0.723
108-88-3	Toluene	5.9 U		5.9	0.548
79-01-6	Trichloroethene	5.9 U		5.9	0.799
75-69-4	Trichlorofluoromethane	5.9 U		5.9	0.877
75-01-4	Vinyl Chloride	5.9 U		5.9	0.437
1330-20-7	Xylene (Total)	5.9 U		5.9	0.497

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2B**	QC Batch:	90050 -114
Sample #:	**345187**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD4**	QC Batch:	90050 -114
Sample #:	**345188**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.524
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.934
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.803
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.729
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.891
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.902
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.843
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.56
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.595
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.530
156-59-2	**cis-1,2-Dichloroethene**	**19**		6.2	0.873
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.865
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.721
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.669
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.504
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.330
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.873
78-93-3	Methyl Ethyl Ketone	24 U		24	6.15
591-78-6	2-Hexanone	12 U		12	2.78
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.80
67-64-1	**Acetone**	**38**	B,Z	24	6.15
71-43-2	Benzene	6.2 U		6.2	0.648
74-97-5	Bromochloromethane	6.2 U		6.2	0.936
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.616
75-25-2	Bromoform	6.2 U		6.2	0.711
74-83-9	Bromomethane	6.2 U		6.2	1.85
75-15-0	Carbon Disulfide	6.2 U		6.2	1.78
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.573
108-90-7	Chlorobenzene	6.2 U		6.2	0.813
75-00-3	Chloroethane	6.2 U		6.2	1.66
67-66-3	Chloroform	6.2 U		6.2	0.549

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD4**	QC Batch:	90050 -114
Sample #:	**345188**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.23

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U		6.2	1.03
110-82-7	Cyclohexane	12 U		12	0.389
10061-01-5	cis-1,3-Dichloropropene	6.2 U		6.2	0.604
10061-02-6	trans-1,3-Dichloropropene	6.2 U		6.2	0.641
75-71-8	Dichlorodifluoromethane	6.2 U		6.2	0.822
124-48-1	Chlorodibromomethane	6.2 U		6.2	0.636
100-41-4	Ethylbenzene	6.2 U		6.2	0.520
98-82-8	Isopropylbenzene	6.2 U		6.2	0.672
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.27
108-87-2	Methylcyclohexane	12 U		12	1.04
1634-04-4	Methyl(tert)butyl Ether	6.2 U		6.2	0.788
75-09-2	Methylene Chloride	24 U	UJ,C	24	3.46
100-42-5	Styrene	6.2 U		6.2	0.544
127-18-4	Tetrachloroethene	6.2 U		6.2	0.754
108-88-3	**Toluene**	**0.69 J**		6.2	0.571
79-01-6	Trichloroethene	6.2 U		6.2	0.833
75-69-4	Trichlorofluoromethane	6.2 U		6.2	0.914
75-01-4	Vinyl Chloride	6.2 U		6.2	0.455
1330-20-7	Xylene (Total)	6.2 U		6.2	0.518

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD4**	QC Batch:	90050 -114
Sample #:	**345188**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2C**	QC Batch:	90050 -114
Sample #:	**345189**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.4 U		5.4	0.460
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.4 U		5.4	0.820
79-34-5	1,1,2,2-Tetrachloroethane	5.4 U		5.4	0.705
79-00-5	1,1,2-Trichloroethane	5.4 U		5.4	0.640
75-34-3	1,1-Dichloroethane	5.4 U		5.4	0.782
75-35-4	1,1-Dichloroethylene	5.4 U		5.4	0.792
106-93-4	1,2-Dibromoethane	5.4 U		5.4	0.740
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.25
95-50-1	1,2-Dichlorobenzene	5.4 U		5.4	0.523
107-06-2	1,2-Dichloroethane	5.4 U		5.4	0.465
156-59-2	cis-1,2-Dichloroethene	5.4 U		5.4	0.767
156-60-5	trans-1,2-Dichloroethene	5.4 U		5.4	0.759
78-87-5	1,2-Dichloropropane	5.4 U		5.4	0.633
87-61-6	1,2,3-Trichlorobenzene	5.4 U		5.4	0.588
120-82-1	1,2,4-Trichlorobenzene	5.4 U		5.4	0.443
541-73-1	1,3-Dichlorobenzene	5.4 U		5.4	0.289
106-46-7	1,4-Dichlorobenzene	5.4 U		5.4	0.767
78-93-3	Methyl Ethyl Ketone	22 U		22	5.40
591-78-6	2-Hexanone	11 U		11	2.44
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.58
67-64-1	**Acetone**	**28**	B,Z	22	5.40
71-43-2	Benzene	5.4 U		5.4	0.569
74-97-5	Bromochloromethane	5.4 U		5.4	0.822
75-27-4	Dichlorobromomethane	5.4 U		5.4	0.541
75-25-2	Bromoform	5.4 U		5.4	0.624
74-83-9	Bromomethane	5.4 U		5.4	1.62
75-15-0	Carbon Disulfide	5.4 U		5.4	1.57
56-23-5	Carbon Tetrachloride	5.4 U		5.4	0.503
108-90-7	Chlorobenzene	5.4 U		5.4	0.714
75-00-3	Chloroethane	5.4 U		5.4	1.46
67-66-3	Chloroform	5.4 U		5.4	0.482

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2C**	QC Batch:	90050 -114
Sample #:	**345189**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.08

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.4 U		5.4	0.901
110-82-7	Cyclohexane	11 U		11	0.341
10061-01-5	cis-1,3-Dichloropropene	5.4 U		5.4	0.530
10061-02-6	trans-1,3-Dichloropropene	5.4 U		5.4	0.563
75-71-8	Dichlorodifluoromethane	5.4 U		5.4	0.721
124-48-1	Chlorodibromomethane	5.4 U		5.4	0.558
100-41-4	Ethylbenzene	5.4 U		5.4	0.457
98-82-8	Isopropylbenzene	5.4 U		5.4	0.590
79-20-9	Methyl Acetate	22 U	UJ/C	22	3.75
108-87-2	Methylcyclohexane	11 U		11	0.913
1634-04-4	Methyl(tert)butyl Ether	5.4 U		5.4	0.692
75-09-2	Methylene Chloride	22 U	UJ/C	22	3.03
100-42-5	Styrene	5.4 U		5.4	0.477
127-18-4	Tetrachloroethene	5.4 U		5.4	0.662
108-88-3	Toluene	5.4 U		5.4	0.501
79-01-6	Trichloroethene	5.4 U		5.4	0.731
75-69-4	Trichlorofluoromethane	5.4 U		5.4	0.802
75-01-4	Vinyl Chloride	5.4 U		5.4	0.400
1330-20-7	Xylene (Total)	5.4 U		5.4	0.455

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB2C**	QC Batch:	90050 -114
Sample #:	**345189**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1A**	QC Batch:	90050 -114
Sample #:	**345196**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.43

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.1 U		7.1	0.609
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.1 U		7.1	1.09
79-34-5	1,1,2,2-Tetrachloroethane	7.1 U		7.1	0.934
79-00-5	1,1,2-Trichloroethane	7.1 U		7.1	0.848
75-34-3	1,1-Dichloroethane	7.1 U		7.1	1.04
75-35-4	1,1-Dichloroethylene	7.1 U		7.1	1.05
106-93-4	1,2-Dibromoethane	7.1 U		7.1	0.980
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.97
95-50-1	1,2-Dichlorobenzene	7.1 U		7.1	0.692
107-06-2	1,2-Dichloroethane	7.1 U		7.1	0.616
156-59-2	cis-1,2-Dichloroethene	7.1 U		7.1	1.02
156-60-5	trans-1,2-Dichloroethene	7.1 U		7.1	1.01
78-87-5	1,2-Dichloropropane	7.1 U		7.1	0.838
87-61-6	1,2,3-Trichlorobenzene	7.1 U		7.1	0.778
120-82-1	1,2,4-Trichlorobenzene	7.1 U		7.1	0.586
541-73-1	1,3-Dichlorobenzene	7.1 U		7.1	0.383
106-46-7	1,4-Dichlorobenzene	7.1 U		7.1	1.02
78-93-3	Methyl Ethyl Ketone	28 U		28	7.15
591-78-6	2-Hexanone	14 U		14	3.23
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.09
67-64-1	**Acetone**	**100**	B,2	28	7.15
71-43-2	Benzene	7.1 U		7.1	0.754
74-97-5	Bromochloromethane	7.1 U		7.1	1.09
75-27-4	Dichlorobromomethane	7.1 U		7.1	0.716
75-25-2	Bromoform	7.1 U		7.1	0.827
74-83-9	Bromomethane	7.1 U		7.1	2.15
75-15-0	Carbon Disulfide	7.1 U		7.1	2.07
56-23-5	Carbon Tetrachloride	7.1 U		7.1	0.666
108-90-7	Chlorobenzene	7.1 U		7.1	0.945
75-00-3	Chloroethane	7.1 U		7.1	1.93
67-66-3	Chloroform	7.1 U		7.1	0.638

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1A**	QC Batch:	90050 -114
Sample #:	**345196**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.43

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.1 U		7.1	1.19
110-82-7	Cyclohexane	14 U		14	0.452
10061-01-5	cis-1,3-Dichloropropene	7.1 U		7.1	0.702
10061-02-6	trans-1,3-Dichloropropene	7.1 U		7.1	0.745
75-71-8	Dichlorodifluoromethane	7.1 U		7.1	0.955
124-48-1	Chlorodibromomethane	7.1 U		7.1	0.739
100-41-4	Ethylbenzene	7.1 U		7.1	0.605
98-82-8	Isopropylbenzene	7.1 U		7.1	0.781
79-20-9	Methyl Acetate	28 U	UJ,C	28	4.96
108-87-2	Methylcyclohexane	14 U		14	1.21
1634-04-4	Methyl(tert)butyl Ether	7.1 U		7.1	0.917
75-09-2	Methylene Chloride	28 U	UJ,C	28	4.02
100-42-5	Styrene	7.1 U		7.1	0.632
127-18-4	Tetrachloroethene	7.1 U		7.1	0.877
108-88-3	Toluene	7.1 U		7.1	0.664
79-01-6	Trichloroethene	7.1 U		7.1	0.968
75-69-4	Trichlorofluoromethane	7.1 U		7.1	1.06
75-01-4	Vinyl Chloride	7.1 U		7.1	0.529
1330-20-7	Xylene (Total)	7.1 U		7.1	0.602

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1A**	QC Batch:	90050 -114
Sample #:	**345196**	Anal. Batch:	208007
Matrix:	Soil	Percent Solids:	70
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Camphene	79-92-5	10	E NJ+
Hexanal	66-25-1	8.8	E NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1B**	QC Batch:	90050 -214
Sample #:	**345197**	Anal. Batch:	208009
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	0.520
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.926
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	0.797
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	0.723
75-34-3	1,1-Dichloroethane	6.1 U		6.1	0.883
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	0.894
106-93-4	1,2-Dibromoethane	6.1 U		6.1	0.836
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.54
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	0.590
107-06-2	1,2-Dichloroethane	6.1 U		6.1	0.526
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	0.866
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	0.858
78-87-5	1,2-Dichloropropane	6.1 U		6.1	0.715
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	0.664
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	0.500
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	0.327
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.866
78-93-3	**Methyl Ethyl Ketone**	**23 J**		24	6.10
591-78-6	2-Hexanone	12 U	UJ,c	12	2.76
108-10-1	4-Methyl-2-Pentanone	12 U	UJ,c	12	1.78
67-64-1	**Acetone**	**96**	B,z	24	6.10
71-43-2	Benzene	6.1 U		6.1	0.643
74-97-5	Bromochloromethane	6.1 U		6.1	0.928
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.611
75-25-2	Bromoform	6.1 U		6.1	0.705
74-83-9	Bromomethane	6.1 U		6.1	1.83
75-15-0	Carbon Disulfide	6.1 U	UJ,c	6.1	1.77
56-23-5	Carbon Tetrachloride	6.1 U		6.1	0.569
108-90-7	Chlorobenzene	6.1 U		6.1	0.806
75-00-3	Chloroethane	6.1 U		6.1	1.65
67-66-3	Chloroform	6.1 U		6.1	0.544

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1B**	QC Batch:	90050 -214
Sample #:	**345197**	Anal. Batch:	208009
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.02
110-82-7	Cyclohexane	12 U		12	0.386
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.599
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.636
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.815
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.631
100-41-4	Ethylbenzene	6.1 U		6.1	0.516
98-82-8	Isopropylbenzene	6.1 U		6.1	0.666
79-20-9	Methyl Acetate	24 U	VJ,C	24	4.23
108-87-2	Methylcyclohexane	12 U		12	1.03
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.782
75-09-2	Methylene Chloride	24 U		24	3.43
100-42-5	Styrene	6.1 U		6.1	0.539
127-18-4	Tetrachloroethene	6.1 U		6.1	0.748
108-88-3	Toluene	6.1 U		6.1	0.566
79-01-6	Trichloroethene	6.1 U		6.1	0.826
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.906
75-01-4	Vinyl Chloride	6.1 U		6.1	0.451
1330-20-7	Xylene (Total)	6.1 U		6.1	0.514

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1B**	QC Batch:	90050 -214
Sample #:	**345197**	Anal. Batch:	208009
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1C**	QC Batch:	90050 -115
Sample #:	**345198**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.545
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.972
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.836
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.759
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.927
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.938
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.877
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.66
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.620
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.552
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.909
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.900
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.750
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.696
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.525
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.343
106-46-7	1,4-Dichlorobenzene	6.4 U	UJ,c	6.4	0.909
78-93-3	**Methyl Ethyl Ketone**	**20 J**		26	6.40
591-78-6	2-Hexanone	13 U		13	2.89
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.87
67-64-1	**Acetone**	**59**	B,z	26	6.40
71-43-2	Benzene	6.4 U		6.4	0.675
74-97-5	Bromochloromethane	6.4 U		6.4	0.974
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.641
75-25-2	Bromoform	6.4 U		6.4	0.740
74-83-9	Bromomethane	6.4 U		6.4	1.92
75-15-0	Carbon Disulfide	6.4 U	UJ,c	6.4	1.86
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.596
108-90-7	Chlorobenzene	6.4 U		6.4	0.846
75-00-3	Chloroethane	6.4 U		6.4	1.73
67-66-3	Chloroform	6.4 U		6.4	0.571

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1C**	QC Batch:	90050 -115
Sample #:	**345198**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.07
110-82-7	Cyclohexane	13 U		13	0.404
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.628
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.667
75-71-8	Dichlorodifluoromethane	6.4 U	UJ,C	6.4	0.855
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.662
100-41-4	Ethylbenzene	6.4 U		6.4	0.541
98-82-8	Isopropylbenzene	6.4 U		6.4	0.699
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.44
108-87-2	Methylcyclohexane	13 U		13	1.08
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.820
75-09-2	Methylene Chloride	26 U	UJ,C	26	3.60
100-42-5	Styrene	6.4 U		6.4	0.566
127-18-4	Tetrachloroethene	6.4 U		6.4	0.785
108-88-3	Toluene	6.4 U		6.4	0.594
79-01-6	Trichloroethene	6.4 U		6.4	0.867
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.951
75-01-4	Vinyl Chloride	6.4 U		6.4	0.474
1330-20-7	Xylene (Total)	6.4 U		6.4	0.539

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB1C**	QC Batch:	90050 -115
Sample #:	**345198**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3A**	QC Batch:	90050 -115
Sample #:	**345199**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	1.78

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	8.9 U		8.9	0.758
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	8.9 U		8.9	1.35
79-34-5	1,1,2,2-Tetrachloroethane	8.9 U		8.9	1.16
79-00-5	1,1,2-Trichloroethane	8.9 U		8.9	1.06
75-34-3	1,1-Dichloroethane	8.9 U		8.9	1.29
75-35-4	1,1-Dichloroethylene	8.9 U		8.9	1.30
106-93-4	1,2-Dibromoethane	8.9 U		8.9	1.22
96-12-8	1,2-Dibromo-3-chloropropane	18 U		18	3.70
95-50-1	1,2-Dichlorobenzene	8.9 U		8.9	0.862
107-06-2	1,2-Dichloroethane	8.9 U		8.9	0.767
156-59-2	cis-1,2-Dichloroethene	8.9 U		8.9	1.26
156-60-5	trans-1,2-Dichloroethene	8.9 U		8.9	1.25
78-87-5	1,2-Dichloropropane	8.9 U		8.9	1.04
87-61-6	1,2,3-Trichlorobenzene	8.9 U		8.9	0.968
120-82-1	1,2,4-Trichlorobenzene	8.9 U		8.9	0.730
541-73-1	1,3-Dichlorobenzene	8.9 U		8.9	0.477
106-46-7	1,4-Dichlorobenzene	8.9 U	UJ,C	8.9	1.26
78-93-3	Methyl Ethyl Ketone	36 U		36	8.90
591-78-6	2-Hexanone	18 U		18	4.02
108-10-1	4-Methyl-2-Pentanone	18 U		18	2.60
67-64-1	**Acetone**	**130**	B,Z	36	8.90
71-43-2	Benzene	8.9 U		8.9	0.938
74-97-5	Bromochloromethane	8.9 U		8.9	1.35
75-27-4	Dichlorobromomethane	8.9 U		8.9	0.892
75-25-2	Bromoform	8.9 U		8.9	1.03
74-83-9	Bromomethane	8.9 U		8.9	2.67
75-15-0	Carbon Disulfide	8.9 U	UJ,C	8.9	2.58
56-23-5	Carbon Tetrachloride	8.9 U		8.9	0.829
108-90-7	Chlorobenzene	8.9 U		8.9	1.18
75-00-3	Chloroethane	8.9 U		8.9	2.40
67-66-3	Chloroform	8.9 U		8.9	0.794

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3A**	QC Batch:	90050 -115
Sample #:	**345199**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	1.78

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	8.9 U		8.9	1.48
110-82-7	Cyclohexane	18 U		18	0.562
10061-01-5	cis-1,3-Dichloropropene	8.9 U		8.9	0.874
10061-02-6	trans-1,3-Dichloropropene	8.9 U		8.9	0.927
75-71-8	Dichlorodifluoromethane	8.9 U	UJ,C	8.9	1.19
124-48-1	Chlorodibromomethane	8.9 U		8.9	0.920
100-41-4	Ethylbenzene	8.9 U		8.9	0.753
98-82-8	Isopropylbenzene	8.9 U		8.9	0.972
79-20-9	Methyl Acetate	36 U	UJ,C	36	6.18
108-87-2	Methylcyclohexane	18 U		18	1.50
1634-04-4	Methyl(tert)butyl Ether	8.9 U		8.9	1.14
75-09-2	Methylene Chloride	36 U	UJ,C	36	5.00
100-42-5	Styrene	8.9 U		8.9	0.787
127-18-4	Tetrachloroethene	8.9 U		8.9	1.09
108-88-3	Toluene	8.9 U		8.9	0.826
79-01-6	Trichloroethene	8.9 U		8.9	1.21
75-69-4	Trichlorofluoromethane	8.9 U		8.9	1.32
75-01-4	Vinyl Chloride	8.9 U		8.9	0.659
1330-20-7	Xylene (Total)	8.9 U		8.9	0.749

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3A**	QC Batch:	90050 -115
Sample #:	**345199**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	56
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3B**	QC Batch:	90050 -115
Sample #:	**345200**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U	UJ,c	6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**26**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	**Acetone**	**110**	B,z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U	UJ,c	6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3B**	QC Batch:	90050 -115
Sample #:	**345200**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U	UJ,c	6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,c	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	Methylene Chloride	26 U	UJ,c	26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3B**	QC Batch:	90050 -115
Sample #:	**345200**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	5.6	E NJ/A

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3C**	QC Batch:	90050 -115
Sample #:	**345201**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.25

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.533
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.949
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.816
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.741
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.905
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.916
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.856
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.60
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.605
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.539
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	0.888
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.879
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.733
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.680
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.513
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.335
106-46-7	1,4-Dichlorobenzene	6.2 U	UJ,C	6.2	0.888
78-93-3	**Methyl Ethyl Ketone**	**28**		24	6.25
591-78-6	2-Hexanone	12 U		12	2.83
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.83
67-64-1	**Acetone**	**110**	B,Z	24	6.25
71-43-2	Benzene	6.2 U		6.2	0.659
74-97-5	Bromochloromethane	6.2 U		6.2	0.951
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.626
75-25-2	Bromoform	6.2 U		6.2	0.723
74-83-9	Bromomethane	6.2 U		6.2	1.88
75-15-0	Carbon Disulfide	6.2 U		6.2	1.81
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.583
108-90-7	Chlorobenzene	6.2 U		6.2	0.826
75-00-3	Chloroethane	6.2 U		6.2	1.69
67-66-3	Chloroform	6.2 U		6.2	0.558

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3C**	QC Batch:	90050 -115
Sample #:	**345201**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.25

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U		6.2	1.04
110-82-7	Cyclohexane	12 U		12	0.395
10061-01-5	cis-1,3-Dichloropropene	6.2 U		6.2	0.614
10061-02-6	trans-1,3-Dichloropropene	6.2 U		6.2	0.651
75-71-8	Dichlorodifluoromethane	6.2 U	UJ,C	6.2	0.835
124-48-1	Chlorodibromomethane	6.2 U		6.2	0.646
100-41-4	Ethylbenzene	6.2 U		6.2	0.529
98-82-8	Isopropylbenzene	6.2 U		6.2	0.683
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.34
108-87-2	Methylcyclohexane	12 U		12	1.06
1634-04-4	Methyl(tert)butyl Ether	6.2 U		6.2	0.801
75-09-2	Methylene Chloride	24 U	UJ,C	24	3.51
100-42-5	Styrene	6.2 U		6.2	0.553
127-18-4	Tetrachloroethene	6.2 U		6.2	0.766
108-88-3	Toluene	6.2 U		6.2	0.580
79-01-6	Trichloroethene	6.2 U		6.2	0.846
75-69-4	Trichlorofluoromethane	6.2 U		6.2	0.929
75-01-4	Vinyl Chloride	6.2 U		6.2	0.463
1330-20-7	Xylene (Total)	6.2 U		6.2	0.526

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**38SB3C**	QC Batch:	90050 -115
Sample #:	**345201**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2A**	QC Batch:	90050 -115
Sample #:	**345408**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.545
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.972
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.836
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.759
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.927
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.938
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.877
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.66
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.620
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.552
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.909
156-60-5	*trans-1,2-Dichloroethene	6.4 U		6.4	0.900
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.750
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.696
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.525
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.343
106-46-7	1,4-Dichlorobenzene	6.4 U	UJ,C	6.4	0.909
78-93-3	**Methyl Ethyl Ketone**	**30**		26	6.40
591-78-6	2-Hexanone	13 U		13	2.89
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.87
67-64-1	***Acetone**	**100**	B,Z	26	6.40
71-43-2	Benzene	6.4 U		6.4	0.675
74-97-5	Bromochloromethane	6.4 U		6.4	0.974
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.641
75-25-2	Bromoform	6.4 U		6.4	0.740
74-83-9	Bromomethane	6.4 U		6.4	1.92
75-15-0	*Carbon Disulfide	6.4 U	UJ,C	6.4	1.86
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.596
108-90-7	Chlorobenzene	6.4 U		6.4	0.846
75-00-3	*Chloroethane	6.4 U		6.4	1.73
67-66-3	Chloroform	6.4 U		6.4	0.571

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2A**	QC Batch:	90050 -115
Sample #:	**345408**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.07
110-82-7	Cyclohexane	13 U		13	0.404
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.628
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.667
75-71-8	Dichlorodifluoromethane	6.4 U	UJ,C	6.4	0.855
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.662
100-41-4	Ethylbenzene	6.4 U		6.4	0.541
98-82-8	Isopropylbenzene	6.4 U		6.4	0.699
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.44
108-87-2	Methylcyclohexane	13 U		13	1.08
1634-04-4	*Methyl(tert)butyl Ether	6.4 U		6.4	0.820
75-09-2	Methylene Chloride	26 U	UJ,C	26	3.60
100-42-5	Styrene	6.4 U		6.4	0.566
127-18-4	Tetrachloroethene	6.4 U		6.4	0.785
108-88-3	Toluene	6.4 U		6.4	0.594
79-01-6	Trichloroethene	6.4 U		6.4	0.867
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.951
75-01-4	Vinyl Chloride	6.4 U		6.4	0.474
1330-20-7	Xylene (Total)	6.4 U		6.4	0.539

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2A**	QC Batch:	90050 -115
Sample #:	**345408**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2B**	QC Batch:	90050 -115
Sample #:	**345409**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.37

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.584
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.04
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.895
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.812
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.992
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	1.00
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.938
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.85
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.663
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.590
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.973
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.963
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.803
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.745
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.562
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.367
106-46-7	1,4-Dichlorobenzene	6.8 U	VJ,C	6.8	0.973
78-93-3	**Methyl Ethyl Ketone**	**24 J**		28	6.85
591-78-6	2-Hexanone	14 U		14	3.10
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.00
67-64-1	**Acetone**	**55**	B,Z	28	6.85
71-43-2	Benzene	6.8 U		6.8	0.722
74-97-5	Bromochloromethane	6.8 U		6.8	1.04
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.686
75-25-2	Bromoform	6.8 U		6.8	0.792
74-83-9	Bromomethane	6.8 U		6.8	2.06
75-15-0	Carbon Disulfide	6.8 U	VJ,C	6.8	1.99
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.638
108-90-7	Chlorobenzene	6.8 U		6.8	0.906
75-00-3	Chloroethane	6.8 U		6.8	1.85
67-66-3	Chloroform	6.8 U		6.8	0.611

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2B**	QC Batch:	90050 -115
Sample #:	**345409**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.37

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.14
110-82-7	Cyclohexane	14 U		14	0.433
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.673
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.714
75-71-8	Dichlorodifluoromethane	6.8 U	UJ,c	6.8	0.915
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.708
100-41-4	Ethylbenzene	6.8 U		6.8	0.580
98-82-8	Isopropylbenzene	6.8 U		6.8	0.748
79-20-9	Methyl Acetate	28 U	UJ,c	28	4.75
108-87-2	Methylcyclohexane	14 U		14	1.16
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.878
75-09-2	Methylene Chloride	28 U	UJ,c	28	3.85
100-42-5	Styrene	6.8 U		6.8	0.606
127-18-4	Tetrachloroethene	6.8 U		6.8	0.840
108-88-3	Toluene	6.8 U		6.8	0.636
79-01-6	Trichloroethene	6.8 U		6.8	0.927
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.02
75-01-4	Vinyl Chloride	6.8 U		6.8	0.507
1330-20-7	Xylene (Total)	6.8 U		6.8	0.577

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2B**	QC Batch:	90050 -115
Sample #:	**345409**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2C**	QC Batch:	90050 -115
Sample #:	**345410**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U		7.0	0.601
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U		7.0	1.07
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U		7.0	0.921
79-00-5	1,1,2-Trichloroethane	7.0 U		7.0	0.836
75-34-3	1,1-Dichloroethane	7.0 U		7.0	1.02
75-35-4	1,1-Dichloroethylene	7.0 U		7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U		7.0	0.966
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.93
95-50-1	1,2-Dichlorobenzene	7.0 U		7.0	0.682
107-06-2	1,2-Dichloroethane	7.0 U		7.0	0.608
156-59-2	cis-1,2-Dichloroethene	7.0 U		7.0	1.00
156-60-5	trans-1,2-Dichloroethene	7.0 U		7.0	0.991
78-87-5	1,2-Dichloropropane	7.0 U		7.0	0.826
87-61-6	1,2,3-Trichlorobenzene	7.0 U		7.0	0.767
120-82-1	1,2,4-Trichlorobenzene	7.0 U		7.0	0.578
541-73-1	1,3-Dichlorobenzene	7.0 U		7.0	0.378
106-46-7	1,4-Dichlorobenzene	7.0 U	UJ,c	7.0	1.00
78-93-3	Methyl Ethyl Ketone	28 U		28	7.05
591-78-6	2-Hexanone	14 U		14	3.19
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.06
67-64-1	**Acetone**	**52**	B,z	28	7.05
71-43-2	Benzene	7.0 U		7.0	0.743
74-97-5	Bromochloromethane	7.0 U		7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U		7.0	0.706
75-25-2	Bromoform	7.0 U		7.0	0.815
74-83-9	Bromomethane	7.0 U		7.0	2.12
75-15-0	Carbon Disulfide	7.0 U	UJ,c	7.0	2.04
56-23-5	Carbon Tetrachloride	7.0 U		7.0	0.657
108-90-7	Chlorobenzene	7.0 U		7.0	0.932
75-00-3	Chloroethane	7.0 U		7.0	1.90
67-66-3	Chloroform	7.0 U		7.0	0.629

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2C**	QC Batch:	90050 -115
Sample #:	**345410**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.18
110-82-7	Cyclohexane	14 U		14	0.446
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.692
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.735
75-71-8	Dichlorodifluoromethane	7.0 U	UJ,C	7.0	0.942
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.729
100-41-4	Ethylbenzene	7.0 U		7.0	0.596
98-82-8	Isopropylbenzene	7.0 U		7.0	0.770
79-20-9	Methyl Acetate	28 U	UJ,C	28	4.89
108-87-2	Methylcyclohexane	14 U		14	1.19
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.904
75-09-2	Methylene Chloride	28 U	UJ,C	28	3.96
100-42-5	Styrene	7.0 U		7.0	0.623
127-18-4	Tetrachloroethene	7.0 U		7.0	0.864
108-88-3	Toluene	7.0 U		7.0	0.654
79-01-6	Trichloroethene	7.0 U		7.0	0.955
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.05
75-01-4	Vinyl Chloride	7.0 U		7.0	0.522
1330-20-7	Xylene (Total)	7.0 U		7.0	0.594

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB2C**	QC Batch:	90050 -115
Sample #:	**345410**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD5**	QC Batch:	90050 -115
Sample #:	**345411**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U	UJ,C	6.6	0.937
78-93-3	Methyl Ethyl Ketone	26 U		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	**Acetone**	**43**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U	UJ,C	6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD5**	QC Batch:	90050 -115
Sample #:	**345411**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U	UJ,C	6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	Methylene Chloride	26 U	UJ,C	26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD5**	QC Batch:	90050 -115
Sample #:	**345411**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1A**	QC Batch:	90050 -115
Sample #:	**345412**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.545
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.972
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.836
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.759
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.927
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.938
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.877
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.66
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.620
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.552
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.909
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.900
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.750
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.696
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.525
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.343
106-46-7	1,4-Dichlorobenzene	6.4 U	UJ,C	6.4	0.909
78-93-3	**Methyl Ethyl Ketone**	**30**		26	6.40
591-78-6	2-Hexanone	13 U		13	2.89
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.87
67-64-1	**Acetone**	**79**	B,Z	26	6.40
71-43-2	Benzene	6.4 U		6.4	0.675
74-97-5	Bromochloromethane	6.4 U		6.4	0.974
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.641
75-25-2	Bromoform	6.4 U		6.4	0.740
74-83-9	Bromomethane	6.4 U		6.4	1.92
75-15-0	Carbon Disulfide	6.4 U	UJ,C	6.4	1.86
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.596
108-90-7	Chlorobenzene	6.4 U		6.4	0.846
75-00-3	Chloroethane	6.4 U		6.4	1.73
67-66-3	Chloroform	6.4 U		6.4	0.571

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1A**	QC Batch:	90050 -115
Sample #:	**345412**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.07
110-82-7	Cyclohexane	13 U		13	0.404
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.628
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.667
75-71-8	Dichlorodifluoromethane	6.4 U	UJ,C	6.4	0.855
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.662
100-41-4	Ethylbenzene	6.4 U		6.4	0.541
98-82-8	Isopropylbenzene	6.4 U		6.4	0.699
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.44
108-87-2	Methylcyclohexane	13 U		13	1.08
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.820
75-09-2	Methylene Chloride	26 U	UJ,C	26	3.60
100-42-5	Styrene	6.4 U		6.4	0.566
127-18-4	Tetrachloroethene	6.4 U		6.4	0.785
108-88-3	Toluene	6.4 U		6.4	0.594
79-01-6	Trichloroethene	6.4 U		6.4	0.867
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.951
75-01-4	Vinyl Chloride	6.4 U		6.4	0.474
1330-20-7	Xylene (Total)	6.4 U		6.4	0.539

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1A**	QC Batch:	90050 -115
Sample #:	**345412**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1B**	QC Batch:	90050 -115
Sample #:	**345413**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.39

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.9 U		6.9	0.592
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.9 U		6.9	1.06
79-34-5	1,1,2,2-Tetrachloroethane	6.9 U		6.9	0.908
79-00-5	1,1,2-Trichloroethane	6.9 U		6.9	0.824
75-34-3	1,1-Dichloroethane	6.9 U		6.9	1.01
75-35-4	1,1-Dichloroethylene	6.9 U		6.9	1.02
106-93-4	1,2-Dibromoethane	6.9 U		6.9	0.952
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.89
95-50-1	1,2-Dichlorobenzene	6.9 U		6.9	0.673
107-06-2	1,2-Dichloroethane	6.9 U		6.9	0.599
156-59-2	cis-1,2-Dichloroethene	6.9 U		6.9	0.987
156-60-5	trans-1,2-Dichloroethene	6.9 U		6.9	0.977
78-87-5	1,2-Dichloropropane	6.9 U		6.9	0.815
87-61-6	1,2,3-Trichlorobenzene	6.9 U		6.9	0.756
120-82-1	1,2,4-Trichlorobenzene	6.9 U		6.9	0.570
541-73-1	1,3-Dichlorobenzene	6.9 U		6.9	0.373
106-46-7	1,4-Dichlorobenzene	6.9 U	UJ,C	6.9	0.987
78-93-3	**Methyl Ethyl Ketone**	**24 J**		28	6.95
591-78-6	2-Hexanone	14 U		14	3.14
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.03
67-64-1	**Acetone**	**51**	B,2	28	6.95
71-43-2	Benzene	6.9 U		6.9	0.733
74-97-5	Bromochloromethane	6.9 U		6.9	1.06
75-27-4	Dichlorobromomethane	6.9 U		6.9	0.696
75-25-2	Bromoform	6.9 U		6.9	0.803
74-83-9	Bromomethane	6.9 U		6.9	2.09
75-15-0	Carbon Disulfide	6.9 U	UJ,C	6.9	2.02
56-23-5	Carbon Tetrachloride	6.9 U		6.9	0.648
108-90-7	Chlorobenzene	6.9 U		6.9	0.919
75-00-3	Chloroethane	6.9 U		6.9	1.88
67-66-3	Chloroform	6.9 U		6.9	0.620

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1B**	QC Batch:	90050 -115
Sample #:	**345413**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.39

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.9 U		6.9	1.16
110-82-7	Cyclohexane	14 U		14	0.439
10061-01-5	cis-1,3-Dichloropropene	6.9 U		6.9	0.682
10061-02-6	trans-1,3-Dichloropropene	6.9 U		6.9	0.724
75-71-8	Dichlorodifluoromethane	6.9 U	VJ,c	6.9	0.929
124-48-1	Chlorodibromomethane	6.9 U		6.9	0.719
100-41-4	Ethylbenzene	6.9 U		6.9	0.588
98-82-8	Isopropylbenzene	6.9 U		6.9	0.759
79-20-9	Methyl Acetate	28 U	VJ,c	28	4.82
108-87-2	Methylcyclohexane	14 U		14	1.17
1634-04-4	Methyl(tert)butyl Ether	6.9 U		6.9	0.891
75-09-2	Methylene Chloride	28 U	VJ,c	28	3.91
100-42-5	Styrene	6.9 U		6.9	0.614
127-18-4	Tetrachloroethene	6.9 U		6.9	0.852
108-88-3	Toluene	6.9 U		6.9	0.645
79-01-6	Trichloroethene	6.9 U		6.9	0.941
75-69-4	Trichlorofluoromethane	6.9 U		6.9	1.03
75-01-4	Vinyl Chloride	6.9 U		6.9	0.514
1330-20-7	Xylene (Total)	6.9 U		6.9	0.585

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1B**	QC Batch:	90050 -115
Sample #:	**345413**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	72
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1C**	QC Batch:	90050 -115
Sample #:	**345414**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.7 U		6.7	0.567
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.7 U		6.7	1.01
79-34-5	1,1,2,2-Tetrachloroethane	6.7 U		6.7	0.868
79-00-5	1,1,2-Trichloroethane	6.7 U		6.7	0.789
75-34-3	1,1-Dichloroethane	6.7 U		6.7	0.963
75-35-4	1,1-Dichloroethylene	6.7 U		6.7	0.975
106-93-4	1,2-Dibromoethane	6.7 U		6.7	0.911
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.77
95-50-1	1,2-Dichlorobenzene	6.7 U		6.7	0.644
107-06-2	1,2-Dichloroethane	6.7 U		6.7	0.573
156-59-2	cis-1,2-Dichloroethene	6.7 U		6.7	0.944
156-60-5	trans-1,2-Dichloroethene	6.7 U		6.7	0.935
78-87-5	1,2-Dichloropropane	6.7 U		6.7	0.779
87-61-6	1,2,3-Trichlorobenzene	6.7 U		6.7	0.724
120-82-1	1,2,4-Trichlorobenzene	6.7 U		6.7	0.545
541-73-1	1,3-Dichlorobenzene	6.7 U		6.7	0.356
106-46-7	1,4-Dichlorobenzene	6.7 U	UJ,C	6.7	0.944
78-93-3	Methyl Ethyl Ketone	26 U		26	6.65
591-78-6	2-Hexanone	13 U		13	3.01
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.94
67-64-1	**Acetone**	**42**	B,Z	26	6.65
71-43-2	Benzene	6.7 U		6.7	0.701
74-97-5	Bromochloromethane	6.7 U		6.7	1.01
75-27-4	Dichlorobromomethane	6.7 U		6.7	0.666
75-25-2	Bromoform	6.7 U		6.7	0.769
74-83-9	Bromomethane	6.7 U		6.7	2.00
75-15-0	Carbon Disulfide	6.7 U	UJ,C	6.7	1.93
56-23-5	Carbon Tetrachloride	6.7 U		6.7	0.620
108-90-7	Chlorobenzene	6.7 U		6.7	0.879
75-00-3	Chloroethane	6.7 U		6.7	1.80
67-66-3	Chloroform	6.7 U		6.7	0.593

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1C**	QC Batch:	90050 -115
Sample #:	**345414**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.7 U		6.7	1.11
110-82-7	Cyclohexane	13 U		13	0.420
10061-01-5	cis-1,3-Dichloropropene	6.7 U		6.7	0.653
10061-02-6	trans-1,3-Dichloropropene	6.7 U		6.7	0.693
75-71-8	Dichlorodifluoromethane	6.7 U	UJ,C	6.7	0.888
124-48-1	Chlorodibromomethane	6.7 U		6.7	0.688
100-41-4	Ethylbenzene	6.7 U		6.7	0.563
98-82-8	Isopropylbenzene	6.7 U		6.7	0.726
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.62
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.7 U		6.7	0.853
75-09-2	Methylene Chloride	26 U	UJ,C	26	3.74
100-42-5	Styrene	6.7 U		6.7	0.588
127-18-4	Tetrachloroethene	6.7 U		6.7	0.815
108-88-3	Toluene	6.7 U		6.7	0.617
79-01-6	Trichloroethene	6.7 U		6.7	0.900
75-69-4	Trichlorofluoromethane	6.7 U		6.7	0.988
75-01-4	Vinyl Chloride	6.7 U		6.7	0.492
1330-20-7	Xylene (Total)	6.7 U		6.7	0.560

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB1C**	QC Batch:	90050 -115
Sample #:	**345414**	Anal. Batch:	208011
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB3**	QC Batch:	89888 -115
Sample #:	**345617**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	**Acetone**	**2.3 J**	B,Z	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB3**	QC Batch:	89888 -115
Sample #:	**345617**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.67 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB3**	QC Batch:	89888 -115
Sample #:	**345617**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345618**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	1.0 U		1.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345618**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.91 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-3**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**345618**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB2**	QC Batch:	89818 -108
Sample #:	**345184**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U	5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U	5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U	5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U	5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U	5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U	5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U	5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U	5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U	5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U	5.0	0.005
95-57-8	2-Chlorophenol	5.0 U	5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U	5.0	0.084
95-48-7	2-Methylphenol	5.0 U	5.0	0.007
88-74-4	2-Nitroaniline	5.0 U	5.0	0.010
88-75-5	2-Nitrophenol	5.0 U	5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U	5.0	0.058
99-09-2	3-Nitroaniline	5.0 U	5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U	5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U	5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U	5.0	0.018
106-47-8	4-Chloroaniline	5.0 U	5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U	5.0	0.015
106-44-5	4-Methylphenol	5.0 U	5.0	0.014
100-01-6	4-Nitroaniline	5.0 U	5.0	0.070
100-02-7	4-Nitrophenol	10 U	10	0.134
83-32-9	Acenaphthene	5.0 U	5.0	0.008
208-96-8	Acenaphthylene	5.0 U	5.0	0.007
98-86-2	Acetophenone	5.0 U	5.0	0.011

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB2**	QC Batch:	89818 -108
Sample #:	**345184**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U	UJ,c	5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1.1 J**	B,z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.96 J**		5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,l	5.0	0.024
86-74-8	Carbazole	5.0 U		5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	**Diethylphthalate**	**0.12 J**	B,z	5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U		5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB2**	QC Batch:	89818 -108
Sample #:	**345184**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB2**	QC Batch:	89818 -108
Sample #:	**345184**	Anal. Batch:	207854
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	6.54	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.61	E	NJ,+
Eicosane	112-95-8	0.74	E	NJ,+
Stearic Acid	57-11-4	0.52	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2A**	QC Batch:	90209 -109
Sample #:	**345186**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	380 U		380	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	170 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**25 J**	B,X	200	6.25
106-47-8	4-Chloroaniline	200 U	U5,1	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	380 U		380	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2A**	QC Batch:	90209 -109
Sample #:	**345186**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,C	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**46 J**		200	2.48
85-68-7	**Butyl Benzyl Phthalate**	**52 J**	B,X	200	5.38
105-60-2	Caprolactam	380 U		380	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**4.0 J**	B,Z	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**42 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2A**	QC Batch:	90209 -109
Sample #:	**345186**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	380 U	380	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2A**	QC Batch:	90209 -109
Sample #:	**345186**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (mg/kg dr**	**Qualifier**		Result µg/kg dr
(Z)-9-Octadecenamide	301-02-0	0.16	E	B,X	160
1,2,3,4,4a,9,10,10a-Octa-1-phenanthrene carboxylic acid	1740-19-8	0.29	E	NJ,+	290
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.045	E	B,X	45
1,5,9-Undecatriene, 2,6,10-trimethyl-, (Z)-	62951-96-6	0.048	E	NJ,+	48
13-Tertadecen-1-ol acetate	1000130798 (100013-0798)	0.13	E	NJ,+	130
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	0.086	E	NJ,+	86
Bicyclo[3.1.1]hept-2-ene, 2,6,6-trimethyl-,(n)-	2437-95-8	0.13	E	NJ,+	130
Cyclotetradecane	295-17-0	0.055	E	NJ,+	55
Erucylamide	112-84-5	0.57	E	B,X	570
Heneicosane	629-94-7	0.072	E	NJ,+	72
Stearic Acid	57-11-4	0.10	E	B,X	100

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2B**	QC Batch:	90209 -109
Sample #:	**345187**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	80.0
99-09-2	3-Nitroaniline	200 U		200	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**17 J**	BX	200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,1	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2B**	QC Batch:	90209 -109
Sample #:	**345187**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U	UJ,c	200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**50 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**4.0 J**	B,2	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**23 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2B**	QC Batch:	90209 -109
Sample #:	**345187**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2B**	QC Batch:	90209 -109
Sample #:	**345187**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	85
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	120	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	34	E	B,X
1-HEXACOSANOL	506-52-5	63	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	23	E	NJ,+
Erucylamide	112-84-5	530	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD4**	QC Batch:	90209 -109
Sample #:	**345188**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U	210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U	210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U	210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U	210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U	210	3.14
120-83-2	2,4-Dichlorophenol	210 U	210	4.22
105-67-9	2,4-Dimethylphenol	210 U	210	9.53
51-28-5	2,4-Dinitrophenol	410 U	410	3.84
121-14-2	2,4-Dinitrotoluene	210 U	210	3.78
606-20-2	2,6-Dinitrotoluene	210 U	210	33.2
91-58-7	2-Chloronaphthalene	210 U	210	2.76
95-57-8	2-Chlorophenol	210 U	210	2.41
91-57-6	2-Methylnaphthalene	210 U	210	3.29
95-48-7	2-Methylphenol	210 U	210	5.81
88-74-4	2-Nitroaniline	210 U	210	5.52
88-75-5	2-Nitrophenol	210 U	210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U	210	80.0
99-09-2	3-Nitroaniline	210 U	210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U	210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U	210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**13 J** B,X	210	6.25
106-47-8	4-Chloroaniline	210 U UJ,1	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U	210	3.92
106-44-5	4-Methylphenol	210 U	210	7.64
100-01-6	4-Nitroaniline	210 U	210	8.70
100-02-7	4-Nitrophenol	410 U	410	3.40
83-32-9	Acenaphthene	210 U	210	2.06
208-96-8	Acenaphthylene	210 U	210	1.80
98-86-2	Acetophenone	210 U	210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD4**	QC Batch:	90209 -109
Sample #:	**345188**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U	VJ,c	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**45 J**		210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	**Caprolactam**	**110 J**		410	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**3.0 J**	B,z	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**22 J**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD4**	QC Batch:	90209 -109
Sample #:	**345188**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD4**	QC Batch:	90209 -109
Sample #:	**345188**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	81
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	47	E	NJ,+
(Z)-9-Octadecenamide	301-02-0	110	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	30	E	B,X
Erucylamide	112-84-5	480	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2C**	QC Batch:	90209 -109
Sample #:	**345189**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	180 U		180	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	180 U		180	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	180 U		180	1.45
95-95-4	2,4,5-Trichlorophenol	180 U		180	3.67
88-06-2	2,4,6-Trichlorophenol	180 U		180	2.88
120-83-2	2,4-Dichlorophenol	180 U		180	3.87
105-67-9	2,4-Dimethylphenol	180 U		180	8.73
51-28-5	2,4-Dinitrophenol	350 U		350	3.52
121-14-2	2,4-Dinitrotoluene	180 U		180	3.47
606-20-2	2,6-Dinitrotoluene	180 U		180	30.5
91-58-7	2-Chloronaphthalene	180 U		180	2.53
95-57-8	2-Chlorophenol	180 U		180	2.21
91-57-6	2-Methylnaphthalene	180 U		180	3.01
95-48-7	2-Methylphenol	180 U		180	5.32
88-74-4	2-Nitroaniline	180 U		180	5.06
88-75-5	2-Nitrophenol	180 U		180	1.87
91-94-1	3,3'-Dichlorobenzidine	180 U		180	73.4
99-09-2	3-Nitroaniline	180 U		180	36.6
534-52-1	4,6-Dinitro-2-Methylphenol	180 U		180	4.96
101-55-3	4-Bromophenyl Phenylether	180 U		180	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**13 J**	BX	180	5.73
106-47-8	4-Chloroaniline	180 U	VJ,1	180	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	180 U		180	3.60
106-44-5	4-Methylphenol	180 U		180	7.01
100-01-6	4-Nitroaniline	180 U		180	7.98
100-02-7	4-Nitrophenol	350 U		350	3.11
83-32-9	Acenaphthene	180 U		180	1.89
208-96-8	Acenaphthylene	180 U		180	1.65
98-86-2	Acetophenone	180 U		180	2.09

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2C**	QC Batch:	90209 -109
Sample #:	**345189**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	180 U		180	5.08
1912-24-9	Atrazine	180 U		180	7.57
100-52-7	Benzaldehyde	180 U	UJ,c	180	4.46
56-55-3	Benzo (a) Anthracene	180 U		180	14.6
50-32-8	Benzo (a) Pyrene	180 U		180	6.28
205-99-2	Benzo (b) Fluoranthene	180 U		180	10.7
191-24-2	Benzo (g,h,i,) Perylene	180 U		180	9.59
207-08-9	Benzo (k) Fluoranthene	180 U		180	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	180 U		180	3.45
111-44-4	Bis (2-Chloroethyl) Ether	180 U		180	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**52 J**		180	2.28
85-68-7	Butyl Benzyl Phthalate	180 U		180	4.93
105-60-2	**Caprolactam**	**85 J**		350	7.02
86-74-8	Carbazole	180 U		180	6.71
218-01-9	Chrysene	180 U		180	11.2
53-70-3	Dibenzo (a,h) Anthracene	180 U		180	6.49
132-64-9	Dibenzofuran	180 U		180	3.48
84-66-2	**Diethylphthalate**	**3.0 J**	B,z	180	2.09
131-11-3	Dimethylphthalate	180 U		180	3.64
84-74-2	**Di-n-Butylphthalate**	**24 J**		180	4.20
117-84-0	Di-n-Octylphthalate	180 U		180	3.41
206-44-0	Fluoranthene	180 U		180	2.59
86-73-7	Fluorene	180 U		180	1.85
118-74-1	Hexachlorobenzene	180 U		180	2.76
87-68-3	Hexachlorobutadiene	180 U		180	4.26
77-47-4	Hexachlorocyclopentadiene	180 U		180	2.18
67-72-1	Hexachloroethane	180 U		180	2.57
193-39-5	Indeno (1,2,3-cd) Pyrene	180 U		180	4.31
78-59-1	Isophorone	180 U		180	1.90
91-20-3	Naphthalene	180 U		180	3.03
98-95-3	Nitrobenzene	180 U		180	3.52

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2C**	QC Batch:	90209 -109
Sample #:	**345189**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	180 U	180	3.62
86-30-6	N-Nitroso-di-Phenylamine	180 U	180	5.23
87-86-5	Pentachlorophenol	350 U	350	4.83
85-01-8	Phenanthrene	180 U	180	2.53
108-95-2	Phenol	180 U	180	4.36
129-00-0	Pyrene	180 U	180	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB2C**	QC Batch:	90209 -109
Sample #:	**345189**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	93
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	130	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	31	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	70	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	52	E	NJ,+
Erucylamide	112-84-5	630	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	14

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	2400 U		2400	34.4
95-94-3	1,2,4,5-Tetrachloro-benzene	2400 U		2400	402
108-60-1	Bis (2-Chloroisopropyl)-Ether	2400 U		2400	18.5
95-95-4	2,4,5-Trichlorophenol	2400 U	UL,S	2400	46.8
88-06-2	2,4,6-Trichlorophenol	2400 U	UL,S	2400	36.7
120-83-2	2,4-Dichlorophenol	2400 U	UL,S	2400	49.3
105-67-9	2,4-Dimethylphenol	2400 U	UL,S	2400	111
51-28-5	2,4-Dinitrophenol	4700 U	UL,S	4700	44.8
121-14-2	**2,4-Dinitrotoluene**	**120 J**		2400	44.1
606-20-2	2,6-Dinitrotoluene	2400 U		2400	388
91-58-7	2-Chloronaphthalene	2400 U		2400	32.2
95-57-8	2-Chlorophenol	2400 U	UL,S	2400	28.1
91-57-6	2-Methylnaphthalene	2400 U		2400	38.4
95-48-7	2-Methylphenol	2400 U	UL,S	2400	67.8
88-74-4	2-Nitroaniline	2400 U		2400	64.4
88-75-5	2-Nitrophenol	2400 U	UL,S	2400	23.8
91-94-1	3,3'-Dichlorobenzidine	2400 U	UJ,C	2400	934
99-09-2	3-Nitroaniline	2400 U		2400	466
534-52-1	4,6-Dinitro-2-Methylphenol	2400 U	UL,S	2400	63.1
101-55-3	4-Bromophenyl Phenylether	2400 U		2400	47.3
59-50-7	4-Chloro-3-Methylphenol	2400 U	UL,S	2400	72.9
106-47-8	4-Chloroaniline	2400 U	UJ,C	2400	17.6
7005-72-3	4-Chlorophenylphenyl-Ether	2400 U		2400	45.8
106-44-5	4-Methylphenol	2400 U	UL,S	2400	89.2
100-01-6	4-Nitroaniline	2400 U		2400	102
100-02-7	4-Nitrophenol	4700 U	UL,S	4700	39.6
83-32-9	Acenaphthene	2400 U		2400	24.1
208-96-8	Acenaphthylene	2400 U		2400	21.0
98-86-2	Acetophenone	2400 U		2400	26.6

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	14

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL	
120-12-7	Anthracene	2400 U		2400	64.7	
1912-24-9	Atrazine	2400 U	UJ,C	2400	96.3	
100-52-7	Benzaldehyde	2400 U	UJ,C	2400	56.7	
56-55-3	Benzo (a) Anthracene	2400 U		2400	186	
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~79.9~~	see dilution
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~137~~	*5
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~122~~	
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~188~~	1/14/03
111-91-1	Bis (2-Chloroethoxy)-Methane	2400 U		2400	44.0	
111-44-4	Bis (2-Chloroethyl) Ether	2400 U		2400	24.2	
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1100 J**	J,C	2400	29.0	
85-68-7	Butyl Benzyl Phthalate	2400 U		2400	62.7	
105-60-2	Caprolactam	4700 U		4700	89.3	
86-74-8	Carbazole	2400 U		2400	85.4	
218-01-9	Chrysene	2400 U		2400	143	
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~82.6~~	see dilution *5 1/14/03
132-64-9	Dibenzofuran	2400 U		2400	44.2	
84-66-2	Diethylphthalate	2400 U		2400	26.6	
131-11-3	Dimethylphthalate	2400 U		2400	46.3	
84-74-2	**Di-n-Butylphthalate**	**14000**		2400	53.5	
117-84-0	Di-n-Octylphthalate	2400 U	UJ,C	2400	43.4	
206-44-0	**Fluoranthene**	**80 J**		2400	32.9	
86-73-7	Fluorene	2400 U		2400	23.5	
118-74-1	Hexachlorobenzene	2400 U		2400	35.1	
87-68-3	Hexachlorobutadiene	2400 U		2400	54.2	
77-47-4	Hexachlorocyclopentadiene	2400 U		2400	27.7	
67-72-1	Hexachloroethane	2400 U		2400	32.7	
~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~2400 UR~~	~~R,i~~	~~2400~~	~~54.9~~	see dilution *5 1/14/03
78-59-1	Isophorone	2400 U		2400	24.2	
91-20-3	Naphthalene	2400 U		2400	38.5	
98-95-3	Nitrobenzene	2400 U		2400	44.8	

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	14

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	2400 U		2400	46.1
86-30-6	**N-Nitroso-di-Phenylamine**	**150 J**		2400	66.5
87-86-5	Pentachlorophenol	4700 U	UL,S	4700	61.5
85-01-8	**Phenanthrene**	**40 J**		2400	32.2
108-95-2	Phenol	2400 U	UL,S	2400	55.4
129-00-0	**Pyrene**	**50 J**		2400	20.7

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	70
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	71

use DF 10 results
ok 1/14/04

CAS Number	Semivolatile Organics *OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	12000 U		12000	175
95-94-3	1,2,4,5-Tetrachloro-benzene	12000 U		12000	2040
108-60-1	Bis (2-Chloroisopropyl)-Ether	12000 U		12000	93.7
95-95-4	2,4,5-Trichlorophenol	12000 U		12000	237
88-06-2	2,4,6-Trichlorophenol	12000 U		12000	186
120-83-2	2,4-Dichlorophenol	12000 U		12000	250
105-67-9	2,4-Dimethylphenol	12000 U		12000	564
51-28-5	2,4-Dinitrophenol	24000 U		24000	227
121-14-2	2,4-Dinitrotoluene	12000 U		12000	224
606-20-2	2,6-Dinitrotoluene	12000 U		12000	1970
91-58-7	2-Chloronaphthalene	12000 U		12000	163
95-57-8	2-Chlorophenol	12000 U		12000	143
91-57-6	2-Methylnaphthalene	12000 U		12000	195
95-48-7	2-Methylphenol	12000 U		12000	344
88-74-4	2-Nitroaniline	12000 U		12000	327
88-75-5	2-Nitrophenol	12000 U		12000	121
91-94-1	3,3'-Dichlorobenzidine	12000 U		12000	4740
99-09-2	3-Nitroaniline	12000 U		12000	2360
534-52-1	4,6-Dinitro-2-Methylphenol	12000 U		12000	320
101-55-3	4-Bromophenyl Phenylether	12000 U		12000	240
59-50-7	4-Chloro-3-Methylphenol	12000 U		12000	370
106-47-8	4-Chloroaniline	12000 U	UJ,c	12000	89.5
7005-72-3	4-Chlorophenylphenyl-Ether	12000 U		12000	232
106-44-5	4-Methylphenol	12000 U		12000	452
100-01-6	4-Nitroaniline	12000 U		12000	515
100-02-7	4-Nitrophenol	24000 U		24000	201
83-32-9	Acenaphthene	12000 U		12000	122
208-96-8	Acenaphthylene	12000 U		12000	107
98-86-2	Acetophenone	12000 U		12000	135

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	71

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	12000 U	12000	328
1912-24-9	Atrazine	12000 U	12000	488
100-52-7	Benzaldehyde	12000 U UJ,e	12000	288
56-55-3	Benzo (a) Anthracene	12000 U	12000	944
50-32-8	Benzo (a) Pyrene	12000 U	12000	405
205-99-2	Benzo (b) Fluoranthene	12000 U	12000	693
191-24-2	Benzo (g,h,i,) Perylene	12000 U	12000	619
207-08-9	Benzo (k) Fluoranthene	12000 U	12000	951
111-91-1	Bis (2-Chloroethoxy)-Methane	12000 U	12000	223
111-44-4	Bis (2-Chloroethyl) Ether	12000 U	12000	123
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**2500 J**	12000	147
85-68-7	Butyl Benzyl Phthalate	12000 U	12000	318
105-60-2	Caprolactam	24000 U	24000	453
86-74-8	Carbazole	12000 U	12000	433
218-01-9	Chrysene	12000 U	12000	724
53-70-3	Dibenzo (a,h) Anthracene	12000 U	12000	419
132-64-9	Dibenzofuran	12000 U	12000	224
84-66-2	Diethylphthalate	12000 U	12000	135
131-11-3	Dimethylphthalate	12000 U	12000	235
84-74-2	**Di-n-Butylphthalate**	**13000**	12000	271
117-84-0	Di-n-Octylphthalate	12000 U	12000	220
206-44-0	Fluoranthene	12000 U	12000	167
86-73-7	Fluorene	12000 U	12000	119
118-74-1	Hexachlorobenzene	12000 U	12000	178
87-68-3	Hexachlorobutadiene	12000 U	12000	275
77-47-4	Hexachlorocyclopentadiene	12000 U	12000	141
67-72-1	Hexachloroethane	12000 U	12000	166
193-39-5	Indeno (1,2,3-cd) Pyrene	12000 U	12000	278
78-59-1	Isophorone	12000 U	12000	123
91-20-3	Naphthalene	12000 U	12000	195
98-95-3	Nitrobenzene	12000 U	12000	227

* only use these results AS 1/14/03

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1A**	QC Batch:	90209 -109
Sample #:	**345196DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	71

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	12000 U	12000	234
86-30-6	N-Nitroso-di-Phenylamine	12000 U	12000	337
87-86-5	Pentachlorophenol	24000 U	24000	312
85-01-8	Phenanthrene	12000 U	12000	163
108-95-2	Phenol	12000 U	12000	281
129-00-0	Pyrene	12000 U	12000	105

Use DF10 results 1/14/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1B**	QC Batch:	90210 -110
Sample #:	**345197**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U		400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U	UJ,C	210	80.0
99-09-2	3-Nitroaniline	210 U		210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**	B,X	210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,C	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1B**	QC Batch:	90210 -110
Sample #:	**345197**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U	UJ,C	210	8.26
100-52-7	Benzaldehyde	210 U	UJ,C	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**49 J**	J,C	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**100 J**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U	UJ,C	210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1B**	QC Batch:	90210 -110
Sample #:	**345197**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1B**	QC Batch:	90210 -110
Sample #:	**345197**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	32	E	B, X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	50	E	B, X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	87	E	NJ, I

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1C**	QC Batch:	90210 -110
Sample #:	**345198**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U		420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	UJ,C	220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**14 J**	B,X	220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,C	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1C**	QC Batch:	90210 -110
Sample #:	**345198**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U	UJ,C	220	8.94
100-52-7	Benzaldehyde	220 U	UJ,C	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**53 J**	J,C	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**4.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**140 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U	UJ,C	220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1C**	QC Batch:	90210 -110
Sample #:	**345198**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB1C**	QC Batch:	90210 -110
Sample #:	**345198**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	47	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	87	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~930~~	~~E~~	

1/14/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	18

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	3000 U		3000	44.3
95-94-3	1,2,4,5-Tetrachloro-benzene	3000 U		3000	517
108-60-1	Bis (2-Chloroisopropyl)-Ether	3000 U		3000	23.8
95-95-4	2,4,5-Trichlorophenol	3000 U	UL,S	3000	60.1
88-06-2	2,4,6-Trichlorophenol	3000 U	UL,S	3000	47.2
120-83-2	2,4-Dichlorophenol	3000 U	UL,6	3000	63.4
105-67-9	2,4-Dimethylphenol	3000 U	UL,S	3000	143
51-28-5	2,4-Dinitrophenol	5900 U	UL,S	5900	57.6
121-14-2	2,4-Dinitrotoluene	3000 U		3000	56.7
606-20-2	2,6-Dinitrotoluene	3000 U		3000	499
91-58-7	2-Chloronaphthalene	3000 U		3000	41.4
95-57-8	2-Chlorophenol	3000 U	UL,S	3000	36.2
91-57-6	2-Methylnaphthalene	3000 U		3000	49.3
95-48-7	2-Methylphenol	3000 U	UL,S	3000	87.1
88-74-4	2-Nitroaniline	3000 U		3000	82.8
88-75-5	2-Nitrophenol	3000 U	UL,S	3000	30.6
91-94-1	3,3'-Dichlorobenzidine	3000 U	UJ,C	3000	1200
99-09-2	3-Nitroaniline	3000 U		3000	599
534-52-1	4,6-Dinitro-2-Methylphenol	3000 U	UL,S	3000	81.2
101-55-3	4-Bromophenyl Phenylether	3000 U		3000	60.8
59-50-7	4-Chloro-3-Methylphenol	3000 U	UL,S	3000	93.8
106-47-8	4-Chloroaniline	3000 U	UJ,C	3000	22.7
7005-72-3	4-Chlorophenylphenyl-Ether	3000 U		3000	58.9
106-44-5	4-Methylphenol	3000 U	UL,S	3000	115
100-01-6	4-Nitroaniline	3000 U		3000	131
100-02-7	4-Nitrophenol	5900 U	UL,S	5900	50.9
83-32-9	Acenaphthene	3000 U		3000	31.0
208-96-8	Acenaphthylene	3000 U		3000	27.0
98-86-2	Acetophenone	3000 U		3000	34.2

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	18

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL	
120-12-7	Anthracene	3000 U	3000	83.2	
1912-24-9	Atrazine	3000 U UJ,c	3000	124	
100-52-7	Benzaldehyde	3000 U UJ,c	3000	72.9	
56-55-3	Benzo (a) Anthracene	3000 U	3000	239	
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~3000 UR~~ R,i	~~3000~~	~~103~~	see dilution
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~3000 UR~~ R,i	~~3000~~	~~176~~	~~1/14/04~~
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~3000 UR~~ R,i	~~3000~~	~~157~~	
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~3000 UR~~ R,i	~~3000~~	~~241~~	
111-91-1	Bis (2-Chloroethoxy)-Methane	3000 U	3000	56.5	
111-44-4	Bis (2-Chloroethyl) Ether	3000 U	3000	31.1	
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1300 J** J,c	3000	37.3	
85-68-7	Butyl Benzyl Phthalate	3000 U	3000	80.6	
105-60-2	Caprolactam	5900 U	5900	115	
86-74-8	Carbazole	3000 U	3000	110	
218-01-9	Chrysene	3000 U	3000	184	
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~3000 UR~~ R,i	~~3000~~	~~106~~	see dilution
132-64-9	Dibenzofuran	3000 U	3000	56.9	~~1/14/04~~
84-66-2	Diethylphthalate	3000 U	3000	34.2	
131-11-3	Dimethylphthalate	3000 U	3000	59.6	
84-74-2	**Di-n-Butylphthalate**	**8600**	3000	68.8	
117-84-0	Di-n-Octylphthalate	3000 U UJ,c	3000	55.8	
206-44-0	**Fluoranthene**	**170 J**	3000	42.3	
86-73-7	Fluorene	3000 U	3000	30.2	
118-74-1	Hexachlorobenzene	3000 U	3000	45.2	
87-68-3	Hexachlorobutadiene	3000 U	3000	69.7	
77-47-4	Hexachlorocyclopentadiene	3000 U	3000	35.6	
67-72-1	Hexachloroethane	3000 U	3000	42.0	
~~193-39-5~~	~~*Indeno (1,2,3 cd) Pyrene~~	~~3000 UR~~ R,i	~~3000~~	~~70.6~~	see dilution
78-59-1	Isophorone	3000 U	3000	31.1	~~1/14/04~~
91-20-3	Naphthalene	3000 U	3000	49.5	
98-95-3	Nitrobenzene	3000 U	3000	57.6	

* See attached Statement of Data Qualifications.

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Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	18

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	3000 U		3000	59.2
86-30-6	**N-Nitroso-di-Phenylamine**	**160 J**		3000	85.5
87-86-5	Pentachlorophenol	5900 U	UL,S	5900	79.0
85-01-8	**Phenanthrene**	**110 J**		3000	41.4
108-95-2	Phenol	3000 U	UL,S	3000	71.3
129-00-0	**Pyrene**	**90 J**		3000	26.6

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	56
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
2 (5H)-Furanone	497-23-4	72	E	NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	89

Use DF 10 results as 1/14/04

CAS Number	Semivolatile Organics *OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	15000 U		15000	219
95-94-3	1,2,4,5-Tetrachloro-benzene	15000 U		15000	2550
108-60-1	Bis (2-Chloroisopropyl)-Ether	15000 U		15000	117
95-95-4	2,4,5-Trichlorophenol	15000 U		15000	297
88-06-2	2,4,6-Trichlorophenol	15000 U		15000	233
120-83-2	2,4-Dichlorophenol	15000 U		15000	313
105-67-9	2,4-Dimethylphenol	15000 U		15000	707
51-28-5	2,4-Dinitrophenol	29000 U		29000	285
121-14-2	2,4-Dinitrotoluene	15000 U		15000	280
606-20-2	2,6-Dinitrotoluene	15000 U		15000	2470
91-58-7	2-Chloronaphthalene	15000 U		15000	205
95-57-8	2-Chlorophenol	15000 U		15000	179
91-57-6	2-Methylnaphthalene	15000 U		15000	244
95-48-7	2-Methylphenol	15000 U		15000	431
88-74-4	2-Nitroaniline	15000 U		15000	409
88-75-5	2-Nitrophenol	15000 U		15000	151
91-94-1	3,3'-Dichlorobenzidine	15000 U		15000	5940
99-09-2	3-Nitroaniline	15000 U		15000	2960
534-52-1	4,6-Dinitro-2-Methylphenol	15000 U		15000	401
101-55-3	4-Bromophenyl Phenylether	15000 U		15000	301
59-50-7	4-Chloro-3-Methylphenol	15000 U		15000	464
106-47-8	4-Chloroaniline	15000 U	VJC	15000	112
7005-72-3	4-Chlorophenylphenyl-Ether	15000 U		15000	291
106-44-5	4-Methylphenol	15000 U		15000	567
100-01-6	4-Nitroaniline	15000 U		15000	645
100-02-7	4-Nitrophenol	29000 U		29000	252
83-32-9	Acenaphthene	15000 U		15000	153
208-96-8	Acenaphthylene	15000 U		15000	134
98-86-2	Acetophenone	15000 U		15000	169

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	89

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	15000 U	15000	411
1912-24-9	Atrazine	15000 U	15000	612
100-52-7	Benzaldehyde	15000 U UJ,C	15000	360
56-55-3	Benzo (a) Anthracene	15000 U	15000	1180
50-32-8	Benzo (a) Pyrene	15000 U	15000	508
205-99-2	Benzo (b) Fluoranthene	15000 U	15000	869
191-24-2	Benzo (g,h,i,) Perylene	15000 U	15000	776
207-08-9	Benzo (k) Fluoranthene	15000 U	15000	1190
111-91-1	Bis (2-Chloroethoxy)-Methane	15000 U	15000	279
111-44-4	Bis (2-Chloroethyl) Ether	15000 U	15000	154
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**3000 J**	15000	184
85-68-7	Butyl Benzyl Phthalate	15000 U	15000	399
105-60-2	Caprolactam	29000 U	29000	568
86-74-8	Carbazole	15000 U	15000	543
218-01-9	Chrysene	15000 U	15000	908
53-70-3	Dibenzo (a,h) Anthracene	15000 U	15000	525
132-64-9	Dibenzofuran	15000 U	15000	281
84-66-2	Diethylphthalate	15000 U	15000	169
131-11-3	Dimethylphthalate	15000 U	15000	295
84-74-2	**Di-n-Butylphthalate**	**8200 J**	15000	340
117-84-0	Di-n-Octylphthalate	15000 U	15000	276
206-44-0	Fluoranthene	15000 U	15000	209
86-73-7	Fluorene	15000 U	15000	150
118-74-1	Hexachlorobenzene	15000 U	15000	223
87-68-3	Hexachlorobutadiene	15000 U	15000	344
77-47-4	Hexachlorocyclopentadiene	15000 U	15000	176
67-72-1	Hexachloroethane	15000 U	15000	208
193-39-5	Indeno (1,2,3-cd) Pyrene	15000 U	15000	349
78-59-1	Isophorone	15000 U	15000	154
91-20-3	Naphthalene	15000 U	15000	245
98-95-3	Nitrobenzene	15000 U	15000	285

★ Use only these results, ★ 1/14/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3A**	QC Batch:	90210 -110
Sample #:	**345199DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	89

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	15000 U	15000	293
86-30-6	N-Nitroso-di-Phenylamine	15000 U	15000	423
87-86-5	Pentachlorophenol	29000 U	29000	391
85-01-8	Phenanthrene	15000 U	15000	205
108-95-2	Phenol	15000 U	15000	352
129-00-0	Pyrene	15000 U	15000	132

Use DF 10 results
AB 1/14/2004

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	86.7
99-09-2	3-Nitroaniline	220 U	220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL	
120-12-7	Anthracene	220 U		220	6.01	
1912-24-9	Atrazine	220 U		220	8.94	
100-52-7	Benzaldehyde	220 U	UJc	220	5.27	
56-55-3	Benzo (a) Anthracene	220 U		220	17.3	
~~50-32-8~~	~~*Benzo (a) Pyrene~~	~~220 UR~~	~~Rj~~	~~220~~	~~7.42~~	See Dilution
~~205-99-2~~	~~*Benzo (b) Fluoranthene~~	~~220 UR~~	~~Rj~~	~~220~~	~~12.7~~	
~~191-24-2~~	~~*Benzo (g,h,i,) Perylene~~	~~220 UR~~	~~Rj~~	~~220~~	~~11.3~~	~~1/14/04~~
~~207-08-9~~	~~*Benzo (k) Fluoranthene~~	~~220 UR~~	~~Rj~~	~~220~~	~~17.4~~	
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08	
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25	
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**98 J**		170	2.69	
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82	
105-60-2	Caprolactam	430 U		430	8.29	
86-74-8	Carbazole	220 U		220	7.93	
218-01-9	Chrysene	220 U		220	13.3	
~~53-70-3~~	~~*Dibenzo (a,h) Anthracene~~	~~220 UR~~	~~Rj~~	~~220~~	~~7.67~~	See dilution ~~1/14/04~~
132-64-9	Dibenzofuran	220 U		220	4.11	
84-66-2	**Diethylphthalate**	**5.0 J**	B,X	220	2.47	
131-11-3	Dimethylphthalate	220 U		220	4.30	
84-74-2	**Di-n-Butylphthalate**	**500**		220	4.97	
117-84-0	Di-n-Octylphthalate	220 U		220	4.03	
206-44-0	**Fluoranthene**	**9.0 J**		220	3.06	
86-73-7	Fluorene	220 U		220	2.18	
118-74-1	Hexachlorobenzene	220 U		220	3.26	
87-68-3	Hexachlorobutadiene	220 U		220	5.03	
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57	
67-72-1	Hexachloroethane	220 U		220	3.03	
~~193-39-5~~	~~*Indeno (1,2,3-cd) Pyrene~~	~~220 UR~~	~~Rj~~	~~220~~	~~5.10~~	See dilution ~~1/14/04~~
78-59-1	Isophorone	220 U		220	2.25	
91-20-3	Naphthalene	220 U		220	3.58	
98-95-3	Nitrobenzene	220 U		220	4.16	

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**17 J**	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**7.0 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**5.0 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	47	E B, X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~690~~	~~E~~

1/14/2003

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	6.6

See straight run 1/14/04

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1100 U		1100	16.2
95-94-3	1,2,4,5-Tetrachloro-benzene	1100 U		1100	189
108-60-1	Bis (2-Chloroisopropyl)-Ether	1100 U		1100	8.71
95-95-4	2,4,5-Trichlorophenol	1100 U		1100	22.0
88-06-2	2,4,6-Trichlorophenol	1100 U		1100	17.3
120-83-2	2,4-Dichlorophenol	1100 U		1100	23.2
105-67-9	2,4-Dimethylphenol	1100 U		1100	52.4
51-28-5	2,4-Dinitrophenol	2200 U		2200	21.1
121-14-2	2,4-Dinitrotoluene	1100 U		1100	20.8
606-20-2	2,6-Dinitrotoluene	1100 U		1100	183
91-58-7	2-Chloronaphthalene	1100 U		1100	15.2
95-57-8	2-Chlorophenol	1100 U		1100	13.3
91-57-6	2-Methylnaphthalene	1100 U		1100	18.1
95-48-7	2-Methylphenol	1100 U		1100	31.9
88-74-4	2-Nitroaniline	1100 U		1100	30.4
88-75-5	2-Nitrophenol	1100 U		1100	11.2
91-94-1	3,3'-Dichlorobenzidine	1100 U		1100	440
99-09-2	3-Nitroaniline	1100 U		1100	220
534-52-1	4,6-Dinitro-2-Methylphenol	1100 U		1100	29.8
101-55-3	4-Bromophenyl Phenylether	1100 U		1100	22.3
59-50-7	4-Chloro-3-Methylphenol	1100 U		1100	34.4
106-47-8	4-Chloroaniline	1100 U	VJ,c	1100	8.32
7005-72-3	4-Chlorophenylphenyl-Ether	1100 U		1100	21.6
106-44-5	4-Methylphenol	1100 U		1100	42.0
100-01-6	4-Nitroaniline	1100 U		1100	47.9
100-02-7	4-Nitrophenol	2200 U		2200	18.7
83-32-9	Acenaphthene	1100 U		1100	11.4
208-96-8	Acenaphthylene	1100 U		1100	9.90
98-86-2	Acetophenone	1100 U		1100	12.5

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	6.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	1100 U	1100	30.5
1912-24-9	Atrazine	1100 U	1100	45.4
100-52-7	Benzaldehyde	1100 U UJ,C	1100	26.7
56-55-3	Benzo (a) Anthracene	1100 U	1100	87.8
50-32-8	Benzo (a) Pyrene	1100 U	1100	37.7
205-99-2	Benzo (b) Fluoranthene	1100 U	1100	64.4
191-24-2	Benzo (g,h,i,) Perylene	1100 U	1100	57.6
207-08-9	Benzo (k) Fluoranthene	1100 U	1100	88.4
111-91-1	Bis (2-Chloroethoxy)-Methane	1100 U	1100	20.7
111-44-4	Bis (2-Chloroethyl) Ether	1100 U	1100	11.4
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**220 J**	1100	13.7
85-68-7	Butyl Benzyl Phthalate	1100 U	1100	29.6
105-60-2	Caprolactam	2200 U	2200	42.1
86-74-8	Carbazole	1100 U	1100	40.3
218-01-9	Chrysene	1100 U	1100	67.3
53-70-3	Dibenzo (a,h) Anthracene	1100 U	1100	38.9
132-64-9	Dibenzofuran	1100 U	1100	20.9
84-66-2	Diethylphthalate	1100 U	1100	12.5
131-11-3	Dimethylphthalate	1100 U	1100	21.8
84-74-2	**Di-n-Butylphthalate**	**430 J**	1100	25.2
117-84-0	Di-n-Octylphthalate	1100 U	1100	20.5
206-44-0	Fluoranthene	1100 U	1100	15.5
86-73-7	Fluorene	1100 U	1100	11.1
118-74-1	Hexachlorobenzene	1100 U	1100	16.6
87-68-3	Hexachlorobutadiene	1100 U	1100	25.5
77-47-4	Hexachlorocyclopentadiene	1100 U	1100	13.1
67-72-1	Hexachloroethane	1100 U	1100	15.4
193-39-5	Indeno (1,2,3-cd) Pyrene	1100 U	1100	25.9
78-59-1	Isophorone	1100 U	1100	11.4
91-20-3	Naphthalene	1100 U	1100	18.2
98-95-3	Nitrobenzene	1100 U	1100	21.1

* Use only these results, AS 1/14/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3B**	QC Batch:	90210 -110
Sample #:	**345200DL**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	6.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	1100 U	1100	21.7
86-30-6	N-Nitroso-di-Phenylamine	1100 U	1100	31.4
87-86-5	Pentachlorophenol	2200 U	2200	29.0
85-01-8	Phenanthrene	1100 U	1100	15.2
108-95-2	Phenol	1100 U	1100	26.1
129-00-0	Pyrene	1100 U	1100	9.77

use straight analysis
1/14/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3C**	QC Batch:	90210 -110
Sample #:	**345201**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U	210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U	210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U	210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U	210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U	210	3.14
120-83-2	2,4-Dichlorophenol	210 U	210	4.22
105-67-9	2,4-Dimethylphenol	210 U	210	9.53
51-28-5	2,4-Dinitrophenol	410 U	410	3.84
121-14-2	2,4-Dinitrotoluene	210 U	210	3.78
606-20-2	2,6-Dinitrotoluene	210 U	210	33.2
91-58-7	2-Chloronaphthalene	210 U	210	2.76
95-57-8	2-Chlorophenol	210 U	210	2.41
91-57-6	2-Methylnaphthalene	210 U	210	3.29
95-48-7	2-Methylphenol	210 U	210	5.81
88-74-4	2-Nitroaniline	210 U	210	5.52
88-75-5	2-Nitrophenol	210 U	210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U	210	80.0
99-09-2	3-Nitroaniline	210 U	210	40.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U	210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U	210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**17 J** B,X	210	6.25
106-47-8	4-Chloroaniline	210 U	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U	210	3.92
106-44-5	4-Methylphenol	210 U	210	7.64
100-01-6	4-Nitroaniline	210 U	210	8.70
100-02-7	4-Nitrophenol	410 U	410	3.40
83-32-9	Acenaphthene	210 U	210	2.06
208-96-8	Acenaphthylene	210 U	210	1.80
98-86-2	Acetophenone	210 U	210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3C**	QC Batch:	90210 -110
Sample #:	**345201**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U	UJ,C	210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**53 J**		210	2.48
85-68-7	**Butyl Benzyl Phthalate**	**41 J**	B,X	210	5.38
105-60-2	**Caprolactam**	**130 J**		410	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**4.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**66 J**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3C**	QC Batch:	90210 -110
Sample #:	**345201**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**38SB3C**	QC Batch:	90210 -110
Sample #:	**345201**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.beta.-Sesquiphellan-drene	1000122102 (10012?2-10-2)	24	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	53	E	NJ,+
Erucylamide	112-84-5	570	E	B,X
Ethanol, 2-(hexadecyloxy)-	2136-71-2	53	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~83~~	~~E~~	* 1/14/2004
Stearic Acid	57-11-4	120	E	B,X

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2A**	QC Batch:	90482 -114
Sample #:	**345408**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**9.0 J**	B,X	220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2A**	QC Batch:	90482 -114
Sample #:	**345408**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,c	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**25 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**45 J**	J,l	220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**54 J**	B,z	220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**42 J**	B,x	220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**4.0 J**	B,x	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**29 J**	B,z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**14 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**36 J**	J,l	220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2A**	QC Batch:	90482 -114
Sample #:	**345408**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**6.0 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**12 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2A**	QC Batch:	90482 -114
Sample #:	**345408**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	590	E	B, X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	44	E	B, X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~400~~	~~E~~	A, 1/14/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2B**	QC Batch:	90210 -110
Sample #:	**345409**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U	240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U	240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U	240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U	240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U	240	3.67
120-83-2	2,4-Dichlorophenol	240 U	240	4.93
105-67-9	2,4-Dimethylphenol	240 U	240	11.1
51-28-5	2,4-Dinitrophenol	460 U	460	4.48
121-14-2	2,4-Dinitrotoluene	240 U	240	4.41
606-20-2	2,6-Dinitrotoluene	240 U	240	38.8
91-58-7	2-Chloronaphthalene	240 U	240	3.22
95-57-8	2-Chlorophenol	240 U	240	2.81
91-57-6	2-Methylnaphthalene	240 U	240	3.84
95-48-7	2-Methylphenol	240 U	240	6.78
88-74-4	2-Nitroaniline	240 U	240	6.44
88-75-5	2-Nitrophenol	240 U	240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U	240	93.4
99-09-2	3-Nitroaniline	240 U	240	46.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U	240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U	240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**26 J** B,X	240	7.29
106-47-8	4-Chloroaniline	240 U	240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U	240	4.58
106-44-5	4-Methylphenol	240 U	240	8.92
100-01-6	4-Nitroaniline	240 U	240	10.2
100-02-7	4-Nitrophenol	460 U	460	3.96
83-32-9	Acenaphthene	240 U	240	2.41
208-96-8	Acenaphthylene	240 U	240	2.10
98-86-2	Acetophenone	240 U	240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2B**	QC Batch:	90210 -110
Sample #:	**345409**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U	U,c	240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**50 J**		240	2.90
85-68-7	Butyl Benzyl Phthalate	240 U		240	6.27
105-60-2	**Caprolactam**	**90 J**		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**5.0 J**	B,x	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**5.6 J**		240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2B**	QC Batch:	90210 -110
Sample #:	**345409**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2B**	QC Batch:	90210 -110
Sample #:	**345409**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	260	E	B,X
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	85	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	27	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 (100014-39-24)	32	E	NJ,+
Erucylamide	112-84-5	850	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~260~~	~~E~~	~~B~~ 10/14/2003

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2C**	QC Batch:	90210 -110
Sample #:	**345410**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U		460	4.48
121-14-2	2,4-Dinitrotoluene	240 U		240	4.41
606-20-2	2,6-Dinitrotoluene	240 U		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	2-Methylnaphthalene	240 U		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	93.4
99-09-2	3-Nitroaniline	240 U		240	46.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	B,X	240	7.29
106-47-8	4-Chloroaniline	240 U		240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	Acenaphthene	240 U		240	2.41
208-96-8	Acenaphthylene	240 U		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB2C**	QC Batch:	90210 -110
Sample #:	**345410**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U	VJC	240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**55 J**		240	2.90
85-68-7	Butyl Benzyl Phthalate	240 U		240	6.27
105-60-2	Caprolactam	460 U		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**4.0 J**	B/X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**55 J**		240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2C**	QC Batch:	90210 -110
Sample #:	**345410**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB2C**	QC Batch:	90210 -110
Sample #:	**345410**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	100	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	120	E	NJ,+
Erucylamide	112-84-5	820	E	B,X
Ethanol, 2-(hexadecyloxy)-	2136-71-2	70	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~40~~	~~E~~	~~h, 10/14/03~~

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD5**	QC Batch:	90210 -110
Sample #:	**345411**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	460 U	460	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	86.7
99-09-2	3-Nitroaniline	220 U	220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	460 U	460	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD5**	QC Batch:	90210 -110
Sample #:	**345411**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	U5,C	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**100 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	460 U		460	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**100 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD5**	QC Batch:	90210 -110
Sample #:	**345411**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	460 U	460	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD5**	QC Batch:	90210 -110
Sample #:	**345411**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	540	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	90	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	82	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~40~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1A**	QC Batch:	90210 -110
Sample #:	**345412**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	460 U		460	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	B,X	220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	460 U		460	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1A**	QC Batch:	90210 -110
Sample #:	**345412**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,c	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**54 J**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**41 J**	B,X	220	5.82
105-60-2	Caprolactam	460 U		460	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**4.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**110 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1A**	QC Batch:	90210 -110
Sample #:	**345412**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	460 U	460	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1A**	QC Batch:	90210 -110
Sample #:	**345412**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	780	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	23	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	110	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924	23	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~790~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1B**	QC Batch:	90210 -110
Sample #:	**345413**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U		460	4.48
121-14-2	2,4-Dinitrotoluene	240 U		240	4.41
606-20-2	2,6-Dinitrotoluene	240 U		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	2-Methylnaphthalene	240 U		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	93.4
99-09-2	3-Nitroaniline	240 U		240	46.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**22 J**	B,X	240	7.29
106-47-8	4-Chloroaniline	240 U		240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	Acenaphthene	240 U		240	2.41
208-96-8	Acenaphthylene	240 U		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1B**	QC Batch:	90210 -110
Sample #:	**345413**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U	UJ,c	240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**53 J**		240	2.90
85-68-7	**Butyl Benzyl Phthalate**	**46 J**	B,X	240	6.27
105-60-2	Caprolactam	460 U		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**4.0 J**	B,X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**75 J**		240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	**Fluoranthene**	**4.0 J**		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1B**	QC Batch:	90210 -110
Sample #:	**345413**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1B**	QC Batch:	90210 -110
Sample #:	**345413**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	72
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	160	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	110	E	NJ,+
Erucylamide	112-84-5	750	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~210~~	~~E~~	~~B,X~~

AS 1/14/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1C**	QC Batch:	90210 -110
Sample #:	**345414**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	460 U		460	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**27 J**	B, x	220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	460 U		460	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1C**	QC Batch:	90210 -110
Sample #:	**345414**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,C	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**58 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	460 U		460	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**180 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1C**	QC Batch:	90210 -110
Sample #:	**345414**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	460 U	460	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB1C**	QC Batch:	90210 -110
Sample #:	**345414**	Anal. Batch:	207854
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	210	E	B,X
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	370	E	B,X
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	210	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	120	E	NJ,+
Erucylamide	112-84-5	840	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~600~~	~~E~~	~~B,X~~ 1/14/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB3**	QC Batch:	90070 -113
Sample #:	**345617**	Anal. Batch:	208316
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U		5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U		5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U		5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U		5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U		5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U		5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U		5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	UJ,l	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U		5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U		5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U		5.0	0.005
95-57-8	2-Chlorophenol	5.0 U		5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U		5.0	0.084
95-48-7	2-Methylphenol	5.0 U		5.0	0.007
88-74-4	2-Nitroaniline	5.0 U		5.0	0.010
88-75-5	2-Nitrophenol	5.0 U		5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U		5.0	0.058
99-09-2	3-Nitroaniline	5.0 U		5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U		5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U		5.0	0.019
59-50-7	**4-Chloro-3-Methylphenol**	**0.14 J**		5.0	0.018
106-47-8	4-Chloroaniline	5.0 U	UJ,c	5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U		5.0	0.015
106-44-5	4-Methylphenol	5.0 U		5.0	0.014
100-01-6	4-Nitroaniline	5.0 U		5.0	0.070
100-02-7	4-Nitrophenol	10 U		10	0.134
83-32-9	Acenaphthene	5.0 U		5.0	0.008
208-96-8	Acenaphthylene	5.0 U		5.0	0.007
98-86-2	Acetophenone	5.0 U		5.0	0.011

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB3**	QC Batch:	90070 -113
Sample #:	**345617**	Anal. Batch:	208316
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U	UJ,C	5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1.4 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**1.0 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U		5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	**Diethylphthalate**	**0.11 J**		5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U		5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB3**	QC Batch:	90070 -113
Sample #:	**345617**	Anal. Batch:	208316
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB3**	QC Batch:	90070 -113
Sample #:	**345617**	Anal. Batch:	208316
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	1.24	E	NJ,+
Erucylamide	112-84-5	26.3	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**EQB2**	QC Batch:	90710 -108
Sample #:	**345184**	Anal. Batch:	208174
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB2A**	QC Batch:	90708 -113
Sample #:	**345186**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	240 U		240	13.9
120-12-7	Anthracene	24 U		24	0.840
56-55-3	Benzo (a) Anthracene	24 U		24	0.960
50-32-8	Benzo (a) Pyrene	24 U		24	1.20
205-99-2	Benzo (b) Fluoranthene	24 U		24	1.56
191-24-2	Benzo (g,h,i,) Perylene	24 U		24	15.0
207-08-9	Benzo (k) Fluoranthene	24 U		24	1.20
218-01-9	Chrysene	24 U		24	1.44
53-70-3	Dibenzo (a,h) Anthracene	24 U		24	1.68
206-44-0	Fluoranthene	24 U	UJ,1	24	2.04
86-73-7	Fluorene	24 U		24	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U		24	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	24 U		24	0.720
129-00-0	Pyrene	24 U		24	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB2B**	QC Batch:	90708 -113
Sample #:	**345187**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	85
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U	UJ,I	25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD4**	QC Batch:	90708 -113
Sample #:	**345188**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	81
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	UL,S	120	11.3
208-96-8	Acenaphthylene	260 U		260	13.9
120-12-7	Anthracene	26 U		26	0.840
56-55-3	Benzo (a) Anthracene	26 U		26	0.960
50-32-8	Benzo (a) Pyrene	26 U		26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U		26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.20
218-01-9	Chrysene	26 U		26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.68
206-44-0	Fluoranthene	26 U	UJ,I	26	2.04
86-73-7	Fluorene	26 U	UL,S	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	26 U		26	0.720
129-00-0	Pyrene	26 U		26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB2C**	QC Batch:	90708 -113
Sample #:	**345189**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	93
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	UL,s	110	10.3
208-96-8	Acenaphthylene	230 U		230	12.8
120-12-7	Anthracene	23 U		23	0.770
56-55-3	Benzo (a) Anthracene	23 U		23	0.880
50-32-8	Benzo (a) Pyrene	23 U		23	1.10
205-99-2	Benzo (b) Fluoranthene	23 U		23	1.43
191-24-2	Benzo (g,h,i,) Perylene	23 U		23	13.8
207-08-9	Benzo (k) Fluoranthene	23 U		23	1.10
218-01-9	Chrysene	23 U		23	1.32
53-70-3	Dibenzo (a,h) Anthracene	23 U		23	1.54
206-44-0	Fluoranthene	23 U	UJ,l	23	1.87
86-73-7	Fluorene	23 U	UL,s	23	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	23 U		23	0.770
91-20-3	Naphthalene	110 U		110	8.69
85-01-8	Phenanthrene	23 U		23	0.660
129-00-0	Pyrene	23 U		23	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/13/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB1A**	QC Batch:	90708 -113
Sample #:	**345196**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	UL,S	140	13.2
208-96-8	Acenaphthylene	300 U	L	300	16.2
120-12-7	**Anthracene**	**6.6 J**	L,S	30	0.980
56-55-3	Benzo (a) Anthracene	30 U	UL,S	30	1.12
50-32-8	Benzo (a) Pyrene	30 U	L	30	1.40
205-99-2	**Benzo (b) Fluoranthene**	**23 J**	L,S	30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U	UL,S	30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U	L	30	1.40
218-01-9	**Chrysene**	**29 J**	L,S	30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U	UL,S	30	1.96
206-44-0	**Fluoranthene**	**110**	J,I	30	2.38
86-73-7	**Fluorene**	**4.6 J**	L,S	30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U	UL,S	30	0.980
91-20-3	Naphthalene	140 U	L	140	11.1
85-01-8	**Phenanthrene**	**46**	L,S	30	0.840
129-00-0	**Pyrene**	**56**	L,S	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB1B**	QC Batch:	90709 -114
Sample #:	**345197**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.4
208-96-8	Acenaphthylene	280 U		280	15.3
120-12-7	Anthracene	28 U		28	0.924
56-55-3	Benzo (a) Anthracene	28 U		28	1.06
50-32-8	Benzo (a) Pyrene	28 U		28	1.32
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.72
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	16.5
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.32
218-01-9	Chrysene	28 U		28	1.58
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.85
206-44-0	Fluoranthene	28 U		28	2.24
86-73-7	Fluorene	28 U		28	1.72
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.924
91-20-3	Naphthalene	130 U		130	10.4
85-01-8	Phenanthrene	28 U		28	0.792
129-00-0	Pyrene	28 U		28	1.19

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB1C**	QC Batch:	90709 -114
Sample #:	**345198**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	260 U	260	13.9
120-12-7	Anthracene	26 U	26	0.840
56-55-3	Benzo (a) Anthracene	26 U	26	0.960
50-32-8	Benzo (a) Pyrene	26 U	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.20
218-01-9	Chrysene	26 U	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.68
206-44-0	Fluoranthene	26 U	26	2.04
86-73-7	Fluorene	26 U	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	Phenanthrene	26 U	26	0.720
129-00-0	Pyrene	26 U	26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB3A**	QC Batch:	90709 -114
Sample #:	**345199**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	56
Unit:	ug/kg dry	Dilution Factor:	1.8

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	180 U	180	16.9
208-96-8	Acenaphthylene	380 U	380	20.9
120-12-7	**Anthracene**	**13 J**	38	1.26
56-55-3	**Benzo (a) Anthracene**	**82**	38	1.44
50-32-8	Benzo (a) Pyrene	38 U	38	1.80
205-99-2	**Benzo (b) Fluoranthene**	**15 J**	38	2.34
191-24-2	Benzo (g,h,i,) Perylene	38 U	38	22.5
207-08-9	**Benzo (k) Fluoranthene**	**7.5 J**	38	1.80
218-01-9	**Chrysene**	**28 J**	38	2.16
53-70-3	Dibenzo (a,h) Anthracene	38 U	38	2.52
206-44-0	**Fluoranthene**	**180**	38	3.06
86-73-7	**Fluorene**	**8.9 J**	38	2.34
193-39-5	Indeno (1,2,3-cd) Pyrene	38 U	38	1.26
91-20-3	Naphthalene	180 U	180	14.2
85-01-8	**Phenanthrene**	**100**	38	1.08
129-00-0	**Pyrene**	**98**	38	1.62

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB3B**	QC Batch:	90709 -114
Sample #:	**345200**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.79

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	180 U	UL,S	180	16.8
208-96-8	Acenaphthylene	380 U		380	20.8
120-12-7	Anthracene	38 U		38	1.25
56-55-3	Benzo (a) Anthracene	38 U		38	1.43
50-32-8	Benzo (a) Pyrene	38 U		38	1.79
205-99-2	Benzo (b) Fluoranthene	38 U		38	2.33
191-24-2	Benzo (g,h,i,) Perylene	38 U		38	22.4
207-08-9	Benzo (k) Fluoranthene	38 U		38	1.79
218-01-9	Chrysene	38 U		38	2.15
53-70-3	Dibenzo (a,h) Anthracene	38 U		38	2.51
206-44-0	Fluoranthene	38 U		38	3.04
86-73-7	Fluorene	38 U		38	2.33
193-39-5	Indeno (1,2,3-cd) Pyrene	38 U		38	1.25
91-20-3	Naphthalene	180 U		180	14.1
85-01-8	Phenanthrene	38 U		38	1.07
129-00-0	Pyrene	38 U		38	1.61

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**38SB3C**	QC Batch:	90709 -114
Sample #:	**345201**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	260 U	260	13.9
120-12-7	Anthracene	26 U	26	0.840
56-55-3	Benzo (a) Anthracene	26 U	26	0.960
50-32-8	Benzo (a) Pyrene	26 U	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.20
218-01-9	Chrysene	26 U	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.68
206-44-0	Fluoranthene	26 U	26	2.04
86-73-7	Fluorene	26 U	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	Phenanthrene	26 U	26	0.720
129-00-0	Pyrene	26 U	26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB2A**	QC Batch:	90834 -115
Sample #:	**345408**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	UL,S	120	11.3
208-96-8	Acenaphthylene	260 U	UL,S	260	13.9
120-12-7	**Anthracene**	**7.1 J**	L,S	26	0.840
56-55-3	**Benzo (a) Anthracene**	**14 J**	L,S	26	0.960
50-32-8	**Benzo (a) Pyrene**	**15 J**	L,S	26	1.20
205-99-2	**Benzo (b) Fluoranthene**	**9.5 J**	L,S	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	UL,S	26	15.0
207-08-9	**Benzo (k) Fluoranthene**	**6.7 J**	L,S	26	1.20
218-01-9	**Chrysene**	**12 J**	L,S	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	UL,S	26	1.68
206-44-0	**Fluoranthene**	**38**	L,S	26	2.04
86-73-7	**Fluorene**	**3.1 J**	L,S	26	1.56
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**8.6 J**	L,S	26	0.840
91-20-3	Naphthalene	120 U	UL,S	120	9.48
85-01-8	***Phenanthrene**	**30**	L,S	26	0.720
129-00-0	***Pyrene**	**30**	L,S	26	1.08

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB2B**	QC Batch:	90709 -114
Sample #:	**345409**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	VL,S	140	13.2
208-96-8	Acenaphthylene	290 U		290	16.2
120-12-7	Anthracene	29 U		29	0.980
56-55-3	Benzo (a) Anthracene	29 U		29	1.12
50-32-8	Benzo (a) Pyrene	29 U		29	1.40
205-99-2	Benzo (b) Fluoranthene	29 U		29	1.82
191-24-2	Benzo (g,h,i,) Perylene	29 U		29	17.5
207-08-9	Benzo (k) Fluoranthene	29 U		29	1.40
218-01-9	Chrysene	29 U		29	1.68
53-70-3	Dibenzo (a,h) Anthracene	29 U		29	1.96
206-44-0	Fluoranthene	29 U		29	2.38
86-73-7	Fluorene	29 U		29	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	29 U		29	0.980
91-20-3	Naphthalene	140 U		140	11.1
85-01-8	Phenanthrene	29 U		29	0.840
129-00-0	Pyrene	29 U		29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB2C**	QC Batch:	90709 -114
Sample #:	**345410**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	300 U	300	16.2
120-12-7	Anthracene	30 U	30	0.980
56-55-3	Benzo (a) Anthracene	30 U	30	1.12
50-32-8	Benzo (a) Pyrene	30 U	30	1.40
205-99-2	Benzo (b) Fluoranthene	30 U	30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U	30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U	30	1.40
218-01-9	Chrysene	30 U	30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U	30	1.96
206-44-0	Fluoranthene	30 U	30	2.38
86-73-7	Fluorene	30 U	30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U	30	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	30 U	30	0.840
129-00-0	Pyrene	30 U	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD5**	QC Batch:	90709 -114
Sample #:	**345411**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	140 U	140	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB1A**	QC Batch:	90709 -114
Sample #:	**345412**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	27 U		27	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	**Fluoranthene**	**2.8 J**	L,S	27	2.21
86-73-7	Fluorene	27 U	UL,S	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	27 U		27	0.780
129-00-0	**Pyrene**	**2.1 J**	L,S	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB1B**	QC Batch:	90709 -114
Sample #:	**345413**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	UL,S	140	13.2
208-96-8	Acenaphthylene	250 U		250	16.2
120-12-7	Anthracene	30 U		30	0.980
56-55-3	Benzo (a) Anthracene	30 U		30	1.12
50-32-8	Benzo (a) Pyrene	30 U		30	1.40
205-99-2	Benzo (b) Fluoranthene	30 U		30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U		30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U		30	1.40
218-01-9	Chrysene	30 U		30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U		30	1.96
206-44-0	Fluoranthene	30 U		30	2.38
86-73-7	Fluorene	30 U		30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U		30	0.980
91-20-3	Naphthalene	140 U		140	11.1
85-01-8	Phenanthrene	30 U		30	0.840
129-00-0	Pyrene	30 U		30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB1C**	QC Batch:	90709 -114
Sample #:	**345414**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	VL,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	27 U		27	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	Fluoranthene	27 U		27	2.21
86-73-7	Fluorene	27 U		27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	27 U		27	0.780
129-00-0	Pyrene	27 U		27	1.17

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Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**EQB3**	QC Batch:	90710 -114
Sample #:	**345617**	Anal. Batch:	208739
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**EQB2**	QC Batch:	89804 -109
Sample #:	**345184**	Anal. Batch:	207913
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB2A**	QC Batch:	90258 -114
Sample #:	**345186**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	86
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB2B**	QC Batch:	90258 -114
Sample #:	**345187**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	85
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ, C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD4**	QC Batch:	90258 -114
Sample #:	**345188**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	81
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB2C**	QC Batch:	90258 -114
Sample #:	**345189**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	93
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB1A**	QC Batch:	90258 -114
Sample #:	**345196**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	70
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB1B**	QC Batch:	90259 -115
Sample #:	**345197**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB1C**	QC Batch:	90259 -115
Sample #:	**345198**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB3A**	QC Batch:	90259 -115
Sample #:	**345199**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	56
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB3B**	QC Batch:	90259 -115
Sample #:	**345200**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**38SB3C**	QC Batch:	90259 -115
Sample #:	**345201**	Anal. Batch:	208353
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U		0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB2A**	QC Batch:	90259 -115
Sample #:	**345408**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB2B**	QC Batch:	90259 -115
Sample #:	**345409**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	73
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB2C**	QC Batch:	90259 -115
Sample #:	**345410**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD5**	QC Batch:	90259 -115
Sample #:	**345411**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB1A**	QC Batch:	90259 -115
Sample #:	**345412**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB1B**	QC Batch:	90259 -115
Sample #:	**345413**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	72
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**68SB1C**	QC Batch:	90259 -115
Sample #:	**345414**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/19/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**EQB3**	QC Batch:	89804 -109
Sample #:	**345617**	Anal. Batch:	207866
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**EQB2**	QC Batch:	90180 -108
Sample #:	**345184**	Anal. Batch:	208237
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	0.10 U	0.10	0.0016
72-55-9	4,4'-DDE	0.10 U	0.10	0.0025
50-29-3	4,4'-DDT	0.10 U	0.10	0.0018
309-00-2	Aldrin	0.050 U	0.050	0.0019
319-84-6	Alpha-BHC	0.050 U	0.050	0.0014
57-74-9	A-Chlordane	0.050 U	0.050	0.0024
5103-74-2	G-Chlordane	0.050 U	0.050	0.0023
319-85-7	Beta-BHC	0.050 U	0.050	0.0039
319-86-8	Delta-BHC	0.050 U	0.050	0.0025
60-57-1	Dieldrin	0.10 U	0.10	0.0034
115-29-7	Endosulfan I	0.050 U	0.050	0.0026
33213-65-9	Endosulfan II	0.10 U	0.10	0.0021
1031-07-8	Endosulfan Sulfate	0.10 U	0.10	0.0022
72-20-8	Endrin	0.10 U	0.10	0.0038
7421-93-4	Endrin Aldehyde	0.10 U	0.10	0.0053
53494-70-5	Endrin Ketone	0.10 U	0.10	0.0020
58-89-9	Lindane	0.050 U	0.050	0.0016
76-44-8	Heptachlor	0.050 U	0.050	0.0021
1024-57-3	Heptachlor Epoxide	0.050 U	0.050	0.0022
72-43-5	Methoxychlor	0.50 U	0.50	0.0032
8001-35-2	Toxaphene	1.0 U	1.0	0.118

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/10/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**38SB1A**	QC Batch:	90181 -109
Sample #:	**345196**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	28 U	28	0.333
72-55-9	4,4'-DDE	28 U	28	0.245
50-29-3	4,4'-DDT	28 U	28	0.252
309-00-2	Aldrin	28 U	28	0.426
319-84-6	Alpha-BHC	28 U	28	0.424
57-74-9	A-Chlordane	28 U	28	0.608
5103-74-2	G-Chlordane	28 U	28	0.984
319-85-7	Beta-BHC	28 U	28	1.58
319-86-8	Delta-BHC	28 U	28	1.15
60-57-1	Dieldrin	28 U	28	0.433
115-29-7	Endosulfan I	28 U	28	1.27
33213-65-9	Endosulfan II	28 U	28	0.300
1031-07-8	Endosulfan Sulfate	28 U	28	0.704
72-20-8	Endrin	28 U	28	0.417
7421-93-4	Endrin Aldehyde	28 U	28	1.55
53494-70-5	Endrin Ketone	28 U	28	0.385
58-89-9	Lindane	28 U	28	0.272
76-44-8	Heptachlor	28 U	28	0.987
1024-57-3	Heptachlor Epoxide	28 U	28	0.637
72-43-5	Methoxychlor	28 U	28	0.392
8001-35-2	Toxaphene	240 U	240	32.6

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/11/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**68SB1A**	QC Batch:	90181 -109
Sample #:	**345412**	Anal. Batch:	208238
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	26 U	26	0.309
72-55-9	4,4'-DDE	26 U	26	0.228
50-29-3	4,4'-DDT	26 U	26	0.234
309-00-2	Aldrin	26 U	26	0.395
319-84-6	Alpha-BHC	26 U	26	0.394
57-74-9	A-Chlordane	26 U	26	0.564
5103-74-2	G-Chlordane	26 U	26	0.914
319-85-7	Beta-BHC	26 U	26	1.47
319-86-8	Delta-BHC	26 U	26	1.06
60-57-1	Dieldrin	26 U	26	0.402
115-29-7	Endosulfan I	26 U	26	1.18
33213-65-9	Endosulfan II	26 U	26	0.278
1031-07-8	Endosulfan Sulfate	26 U	26	0.654
72-20-8	Endrin	26 U	26	0.387
7421-93-4	Endrin Aldehyde	26 U	26	1.44
53494-70-5	Endrin Ketone	26 U	26	0.358
58-89-9	Lindane	26 U	26	0.252
76-44-8	Heptachlor	26 U	26	0.917
1024-57-3	Heptachlor Epoxide	26 U	26	0.592
72-43-5	Methoxychlor	26 U	26	0.364
8001-35-2	Toxaphene	220 U	220	30.3

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/08/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**EQB2**	QC Batch:	89851 -108
Sample #:	**345184**	Anal. Batch:	207778
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	0.30 U	0.30	0.0753
11104-28-2	PCB-1221	0.50 U	0.50	0.0504
11141-16-5	PCB-1232	0.30 U	0.30	0.0794
53469-21-9	PCB-1242	0.30 U	0.30	0.0809
12672-29-6	PCB-1248	0.25 U	0.25	0.0828
11097-69-1	PCB-1254	0.10 U	0.10	0.0341
11096-82-5	PCB-1260	0.20 U	0.20	0.0481

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**38SB1A**	QC Batch:	89881 -109
Sample #:	**345196**	Anal. Batch:	207924
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	94 U	94	22.4
11104-28-2	PCB-1221	47 U	47	2.80
11141-16-5	PCB-1232	47 U	47	7.00
53469-21-9	PCB-1242	47 U	47	4.20
12672-29-6	PCB-1248	47 U	47	7.00
11097-69-1	**PCB-1254**	**570**	47	4.20
11096-82-5	PCB-1260	47 U	47	9.80

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/09/03 by JRR
Submittal #:	**36440-3**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**68SB1A**	QC Batch:	89881 -109
Sample #:	**345412**	Anal. Batch:	207924
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	85 U	85	20.8
11104-28-2	PCB-1221	42 U	42	2.60
11141-16-5	PCB-1232	42 U	42	6.50
53469-21-9	PCB-1242	42 U	42	3.90
12672-29-6	PCB-1248	42 U	42	6.50
11097-69-1	**PCB-1254**	**8.7 J**	42	3.90
11096-82-5	PCB-1260	42 U	42	9.10

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/09/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**EQB2**	QC Batch:	90447 -109
Sample #:	**345184**	Anal. Batch:	208309
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	0.50 U	0.50	0.053
93-72-1	2,4,5-TP (Silvex)	0.50 U	0.50	0.104
94-75-7	2,4-D	5.0 U	5.0	0.670
94-82-6	2,4-DB	5.0 U	5.0	0.955
75-99-0	Dalapon	5.0 U	5.0	0.862
1918-00-9	Dicamba	0.50 U	0.50	0.104
120-36-5	Dichlorprop	5.0 U	5.0	0.195
88-85-7	Dinoseb	1.0 U	1.0	0.168
94-74-6	MCPA	250 U	250	76.8
93-65-2	MCPP	250 U	250	74.8

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**38SB1A**	QC Batch:	90218 -110
Sample #:	**345196**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	14

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	710 U	710	28.0
93-72-1	2,4,5-TP (Silvex)	710 U	710	56.0
94-75-7	2,4-D	2800 U	2800	224
94-82-6	2,4-DB	2800 U	2800	868
75-99-0	Dalapon	3600 U	3600	798
1918-00-9	Dicamba	2800 U	2800	28.0
120-36-5	Dichlorprop	2800 U	2800	238
~~88-85-7~~	~~*Dinoseb~~	~~2800 R~~ R,1	~~2800~~	~~294~~
94-74-6	MCPA	280000 U	280000	19500
93-65-2	MCPP	280000 U	280000	70800

See re-extraction 1/11/04

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
		Prepared:	~~10/10/03 by DJM~~ 10/17/2003
Submittal #:	**36440-3**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JLRM
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**38SB1A**	QC Batch:	90218 -110
Sample #:	**345196DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	70
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
~~93-76-5~~	~~2,4,5-T~~	~~71 U~~	~~71~~	~~2.80~~
~~93-72-1~~	~~2,4,5-TP (Silvex)~~	~~71 U~~	~~71~~	~~5.60~~
~~94-75-7~~	~~2,4-D~~	~~280 U~~	~~280~~	~~22.4~~
~~94-82-6~~	~~2,4-DB~~	~~280 U~~	~~280~~	~~86.8~~
~~75-99-0~~	~~Dalapon~~	~~360 U~~	~~360~~	~~79.8~~
~~1918-00-9~~	~~Dicamba~~	~~280 U~~	~~280~~	~~2.80~~
~~120-36-5~~	~~Dichlorprop~~	~~280 U~~	~~280~~	~~23.8~~
88-85-7	Dinoseb	280 U	280	29.4
~~94-74-6~~	~~MCPA~~	~~28000 U~~	~~28000~~	~~1950~~
~~93-65-2~~	~~MCPP~~	~~28000 U~~	~~28000~~	~~7080~~

Use only Dinoseb from this re-extraction analysis.
A 1/11/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**68SB1A**	QC Batch:	90218 -110
Sample #:	**345412**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL	
93-76-5	2,4,5-T	64 U	64	2.60	
93-72-1	2,4,5-TP (Silvex)	64 U	64	5.20	
94-75-7	2,4-D	260 U	260	20.8	
94-82-6	2,4-DB	260 U	260	80.6	
75-99-0	Dalapon	320 U	320	74.1	
1918-00-9	Dicamba	260 U	260	2.60	
120-36-5	Dichlorprop	260 U	260	22.1	
~~88-85-7~~	~~*Dinoseb~~	~~260 R~~	R_1 ~~260~~	~~27.3~~	see re-extracted 4/9/04
94-74-6	MCPA	26000 U	26000	1810	
93-65-2	MCPP	26000 U	26000	6570	

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-3**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JLRM
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**68SB1A**	QC Batch:	90218 -110
Sample #:	**345412DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

1/11/04 AS

10/17/2003

CAS Number	*Herbicides	Analytical Result	Reporting Limit	MDL
~~93-76-5~~	~~2,4,5-T~~	~~64 U~~	~~64~~	~~2.60~~
~~93-72-1~~	~~2,4,5-TP (Silvex)~~	~~64 U~~	~~64~~	~~5.20~~
~~94-75-7~~	~~2,4-D~~	~~260 U~~	~~260~~	~~20.8~~
~~94-82-6~~	~~2,4-DB~~	~~260 U~~	~~260~~	~~80.6~~
~~75-99-0~~	~~Dalapon~~	~~320 U~~	~~320~~	~~74.1~~
~~1918-00-9~~	~~Dicamba~~	~~260 U~~	~~260~~	~~2.68~~
~~120-36-5~~	~~Dichlorprop~~	~~260 U~~	~~260~~	~~22.1~~
88-85-7	Dinoseb	260 U	260	27.3
~~94-74-6~~	~~MCPA~~	~~26000 U~~	~~26000~~	~~1810~~
~~93-65-2~~	~~MCPP~~	~~26000 U~~	~~26000~~	~~6570~~

* See attached Statement of Data Qualifications.

Use only Dinoseb from this analysis. AS 1/11/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **EQB2**
Sample #: **345184**
Matrix: QC Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	100 U		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Barium, Total	10 U		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Calcium, Total	500 U		500	33.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Chromium, Total	1.0 U		1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Total	25 J	B,P	100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Lead, Total	1.0 U		1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Magnesium, Total	500 U		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Total	10 U		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/13/03	MSS	USEPA-7470A
Nickel, Total	1.0 U		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Potassium, Total	200 U		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U		2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Total	0.5 U		0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Sodium, Total	180 J	B,P	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Thallium, Total	1.0 U		1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Vanadium, Total	10 U		10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Total	5.7 J		20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 08:50
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB2A**
Sample #: **345186**
Matrix: Soil

Percent Solids: 86

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	11100		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.80		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	107	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.60 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.4		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1150	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	17		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	7.9	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	7.2		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	16600		250	10.6	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	9.6		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	2840		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	414		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.010 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1600		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.55 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.064 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	38 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.15 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	55	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB2B**		
Sample #:	**345187**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	18500		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.4		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	119	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.55 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.8		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1590	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	22		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	13		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	28500		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	12		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	5040		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	471		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.013 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1700		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.56 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.047 J	B,P	3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	46 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.22 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	43		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	65	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD4**
Sample #: **345188**
Matrix: Soil

Percent Solids: 81

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17800		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	113	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.64 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.7		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1550	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	22		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	13		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	27800		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	11		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	5010		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	460		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.010 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1810		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.61 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.066 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	52 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	43		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	68	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 09:10
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB2C**
Sample #: **345189**
Matrix: Soil

Percent Solids: 93

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	10600		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.1		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	83	L,m	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.43 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.4		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1270	K,m	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	20		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.0	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	8.8		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	21800		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	7.3		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	3420		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	375		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1520		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.43 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.051 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	53 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.12 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	47	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 10:45
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB1A**
Sample #: **345196**
Matrix: Soil

Percent Solids: 70

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	22000	50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.31 J	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.4	0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	94 L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.67 J	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.8	1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	27600 K,M	1250	16.6	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Chromium, Total	75	5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	7.9 J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	57	1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	24600	500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	52	10	0.218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	4550	250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	400	5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.16	0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	33	0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1670	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.59 J	1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.13 J	3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	55 J	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.17 J	0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	35	1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	90 B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB1B**		
Sample #:	**345197**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21800		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	128	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.75 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.8		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	2690	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	24		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	15		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	32200		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	12		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	5130		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	397		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.015 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	18		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2150		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.063 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	49 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.25 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	50		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	72	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 11:20
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB1C**
Sample #: **345198**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	19900		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.7		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	117	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.53 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	3010	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	26		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.1	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	12		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	25300		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	9.9		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	8240		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	377		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.011 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	15		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2210		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.54 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.075 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	52 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.22 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	41		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	55	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB3A**
Sample #: **345199**
Matrix: Soil

Percent Solids: 56

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	26400		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.26 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.6		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	116	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.91 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	6740	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	82		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.8	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	85		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	30700		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	50		10	0.218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	5590		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	414		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.033 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	35		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2410		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.64 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.14 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	46 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.19 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	42		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	100	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 12:15
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB3B**
Sample #: **345200**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	22000		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.8		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	138	L,m	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.93 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.3		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	2580	K,m	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	27		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	12	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	18		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	31900		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	13		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	4960		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	472		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.021 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	18		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2040		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.78 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.061 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	55 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.25 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	49		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	73	B,x	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/03/03 @ 12:30
Sampler: B.F. & J.S.
Received: 10/04/03 @ 08:35

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **38SB3C**
Sample #: **345201**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20000		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.5		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	131	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.63 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.7		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	2630	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	25		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	11	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	15		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	30200		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	12		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	4640		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	478		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.016 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	1880		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.65 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.056 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	53 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.22 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	45		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	65	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 13:15
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB2A**
Sample #: **345408**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	30700		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.5		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
* Barium, Total	86	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.76 J		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.8		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
* Calcium, Total	1230	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	21		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	24	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	14		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	29300		500	21.2	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Lead, Total	7.9		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	5740		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	613		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.022 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2970		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.64 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.084 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	25 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.20 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	49		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	34	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 13:30
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB2B**
Sample #: **345409**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	26200		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	0.15 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.1		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	31	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.1		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.3		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1140	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	19		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	4.6	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	4.3		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	56600		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	6.5		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	1580		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	91		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.042 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	9.1		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2610		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.72 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.058 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	83 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.098 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	26		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	27	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 13:45
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB2C**
Sample #: **345410**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	29300		2500	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	0.91		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	11		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	44	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.7		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	810	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	38		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	15	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	24		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	39400		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	9.9		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	31900		12500	10.7	mg/kg dry	10/23/03	DSC	USEPA-6010B
Manganese, Total	534		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	52		5.0	0.356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	7750	J,+	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.35 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.17 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	108		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	59		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	37	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 00:00
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD5**
Sample #: **345411**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21400		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.64		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	9.2		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	46	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.6		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.0		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	787	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	36		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	17	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	25		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	39200		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	8.6		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	23900		1250	16.1	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Manganese, Total	524		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	45		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	5380	J,f	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.43 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.16 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	107		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.21 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	56		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	33	B,x	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 15:00
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB1A**
Sample #: **345412**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	34500		2500	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	0.50	U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.2		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	78	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.1		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.2		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	661	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	20		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	22	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	15		1.0	0.368	mg/kg dry	10/16/03	DWJ	USRPA-6010B
Iron, Total	33100		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	8.9		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	8010		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	532		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.020	J	0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	17		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	3800		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.89	J	1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.11	J	3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	36	J	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.25	J	0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	53		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/06/03 @ 15:15
Sampler: B.F.& J.S.
Received: 10/07/03 @ 08:55

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB1B**
Sample #: **345413**
Matrix: Soil

Percent Solids: 72

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	19200		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	1.4		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.80		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	20	L,M	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.2		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.1		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1130	K,M	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	6.9		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	3.4	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	4.6		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	38400		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	2.9		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	1650		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	213		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.016 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	8.0		0.50	0.0356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	2490		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.55 J		1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.047 J	B,P	3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	31 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.081 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	16		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	14	B,X	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB1C**		
Sample #:	**345414**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28500		12500	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	0.063 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	7.8		0.40	0.0232	mg/kg dry	10/17/03	JMF	USEPA-6020
Barium, Total	51	L,m	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.3		1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.9		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	37		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	16	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	24		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	38500		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	9.7		1.0	0.0218	mg/kg dry	10/17/03	JMF	USEPA-6020
Magnesium, Total	22900		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	484		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.022 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	55		5.0	0.356	mg/kg dry	10/17/03	JMF	USEPA-6020
Potassium, Total	5460		100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.21 J	B,p	1.0	0.0502	mg/kg dry	10/17/03	JMF	USEPA-6020
Silver, Total	0.16 J		3.0	0.0044	mg/kg dry	10/17/03	JMF	USEPA-6020
Sodium, Total	213		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/17/03	JMF	USEPA-6020
Vanadium, Total	54		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38	B,x	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 16:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-3**
Submittal: Delivery Order 0046
RAAP
Sample ID: **EQB3**
Sample #: **345617**
Matrix: QC Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	100 U		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Barium, Total	10 U		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Calcium, Total	500 U		500	33.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Chromium, Total	1.0 U		1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Total	4.8 J	BP	100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Lead, Total	0.3 J		1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Magnesium, Total	500 U		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Total	10 U		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/13/03	MSS	USEPA-7470A
Nickel, Total	1.0 U		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Potassium, Total	200 U		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U		2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Total	0.5 U		0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Sodium, Total	160 J	BP	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Thallium, Total	1.0 U		1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Vanadium, Total	10 U		10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Total	20 U		20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**EQB2**		
Sample #:	**345184**		
Matrix:	QC Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB2A**		
Sample #:	**345186**		
Matrix:	Soil	Percent Solids:	86

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	86	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB2B**		
Sample #:	**345187**		
Matrix:	Soil	Percent Solids:	85

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	85	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD4**		
Sample #:	**345188**		
Matrix:	Soil	Percent Solids:	81

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	81	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.04 J	0.50	0.0356	mg/kg dry	10/09/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 09:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB2C**		
Sample #:	**345189**		
Matrix:	Soil	Percent Solids:	93

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	93	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
* Cyanide, Total	0.50 U VL,1	0.50	0.0356	mg/kg dry	10/21/03	JLB	USEPA-9012A

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB1A**		
Sample #:	**345196**		
Matrix:	Soil	Percent Solids:	70

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	70	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.30 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB1B**		
Sample #:	**345197**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.13 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 11:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB1C**		
Sample #:	**345198**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB3A**		
Sample #:	**345199**		
Matrix:	Soil	Percent Solids:	56

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	56	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.57	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB3B**		
Sample #:	**345200**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.24 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/03/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/04/03 @ 08:35
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**38SB3C**		
Sample #:	**345201**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.24 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB2A**		
Sample #:	**345408**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler: Received:	B.F.& J.S. 10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**68SB2B**		
Sample #:	**345409**		
Matrix:	Soil	Percent Solids:	73

Paramater	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 13:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB2C**		
Sample #:	**345410**		
Matrix:	Soil	Percent Solids:	71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD5**		
Sample #:	**345411**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB1A**		
Sample #:	**345412**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB1B**		
Sample #:	**345413**		
Matrix:	Soil	Percent Solids:	72

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	72	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/06/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/07/03 @ 08:55
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB1C**		
Sample #:	**345414**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/10/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
Submittal #:	**36440-3**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**EQB3**		
Sample #:	**345617**		
Matrix:	QC Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery							Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?						x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?						x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?								x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.								
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.								x
		1 or more <10%	1 high/low	2 or 3 high/low	2 or 3 all low	2 or 3 all high			
	Positives	L	J	J	L	K			
	Non-detects	R	UJ	UJ	UL	NONE			
	Note: The B qualifier remains over surrogate flagging.								

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

68SB2A	ms	msd	lab limits	RPD	lab limits
acetone	2	35	58-140%		
CS2	42	37	53-145%		
MTBE	110	132	76-122%		
methyl acetate				25%	20%

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 21			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 °C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentrationof the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD >_+15%, but < ± 50%, J(+) only. for %RSD > ±50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?		x	
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?	at dilution		
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		x	
	1 or more <10% 2 or 3 high/low 2 or 3 all low 2 or 3 all high Positives L J L K Non-detects R UJ UL NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?		x	
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).		x	
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x	38SB1A, 38SB3A, & 38SB3B	
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

Two samples have all results reported from a 1:10 dilution with the sixth internal standard associated compounds reportable from a further dilution.

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 19			
	Number of target compounds in each analysis:66			
	Number of results rejected and not reported:0 using Dil results			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	19			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	19			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
___ CLP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: PEST/PCB
Method No.: 8081A/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)
68SB2A's MS/MSD and EQB3 analyses were cancelled.

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes: sampled on 10/2/03, extracted on 10/8-9/03, analyzed 10/10-30/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.				x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?				x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?						x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)						x
	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance			
	1 out	high/low	No action	No action			
	2 out	2 high same column	K	No action			
		2 low same column	L, UL	No action			
		mixed same column	J, UJ	No action			
		2 high diff columns	J	Not applicable			
		2 low diff columns	J, UJ	Not applicable			
		mixed diff columns	Professional judgement	Not applicable			
	3 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		2 high, 1 low	K (2 high)	J (1 low 2nd column)			
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)			
		other mixed	J, UJ	Not applicable			
	4 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		Mixed	J, UJ	Not applicable			
	If any recovery is >0% and <10% then L(+)/R(-).						
	If any recovery is 0% then R(+/-).						

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?	aqueous pest	soil all & aqueous PCBs	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?	x		
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A/SBD1 submitted in SDG 36440-2, BDL for pest and 0.053/0.051 for Aroclor 1254.

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).	x		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	3	3			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-3
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)
68SB2A's MS/MSD and EQB3 analyses were cancelled.

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:
38SB1A collected on 10/03/03, re-extracted on 10/17/03
68SB1A collected on 10/06/03, re-extracted on 10/17/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD see SDG 36440-1

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A and SDB-3 submitted in SDG 36440-2 were both non-detect.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	3			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

Project Name: Radford SSP
SDG No.: 36440-3
Reviewer: AS
Project No.: 15291974.30000
Date: January-04

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C $\pm$ 2 ^{o}C)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: five coolers @ 2.2C, 0.9C, 1.1C, 2.1 & 8.6C (EQB&TB)

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x		x			x		

Note: 38SB2C was collected on 10/3/03 and distilled/analyzed on 10/21/03 the 18th day.

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			6 + BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (labelled LCS by TriMatrix) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%? <50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K	x					x	x			x		
								passed within 70-130%			passed within 80-120%		

Note: A high point added to Al, Ba, Ca, Fe, Mg, Mn, & K curves and the RLs were elevated by 5.

4.0 Blanks		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)												
	< -IDL > IDL < 50% 50% - 79% >120%												
	L(+)/UL(-) K(+) L(+)/R(-) L(+)/UL(-) K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note: _____

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note: _____

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?	x				x		x			x		
	%R > 125% 30%< %R < 74% < 30%												
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: 68SB2A Barium 50/37%(65%) calcium 127%/121%(121%)

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: Serial Dilution: 68SB2A - cobalt 12.5% , post digestion spike recovery passes for cobalt

Post digestion spike: 68SB2A - okay

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	x				x		x			x		

Note: _____

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: _____

Several metals by 6010B and lead by 6020 were analyzed straight and then at dilution due to the presence of high target concentrations

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: 19												
13.1.2	Number of target compounds in each analysis: various												
13.1.3	Number of results rejected and not reported: 0												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%	100%			100%			100%			100%		

Note: _____

metals cart
616-R-12
JM0060

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1077

Project Number	Project Name
0760317	RFAAP

Project Contact (Name and Phone Number): Darren Penrose (804) 765-9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted]	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB 2	10/5/03 1300	5		X	4	HCl		14	X	X	X	X	X	X		X						X	
Trip Blank	10/5/03 —	—	—		6	—		2	X														

↑ 1300 hrs for TB -WR

Box #1			Box #2			Box #3	Box #4	
1. Surface Water	6. Trip Blank		A. HCl + Ice	F. Ice Only		F. Filtered	R. Rush - 3 Day	
2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other _____		U. Unfiltered	S. Standard 28 Day	
3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice			T. Timely 14 Day	
4. Rinsate	9. Other _____		D. H2SO4 + Ice	I. ZnAc + NaOH + Ice			O. Other _____	
5. Soil Sediment/Sludge			E. Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/5/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/4/03 8:35	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-3

11-1

metals cart
Tm0555

00005

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1154

Project Number	Project Name
97604-317	RFAAP

Project Contact (Name and Phone Number): Darren Ramm (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [illegible])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[illegible] - Herb	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
385B2A	10/3/03 850	5		X	S	F	/	5	X	X	X			X		X							
385B2B	10/3/03 900	5		X	S	F	/	5	X	X	X			X		X							
5BD 4	10/3/03	5		X	S	F	/	5	X	X	X			X		X							
385B2C	10/3/03 910	5		X	S	F	/	5	X	X	X			X		X							
385B1A	10/3/03 1045	5		X	S	F	/	8	X	X	X	X	X	X		X						X	
385B1B	10/3/03 1100	5		X	S	F	/	5	X	X	X			X		X							
385B1C	10/3/03 1120	5		X	S	F	/	5	X	X	X			X		X							
385B3A	10/3/03 1200	5		X	S	F	/	5	X	X	X			X		X							
385B3B	10/3/03 1215	5		X	S	F	/	5	X	X	X			X		X							
385B5C	10/3/03 1230	5		X	S	F	/	5	X	X	X			X		X							

Box #1 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil Sediment/Sludge 6. Trip Blank 7. Oil 8. Waste 9. Other _____

Box #2 A. HCl + Ice B. HNO3 + Ice C. NaOH + Ice D. H2SO4 + Ice E. Unpreserved F. Ice Only G. Other _____ H. NaHSO4 + Ice I. ZnAc + NaOH + Ice

Box #3 F. Filtered U. Unfiltered

Box #4 R. Rush - 3 Day S. Standard 28 Day T. Timely 14 Day O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher 10/3/03	1800				
Relinquished by:	Date/time	Received by (for lab):	Date/Time: 10/4/03 8:35	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-3

11-1

Volatile Soil Cart 7

000057

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1078

Project Number	Project Name
97604517	RFAAP

Project Contact (Name and Phone Number): Darren Rennie (804) 965 5000

Samplers: Brett Fehr / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330)	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] Nitrate	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
685B2A	10/6/03 1315	5		X	5	F	/	5	X	X	X			X		X							
685B2A MS	10/6/03 1315	5		X	5	F	/	5	X	X	X			X		X							—
685B2A MSD	10/6/03 1315	5		X	5	F	/	5	X	X	X			X		X							—
685B2B	10/6/03 1330	5		X	5	F	/	5	X	X	X			X		X							
685B2C	10/6/03 1345	5		X	5	F	/	5	X	X	X			X		X							
5BD5	10/6/03 —	5		X	5	F	/	5	X	X	X			X		X							
685B1A	10/6/03 1500	5		X	5	F	/	5	X	X	X	X	X	X		X						X	
685B1B	10/6/03 1515	5		X	5	F	/	5	X	X	X			X		X							
685B1C	10/6/03 1530	5		X	5	F	/	5	X	X	X			X		X							

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fehr	10/6/03 1800				
Relinquished by:	Date/time	Received by: (for lab)	Date/Time		
		John Spangler	10/7/03 8:55		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

36440-3

TM0194 451-B-9

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1217

Project Number	Project Name
9604317	RFAAP

Project Contact (Name and Phone Number): Darren Rowe (804) 965 7000

Samplers: Brad Fisher / Josh Spangler

LAB: Tri Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Part. Size (D422) Nerb	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB3	10/7/03 1600	5		X	4	HP	✓	14	X	X	X	X	X	X		X						X	
TripBlk	10/7/03							2	X														

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/7/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/8/03 8:50	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

TM0194 17-5 36440-3

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-4 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford SSP

Reviewer: AS **Date:** February 9, 2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies:

For the VOC analyses, the method blank for batch 90056-116 contained acetone at 33 ug/Kg. The method blank for batch 90056-117 contained acetone at 22 ug/Kg. The method blank for batch 90050-117 contained acetone at 22 ug/Kg. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The associated equipment blank EQB3 submitted in sample delivery group 36440-3 displayed positive detections for acetone at 2.3 ug/L and methylene chloride at 0.67 ug/L. The associated trip blank displayed a positive detection for methylene chloride at 0.91 ug/L. The field blank detections for methylene chloride and acetone were previously qualified due to method blank detections. No further data qualifying action was required.

The continuing calibration analyzed on 10/16/03 at 1321 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for dichlorodifluoromethane at 38.0%, carbon disulfide at 22.3%, methyl acetate at 30.7%, and 2-hexanone at 20.1%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for methyl-tert-butyl ether at 25.2%, 1,1-dichloroethane at 20.4%, and bromochloromethane at 25.8%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/17/03 at 1235 displayed a percent difference greater than the control limit with a negative bias for methyl acetate at 28.7%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed a percent difference greater than the control limit with a positive bias for trans-1,3-dichloropropene at 23.1%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The laboratory control spike for batch 90056-116 displayed a recovery less than the laboratory generated lower control limit (i.e., 70%) but greater than the project QAPP lower limit (i.e., 50%) for dichlorodifluoromethane at 62%. The associated field sample results were non-detect and were previously flagged for a continuing calibration anomaly. No further data qualifying action was taken.

The matrix spike pair for sample 57SB2B displayed percent recoveries less than the laboratory generated lower control limits for carbon disulfide (33%/37%), chloroethane (74%), methyl acetate (47%/52%), and styrene (48%). The parent sample result for methyl acetate was previously qualified for a low bias displayed in the continuing calibration percent difference and no further data qualifying action was taken. Since one matrix spike recovery was acceptable and the other matrix spike recovery was only marginally low for chloroethane and styrene, no data qualifying action was taken. The parent sample result for carbon disulfide was non-detect and was flagged "UJ,m". This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for 1,1,1-trichloroethane at 26%, methyl ethyl ketone at 28%, chlorobenzene at 25%, chloroform at 24%, cis-1,3-dichloropropene at 28%, toluene at 25%, and trichloroethene at 25%. Since these relative percent differences were less than the project QAPP control limit (i.e., 50%), no data qualifying action was taken.

For the SVOC analyses, the method blank for extraction batch 90482-114 displayed positive detections for bis(2-ethylhexyl)phthalate at 26 ug/Kg and di-n-butylphthalate at 11 ug/Kg. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The associated equipment blank EQB3 submitted with sample delivery group 36440-3 contained 4-chloro-3-methylphenol at 0.14 ug/L, bis(2-ethylhexyl)phthalate at 1.4 ug/L, butyl benzyl phthalate at 1.0 ug/L, diethylphthalate at 0.11 ug/L, and two tentatively identified compounds (TICs). The equipment blank detections for bis(2-ethylhexyl) phthalate and butyl benzyl phthalate were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than ten times the blank concentration for diethylphthalate or less than five times the blank concentration of the TICs or 4-chloro-3-methylphenol were flagged "B,x" in the associated samples.

The continuing calibration analyzed on 10/18/03 at 0632 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for benzaldehyde at 26.4% and 4-chloroaniline at 26.2% and with a positive bias for 2,4,5-trichlorophenol at 25.0%. The associated field sample results were non-detect for benzaldehyde and 4-chloroaniline and were flagged "UJ,c". The associated field sample results were non-detect for 2,4,5-trichlorophenol while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The continuing calibration analyzed on 11/01/03 at 0653 displayed a percent difference greater than the control limit with a negative bias for 4-chloroaniline at 21.7%. The associated field sample results were non-detect and were flagged "UJ,c".

The continuing calibration analyzed on 11/02/03 at 1249 displayed percent differences greater than the control limit with a negative bias for hexachlorocyclopentadiene at 28.0% and 2,4-dinitrophenol at 22.4%. The associated field sample results were non-detect and were flagged "UJ,c".

The laboratory control spike for batch 90482-114 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 128%, 2,6-dinitrotoluene at 123%, 2-nitroaniline at 127%, 3,3'-dichlorobenzidine at 117%, acenaphthylene at 118%, benzo(b)fluoranthene at 125%, benzo(g,h,i)perylene at 130%, carbazole at 127%, dibenzo(a,h)anthracene at 126%, diethylphthalate at 119%, dimethylphthalate at 118%,

fluorene at 121%, hexachlorocyclopentadiene at 115%, and indeno(1,2,3-cd)pyrene at 125%. The laboratory control spike for batch 90572-114 displayed a recovery greater than the laboratory generated upper control limit (i.e., 113%) for 3,3'-dichlorobenzidine at 120%. Positive associated field sample results were flagged "J,l", unless previously qualified for an equipment blank detection anomaly.

The matrix spike pair for sample 57SB2B displayed percent recoveries less than the laboratory generated lower control limits for 2,4-dinitrophenol (12%/11%), 4,6-dinitro-2-methylphenol (20%), 4-chloroaniline (24%/28%), and hexachlorocyclopentadiene (39%/37%). Since the matrix spike recoveries were greater than the project QAPP lower limit (i.e., 10%), no data qualifying action was taken based on these anomalies.

Sample 57SB2A displayed two acid fraction surrogate recoveries greater than the laboratory generated upper control limits for 2-fluorophenol at 119% and 2,4,5-tribromophenol at 117%. The associated acid fraction constituents were non-detect or previously flagged for an equipment blank detection anomaly. No data further data qualifying action was taken.

For the PAH analyses, the 2-fluorobiphenyl surrogate percent recoveries were less than the laboratory generated lower control limit (i.e., 49%) for 68SB3A at 39%, 68SB3B at 37%, 68SB3C at 34%, 57SB1A at 32%, 57SB1B at 46%, SBD6 at 30%, 57SB3B at 47%, 57SB2C at 48%, 69SB1A at 46%, 69SB1B at 42%, 69SB1C at 36%, SBD7 at 45%, and 69SB3B at 45%. Positive associated field sample results were flagged "L,s" while non-detects were flagged "UL,s", unless previously qualified for laboratory control spike anomalies.

The matrix spike pair for sample 57SB2B displayed percent recoveries less than the laboratory generated lower control limits for acenaphthylene (56%/56%), benzo(g,h,i)perylene (67%/68%), dibenzo(a,h)anthracene (67%/65%), fluoranthene (67%/66%), and naphthalene (55%/56%). Since most of the associated field sample results were qualified as biased low due to surrogate recovery anomalies, no further data qualifying action was taken.

For the explosive analyses, the continuing calibration analyzed on 10/22/03 at 1517 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 4-nitrotoluene at 15.2%. The continuing calibration analyzed on 10/22/03 at 2017 displayed a percent difference greater than the control limit with a negative bias for RDX at 16.5%. The continuing calibration analyzed on 10/23/03 at 0859 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 16.5%. The continuing calibration analyzed on 10/23/03 at 1358 displayed a percent difference greater than the control limit with a negative bias for RDX at 23.0%. The continuing calibration analyzed on 10/23/03 at 1426 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.1%. The continuing calibration analyzed on 10/27/03 at 1217 displayed a percent difference greater than the control limit with a negative bias for RDX at 16.9%. The continuing calibration analyzed on 10/27/03 at 1244 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 17.2%. The continuing calibration analyzed on 10/27/03 at 1810 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.4%. The continuing calibration analyzed on 10/27/03 at 2310 displayed percent differences greater than the control limit with a negative bias for RDX at 16.1% and 1,3,5-trinitrobenzene at 15.4%. The continuing calibration analyzed on 10/27/03 at 2337 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.2%. All associated sample results were non-detect and were flagged "UJ,c".

For the PCB analyses, the positive result reported in sample 57SB4A displayed a percent difference greater than the control limit (i.e., 40%) between the two analytical column concentrations for arochlor 1254 at 41.5%. This result was flagged "J,g".

For the herbicide analyses, the laboratory control spike for batch 90218-110 displayed a recovery less than the laboratory generated lower control limit (i.e., 50%) for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (i.e., 91%) for MCPP at 117%. The associated field sample result was non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. Only dinoseb results from the re-extraction should be used for data interpretation. The surrogate recoveries were greater than the upper laboratory generated control limit (i.e., 114%) for all samples of the re-extraction. Since the associated field sample results were non-detect, no data qualifying action was required.

The closing continuing calibration displayed a percent difference greater than the control limit (i.e., 15%) with a positive bias for dicamba at 29.6% on column one and silvex at 17.0% on column two. The associated field sample results were non-detect. No data qualifying action was required.

For the metal analyses by 6020, the method blank for batches 90105-113 and 90112-120 contained lead at 0.089 and 0.098 mg/Kg, respectively. The associated equipment blank EQB3 submitted with sample delivery group 36440-3 contained lead at 0.3 ug/L. The associated field sample results were positive and greater than five times the blank concentrations. Therefore, no data qualifying action was required.

The matrix spike duplicate performed on sample 57SB2B displayed a percent recovery less than the laboratory generated upper control limit (i.e., 87%) for thallium at 84%. Since this recovery was only marginally less than the control limit, greater than the project QAPP lower control limit (i.e., 75%), and the matrix spike displayed an acceptable recovery, no data qualifying action was taken based on this anomaly.

For the metal analyses by 6010B, the method blank for batch 89971-113 contained beryllium at 0.0495 mg/Kg and sodium at 19.8 mg/Kg. The method blank for batch 90177-120 contained cobalt at 0.374 mg/Kg and sodium at 8.95 mg/Kg. Positive associated field sample results less than five times the blank concentration were flagged "B,p". The associated equipment blank EQB3 submitted with sample delivery group 36440-3 contained iron at 4.8 ug/L and sodium at 160 ug/L. The equipment blank results for iron and sodium were previously qualified due to method blank detections. No further data qualifying action was taken based on equipment blank detections.

The matrix spike performed on sample 57SB2B displayed a percent recovery greater than the laboratory generated upper control limit (i.e., 111%) for magnesium at 121%. Since this recovery was only marginally greater than the control limit, less than the project QAPP upper control limit (i.e., 125%), and the matrix spike duplicate displayed an acceptable recovery, no data qualifying action was taken based on this anomaly. The serial dilution performed on sample 57SB2B displayed percent differences greater than the control limit (i.e., 10%) for beryllium at 18.2%, cobalt at 19.2%, and potassium at 13.1%. All associated field sample results were positive and were flagged "J,s". The field duplicate pair (57SB3A and SBD6) displayed relative percent differences greater than the control limit (i.e., 35%) for barium at 36%, cadmium at 41%, calcium at 45%, chromium at 52%, cobalt at 161%, and zinc at 42%.

The positive results were flagged "J,f" in these two samples, except cobalt results that were previously qualified due to a serial dilution anomaly. The field duplicate pair (69SB3A and SBD7) displayed relative percent differences greater than the control limit (i.e., 35%) for aluminum at 37.2% and iron at 36.8%. The positive results were flagged "J,f" in these two samples, except cobalt results that were previously qualified due to a serial dilution anomaly.

Sample 69SB3C displayed an internal standard recovery greater than the laboratory upper control limit (i.e., 120%) for yttrium at 148%. The sample was reanalyzed at a dilution factor of five that displays an acceptable internal standard recovery. The associated field sample result for beryllium was reported from this dilution and displays an elevated method detection limit. Since the reporting limit was greater than three times the elevated method detection limit, the reporting limit was not elevated based on this dilution factor.

For the cyanide analyses, the matrix spike duplicate performed on sample 57SB2B displayed a percent recovery less than the laboratory generated upper control limit (i.e., 80%) for thallium at 74%. Since this recovery was only marginally less than the control limit and the matrix spike displayed an acceptable recovery, no data qualifying action was taken based on this anomaly.

Correctable Anomalies: None.

Comments: Field coolers were received at the laboratory with internal temperatures less than the lower control limit (i.e., 2°C) at 0.9°C and 0.8 °C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken. A cooler was received at the laboratory with an internal temperature greater than the upper control limit (i.e., 6°C) at 8.6 °C. Based on professional judgement no data qualifying action was required since this temperature did not exceed 10°C.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. The GIS-Key format is limited to 12 characters for a TIC CAS number. One or two SVOC TIC detections exceeded this limitation for 57SB3B and 69SB3B. The laboratory reported the CAS number without the dashes. The reviewer manually entered the dashes for evaluation purposes on the hardcopy result forms included in this report.

No anomalies were encountered if a given fraction was not mentioned. All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-4	345619	68SB3A	SO	10/07/03
36440-4	345620	68SB3B	SO	10/07/03
36440-4	345621	68SB3C	SO	10/07/03
36440-4	345622	57SB1A	SO	10/07/03
36440-4	345623	57SB1B	SO	10/07/03
36440-4	345624	57SB1C	SO	10/07/03
36440-4	345625	57SB3A	SO	10/07/03
36440-4	345626	SBD6	SO	10/07/03
36440-4	345627	57SB3B	SO	10/07/03
36440-4	345628	57SB3C	SO	10/07/03
36440-4	345629	57SB2A	SO	10/07/03
36440-4	345630	57SB2B	SO	10/07/03
36440-4	345631	57SB2C	SO	10/07/03
36440-4	345737	57SB4A	SO	10/08/03
36440-4	345738	69SB1A	SO	10/08/03
36440-4	345739	69SB1B	SO	10/08/03
36440-4	345740	69SB1C	SO	10/08/03
36440-4	345741	69SB3A	SO	10/08/03
36440-4	345742	SBD7	SO	10/08/03
36440-4	345743	69SB3B	SO	10/08/03
36440-4	345744	69SB3C	SO	10/08/03

Radford SSP
Duplicate Statistics

57SB3A and SBD6

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
methyl ethyl ketone	ug/Kg	26	130	28		32		13.3%	4	104	Pass
acetone	ug/Kg	26	130	99	B	160		47.1%	61	104	Pass
ethylbenzene	ug/Kg	6.5	33	0.66	J	6.6	U	163.6%	5.94	26	N/A
methylene chloride	ug/Kg	26	130	6.5	J	4.3	J	40.7%	2.2	104	N/A
toluene	ug/Kg	6.5	33	1.3	J	2.6	J	66.7%	1.3	26	N/A
trichloroethene	ug/Kg	6.5	33	1.9	J	1.6	J	17.1%	0.3	26	N/A
Semi-Volatiles											
2-methylnaphthalene	ug/Kg	220	1100	6.0	J	12	J	66.7%	6	880	N/A
4-chloro-3-methylphenol	ug/Kg	220	1100	46	J	38	J	19.0%	8	880	N/A
acenaphthylene	ug/Kg	220	1100	4.0	J	9.0	J	76.9%	5	880	N/A
acetophenone	ug/Kg	220	1100	36	J	75	J	70.3%	39	880	N/A
anthracene	ug/Kg	220	1100	220	U	9.0	J	184.3%	211	880	N/A
benzo(a)pyrene	ug/Kg	220	1100	12	J	20	J	50.0%	8	880	N/A
benzo(b)fluoranthene	ug/Kg	220	1100	20	J	35	J	54.5%	15	880	N/A
benzo(g,h,i)perylene	ug/Kg	220	1100	220	U	15	J	174.5%	205	880	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	220	1100	480		62	J	154.2%	418	880	N/A
caprolactam	ug/Kg	430	2150	43	J	25	J	52.9%	18	1720	N/A
chrysene	ug/Kg	220	1100	23	J	22	J	4.4%	1	880	N/A
diethylphthalate	ug/Kg	220	1100	19	J	21	J	10.0%	2	880	N/A
di-n-butylphthalate	ug/Kg	220	1100	360		230		44.1%	130	880	Pass
fluoranthene	ug/Kg	220	1100	40	J	45	J	11.8%	5	880	N/A
fluorene	ug/Kg	220	1100	220	U	3.0	J	194.6%	217	880	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	220	1100	7.0	J	12	J	52.6%	5	880	N/A
naphthalene	ug/Kg	220	1100	4.0	J	6.0	J	40.0%	2	880	N/A
phenanthrene	ug/Kg	220	1100	27	J	50	J	59.7%	23	880	N/A
pyrene	ug/Kg	220	1100	40	J	44	J	9.5%	4	880	N/A
Polyaromatic Hydrocarbons											
anthracene	ug/Kg	24	120	1.6	J	3.0	J	60.9%	1.4	96	N/A
chrysene	ug/Kg	24	120	5.2	J	12	J	79.1%	6.8	96	N/A
fluoranthene	ug/Kg	24	120	46		84		58.5%	38	96	Pass
phenanthrene	ug/Kg	24	120	18	J	30		50.0%	12	96	N/A
pyrene	ug/Kg	24	120	31		54		54.1%	23	96	Pass
Explosives											
BDL											
Metals											
aluminum	mg/Kg	250	1250	28900		33000		13%	4100	1000	Pass
antimony	mg/Kg	0.5	3	102		104		1.9%	2	2	Pass
arsenic	mg/Kg	0.4	2	5.1		5.3		3.8%	0.2	1.6	Pass
barium	mg/Kg	5	25	107		154		**36%**	47	20	**Fail**
beryllium	mg/Kg	1	5	0.45	J	0.39	J	14%	0.06	4	N/A
cadmium	mg/Kg	1	5	27		41		**41%**	14	4	**Fail**
calcium	mg/Kg	250	1250	1750		2760		**45%**	1010	1000	**Fail**
chromium	mg/Kg	25	125	268		454		**52%**	186	100	**Fail**
cobalt	mg/Kg	1	5	75		8.0		**161%**	67	4	**Fail**
copper	mg/Kg	1	5	27		38		34%	11	4	Pass
iron	mg/Kg	1000	5000	47100		46500		1.3%	600	4000	Pass
lead	mg/Kg	50	250	175		268		42%	93	**200**	Pass
magnesium	mg/Kg	250	1250	1420		1990		33%	570	1000	Pass
manganese	mg/Kg	5	25	544		514		5.7%	30	20	Pass
mercury	mg/Kg	0.1	1	0.11		0.13		17%	0.02	0.4	N/A
nickel	mg/Kg	0.5	3	13		14		7.4%	1	2	Pass
potassium	mg/Kg	100	500	967		1060		9.2%	93	400	Pass
selenium	mg/Kg	1	5	0.57	J	0.64	J	12%	0.07	4	N/A
silver	mg/Kg	3	15	0.11	J	0.15	J	31%	0.04	12	N/A
sodium	mg/Kg	100	500	76	J	97	J	24%	21	400	N/A
thallium	mg/Kg	0.5	3	0.24	J	0.24	J	0.0%	0	2	N/A
vanadium	mg/Kg	1	5	69		67		2.9%	2	4	Pass
zinc	mg/Kg	100	500	895		1370		**42%**	475	400	**Fail**
Cyanide											
Total Cyanide	mg/Kg	0.50	2.5	0.17	J	0.16	J	6%	0.01	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

Radford SSP
Duplicate Statistics

69SB3A and SBD7

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
methyl ethyl ketone	ug/Kg	12	60	41		35		15.8%	6	48	Pass
acetone	ug/Kg	12	60	160		180		11.8%	20	48	Pass
toluene	ug/Kg	6	30	6	U	1.7	J	112%	4.3	24	N/A
4-isopropyltoluene, TIC	ug/Kg	1	5	1	U	1.8		57.1%	0.8	4	N/A
hexanal, TIC	ug/Kg	1	5	1	U	17		178%	16	4	N/A
Semi-Volatiles											
4-chloro-3-methylphenol	ug/Kg	200	1000	23	J	21	J	9.1%	2	800	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	200	1000	19	J	19	J	0.0%	0	800	N/A
butyl benzyl phthalate	ug/Kg	200	1000	6.0	J	210	U	189%	204	800	N/A
caprolactam	ug/Kg	390	1950	14	J	210	U	175%	196	1560	N/A
diethylphthalate	ug/Kg	200	1000	8.0	J	5.0	J	46%	3	800	N/A
di-n-butylphthalate	ug/Kg	200	1000	61	J	63	J	3.2%	2	800	N/A
fluoranthene	ug/Kg	200	1000	27	J	6.0	J	127%	21	800	N/A
phenanthrene	ug/Kg	200	1000	5.0	J	7.0	J	33%	2	800	N/A
pyrene	ug/Kg	200	1000	14	J	7.0	J	67%	7	800	N/A
Polyaromatic Hydrocarbons											
fluoranthene	ug/Kg	25	125	3.8	J	25		147%	21.2	100	N/A
phenanthrene	ug/Kg	25	125	1.6	J	25		176%	23.4	100	N/A
pyrene	ug/Kg	25	125	2.9	J	25		158%	22.1	100	N/A
Explosives											
BDL											
Metals											
aluminum	mg/Kg	50	250	14000		20400		**37.2%**	6400	200	**Fail**
antimony	mg/Kg	0.50	2.5	19.00		14.00		30.3%	5	2	Pass
arsenic	mg/Kg	0.40	2.0	2.9		3.3		13%	0.4	1.6	Pass
barium	mg/Kg	5.0	25	71		90		24%	19	20	Pass
beryllium	mg/Kg	1.0	5.0	0.26	J	0.48	J	59%	0.22	4	N/A
cadmium	mg/Kg	1.0	5.0	2.10		2.5		17%	0.4	4	Pass
calcium	mg/Kg	250	1250	721		835		15%	114	1000	Pass
chromium	mg/Kg	5.0	25	22		38		53%	16	20	Pass
cobalt	mg/Kg	1.0	5.0	11		10		9.5%	1	4	Pass
copper	mg/Kg	1.0	5.0	9		12		31.9%	3.3	4	Pass
iron	mg/Kg	250	1250	17100		24800		**36.8%**	7700	1000	**Fail**
lead	mg/Kg	1.0	5.0	25		22		13%	3	4	Pass
magnesium	mg/Kg	250	1250	997		1040		4.2%	43	1000	Pass
manganese	mg/Kg	5.0	25	914		1010		10%	96	20	Pass
mercury	mg/Kg	0.10	0.50	0.041	J	0.078	J	62%	0.037	0.4	N/A
nickel	mg/Kg	0.50	2.5	9		11		26%	2.5	2	Pass
potassium	mg/Kg	100	500	813		879		7.8%	66	400	Pass
selenium	mg/Kg	1.0	5.0	0.40	J	0.60	J	40%	0.2	4	N/A
silver	mg/Kg	3.0	15	0.051	J	0.050	J	2.0%	0.001	12	N/A
sodium	mg/Kg	100	500	110		116		5.3%	6	400	Pass
thallium	mg/Kg	0.50	2.5	0.26	J	0.23	J	12%	0.03	2	N/A
vanadium	mg/Kg	1.0	5.0	35		49		33%	14	4	Pass
zinc	mg/Kg	4.0	20	45		61		30%	16	16	Pass
Cyanide											
Total Cyanide	mg/Kg	0.50	2.5	0.11	J	0.11	J	0%	0	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

URS
Measurement Systems DV Service

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3A**	QC Batch:	90056 -116
Sample #:	**345619**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	**Methyl Ethyl Ketone**	**33**		24	5.95
591-78-6	2-Hexanone	12 U	UJ,C	12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	***Acetone**	**150 B**	B,Z	24	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U	UJ,C	6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

* See attached Statement of Data Qualifications.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-4**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**68SB3A**
Sample #:	**345619**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/07/03 @ 08:10
Sampler:	B.F. & J.S.
Received:	10/08/03 @ 08:50
Prepared:	n/a
Prep. Method:	n/a
Analyzed:	10/16/03 by JDM
Anal. Method:	USEPA-8260B
QC Batch:	90056 -116
Anal. Batch:	208014
Percent Solids:	84
Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U	UJ, c	6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	24 U	UJ, c	24	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	Methylene Chloride	24 U		24	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**	Prepared:	n/a
Submittal:	Delivery Order 0046	Prep. Method:	n/a
	RAAP	Analyzed:	10/16/03 JDM
Sample ID:	**68SB3A**	Anal. Method:	USEPA-8260B
Sample #:	**345619**	QC Batch:	90056 -116
Matrix:	Soil	Anal. Batch:	208014
		Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3B**	QC Batch:	90056 -116
Sample #:	**345620**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.7 U		6.7	0.567
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.7 U		6.7	1.01
79-34-5	1,1,2,2-Tetrachloroethane	6.7 U		6.7	0.868
79-00-5	1,1,2-Trichloroethane	6.7 U		6.7	0.789
75-34-3	1,1-Dichloroethane	6.7 U		6.7	0.963
75-35-4	1,1-Dichloroethylene	6.7 U		6.7	0.975
106-93-4	1,2-Dibromoethane	6.7 U		6.7	0.911
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.77
95-50-1	1,2-Dichlorobenzene	6.7 U		6.7	0.644
107-06-2	1,2-Dichloroethane	6.7 U		6.7	0.573
156-59-2	cis-1,2-Dichloroethene	6.7 U		6.7	0.944
156-60-5	trans-1,2-Dichloroethene	6.7 U		6.7	0.935
78-87-5	1,2-Dichloropropane	6.7 U		6.7	0.779
87-61-6	1,2,3-Trichlorobenzene	6.7 U		6.7	0.724
120-82-1	1,2,4-Trichlorobenzene	6.7 U		6.7	0.545
541-73-1	1,3-Dichlorobenzene	6.7 U		6.7	0.356
106-46-7	1,4-Dichlorobenzene	6.7 U		6.7	0.944
78-93-3	**Methyl Ethyl Ketone**	**22 J**		26	6.65
591-78-6	2-Hexanone	13 U	UJ,c	13	3.01
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.94
67-64-1	***Acetone**	**49 B**	B,Z	26	6.65
71-43-2	Benzene	6.7 U		6.7	0.701
74-97-5	Bromochloromethane	6.7 U		6.7	1.01
75-27-4	Dichlorobromomethane	6.7 U		6.7	0.666
75-25-2	Bromoform	6.7 U		6.7	0.769
74-83-9	Bromomethane	6.7 U		6.7	2.00
75-15-0	Carbon Disulfide	6.7 U	UJ,c	6.7	1.93
56-23-5	Carbon Tetrachloride	6.7 U		6.7	0.620
108-90-7	Chlorobenzene	6.7 U		6.7	0.879
75-00-3	Chloroethane	6.7 U		6.7	1.80
67-66-3	Chloroform	6.7 U		6.7	0.593

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3B**	QC Batch:	90056 -116
Sample #:	**345620**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.7 U		6.7	1.11
110-82-7	Cyclohexane	13 U		13	0.420
10061-01-5	cis-1,3-Dichloropropene	6.7 U		6.7	0.653
10061-02-6	trans-1,3-Dichloropropene	6.7 U		6.7	0.693
75-71-8	Dichlorodifluoromethane	6.7 U	UJ, C	6.7	0.888
124-48-1	Chlorodibromomethane	6.7 U		6.7	0.688
100-41-4	Ethylbenzene	6.7 U		6.7	0.563
98-82-8	Isopropylbenzene	6.7 U		6.7	0.726
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.62
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.7 U		6.7	0.853
75-09-2	Methylene Chloride	26 U		26	3.74
100-42-5	Styrene	6.7 U		6.7	0.588
127-18-4	Tetrachloroethene	6.7 U		6.7	0.815
108-88-3	Toluene	6.7 U		6.7	0.617
79-01-6	Trichloroethene	6.7 U		6.7	0.900
75-69-4	Trichlorofluoromethane	6.7 U		6.7	0.988
75-01-4	Vinyl Chloride	6.7 U		6.7	0.492
1330-20-7	Xylene (Total)	6.7 U		6.7	0.560

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3B**	QC Batch:	90056 -116
Sample #:	**345620**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**	Prepared:	n/a
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	n/a
		Analyzed:	10/16/03 by JDM
Sample ID:	**68SB3C**	Anal. Method:	USEPA-8260B
Sample #:	**345621**	QC Batch:	90056 -116
Matrix:	Soil	Anal. Batch:	208014
Unit:	ug/kg dry	Percent Solids:	73
		Dilution Factor:	1.37

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.584
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.04
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.895
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.812
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.992
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	1.00
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.938
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.85
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.663
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.590
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.973
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.963
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.803
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.745
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.562
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.367
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.973
78-93-3	**Methyl Ethyl Ketone**	**24 J**		28	6.85
591-78-6	2-Hexanone	14 U	UJ,c	14	3.10
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.00
67-64-1	***Acetone**	**50 B**	B,2	28	6.85
71-43-2	Benzene	6.8 U		6.8	0.722
74-97-5	Bromochloromethane	6.8 U		6.8	1.04
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.686
75-25-2	Bromoform	6.8 U		6.8	0.792
74-83-9	Bromomethane	6.8 U		6.8	2.06
75-15-0	Carbon Disulfide	6.8 U	UJ,c	6.8	1.99
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.638
108-90-7	Chlorobenzene	6.8 U		6.8	0.906
75-00-3	Chloroethane	6.8 U		6.8	1.85
67-66-3	Chloroform	6.8 U		6.8	0.611

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3C**	QC Batch:	90056 -116
Sample #:	**345621**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.37

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.14
110-82-7	Cyclohexane	14 U		14	0.433
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.673
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.714
75-71-8	Dichlorodifluoromethane	6.8 U	UJ, C	6.8	0.915
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.708
100-41-4	Ethylbenzene	6.8 U		6.8	0.580
98-82-8	Isopropylbenzene	6.8 U		6.8	0.748
79-20-9	Methyl Acetate	28 U	UJ,C	28	4.75
108-87-2	Methylcyclohexane	14 U		14	1.16
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.878
75-09-2	**Methylene Chloride**	**5.0 J**		28	3.85
100-42-5	Styrene	6.8 U		6.8	0.606
127-18-4	Tetrachloroethene	6.8 U		6.8	0.840
108-88-3	Toluene	6.8 U		6.8	0.636
79-01-6	Trichloroethene	6.8 U		6.8	0.927
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.02
75-01-4	Vinyl Chloride	6.8 U		6.8	0.507
1330-20-7	Xylene (Total)	6.8 U		6.8	0.577

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**68SB3C**	QC Batch:	90056 -116
Sample #:	**345621**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB1A**	QC Batch:	90056 -116
Sample #:	**345622**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.8 U		5.8	0.494
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.8 U		5.8	0.880
79-34-5	1,1,2,2-Tetrachloroethane	5.8 U		5.8	0.757
79-00-5	1,1,2-Trichloroethane	5.8 U		5.8	0.688
75-34-3	1,1-Dichloroethane	5.8 U		5.8	0.840
75-35-4	1,1-Dichloroethylene	5.8 U		5.8	0.850
106-93-4	1,2-Dibromoethane	5.8 U		5.8	0.795
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.41
95-50-1	1,2-Dichlorobenzene	5.8 U		5.8	0.561
107-06-2	1,2-Dichloroethane	5.8 U		5.8	0.500
156-59-2	cis-1,2-Dichloroethene	5.8 U		5.8	0.824
156-60-5	trans-1,2-Dichloroethene	5.8 U		5.8	0.815
78-87-5	1,2-Dichloropropane	5.8 U		5.8	0.680
87-61-6	1,2,3-Trichlorobenzene	5.8 U		5.8	0.631
120-82-1	1,2,4-Trichlorobenzene	5.8 U		5.8	0.476
541-73-1	1,3-Dichlorobenzene	5.8 U		5.8	0.311
106-46-7	1,4-Dichlorobenzene	5.8 U		5.8	0.824
78-93-3	**Methyl Ethyl Ketone**	**29**		24	5.80
591-78-6	2-Hexanone	12 U	VJ,c	12	2.62
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.69
67-64-1	***Acetone**	**100 B**	Bz	24	5.80
71-43-2	Benzene	5.8 U		5.8	0.611
74-97-5	Bromochloromethane	5.8 U		5.8	0.883
75-27-4	Dichlorobromomethane	5.8 U		5.8	0.581
75-25-2	Bromoform	5.8 U		5.8	0.670
74-83-9	Bromomethane	5.8 U		5.8	1.74
75-15-0	Carbon Disulfide	5.8 U	VJ,c	5.8	1.68
56-23-5	Carbon Tetrachloride	5.8 U		5.8	0.541
108-90-7	Chlorobenzene	5.8 U		5.8	0.767
75-00-3	Chloroethane	5.8 U		5.8	1.57
67-66-3	Chloroform	5.8 U		5.8	0.517

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1A**	QC Batch:	90056 -116
Sample #:	**345622**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.16

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.8 U		5.8	0.967
110-82-7	Cyclohexane	12 U		12	0.367
10061-01-5	cis-1,3-Dichloropropene	5.8 U		5.8	0.570
10061-02-6	trans-1,3-Dichloropropene	5.8 U		5.8	0.604
75-71-8	Dichlorodifluoromethane	5.8 U	UJ, c	5.8	0.775
124-48-1	Chlorodibromomethane	5.8 U		5.8	0.600
100-41-4	Ethylbenzene	5.8 U		5.8	0.491
98-82-8	Isopropylbenzene	5.8 U		5.8	0.633
79-20-9	Methyl Acetate	24 U	UJ,c	24	4.03
108-87-2	Methylcyclohexane	12 U		12	0.980
1634-04-4	Methyl(tert)butyl Ether	5.8 U		5.8	0.744
75-09-2	**Methylene Chloride**	**3.6 J**		24	3.26
100-42-5	Styrene	5.8 U		5.8	0.513
127-18-4	Tetrachloroethene	5.8 U		5.8	0.711
108-88-3	Toluene	5.8 U		5.8	0.538
79-01-6	Trichloroethene	5.8 U		5.8	0.785
75-69-4	Trichlorofluoromethane	5.8 U		5.8	0.862
75-01-4	Vinyl Chloride	5.8 U		5.8	0.429
1330-20-7	Xylene (Total)	5.8 U		5.8	0.488

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1A**	QC Batch:	90056 -116
Sample #:	**345622**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Hexanal	66-25-1	7.0	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1B**	QC Batch:	90056 -116
Sample #:	**345623**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.7 U		6.7	0.567
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.7 U		6.7	1.01
79-34-5	1,1,2,2-Tetrachloroethane	6.7 U		6.7	0.868
79-00-5	1,1,2-Trichloroethane	6.7 U		6.7	0.789
75-34-3	1,1-Dichloroethane	6.7 U		6.7	0.963
75-35-4	1,1-Dichloroethylene	6.7 U		6.7	0.975
106-93-4	1,2-Dibromoethane	6.7 U		6.7	0.911
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.77
95-50-1	1,2-Dichlorobenzene	6.7 U		6.7	0.644
107-06-2	1,2-Dichloroethane	6.7 U		6.7	0.573
156-59-2	cis-1,2-Dichloroethene	6.7 U		6.7	0.944
156-60-5	trans-1,2-Dichloroethene	6.7 U		6.7	0.935
78-87-5	1,2-Dichloropropane	6.7 U		6.7	0.779
87-61-6	1,2,3-Trichlorobenzene	6.7 U		6.7	0.724
120-82-1	1,2,4-Trichlorobenzene	6.7 U		6.7	0.545
541-73-1	1,3-Dichlorobenzene	6.7 U		6.7	0.356
106-46-7	1,4-Dichlorobenzene	6.7 U		6.7	0.944
78-93-3	**Methyl Ethyl Ketone**	**24 J**		26	6.65
591-78-6	2-Hexanone	13 U	UJ,c	13	3.01
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.94
67-64-1	***Acetone**	**50 B**	B,2	26	6.65
71-43-2	Benzene	6.7 U		6.7	0.701
74-97-5	Bromochloromethane	6.7 U		6.7	1.01
75-27-4	Dichlorobromomethane	6.7 U		6.7	0.666
75-25-2	Bromoform	6.7 U		6.7	0.769
74-83-9	Bromomethane	6.7 U		6.7	2.00
75-15-0	Carbon Disulfide	6.7 U	UJ,c	6.7	1.93
56-23-5	Carbon Tetrachloride	6.7 U		6.7	0.620
108-90-7	Chlorobenzene	6.7 U		6.7	0.879
75-00-3	Chloroethane	6.7 U		6.7	1.80
67-66-3	**Chloroform**	**17**		6.7	0.593

* See attached Statement of Data Qualifications.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1B**	QC Batch:	90056 -116
Sample #:	**345623**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.7 U		6.7	1.11
110-82-7	Cyclohexane	13 U		13	0.420
10061-01-5	cis-1,3-Dichloropropene	6.7 U		6.7	0.653
10061-02-6	trans-1,3-Dichloropropene	6.7 U		6.7	0.693
75-71-8	Dichlorodifluoromethane	6.7 U	UJ, c	6.7	0.888
124-48-1	Chlorodibromomethane	6.7 U		6.7	0.688
100-41-4	Ethylbenzene	6.7 U		6.7	0.563
98-82-8	Isopropylbenzene	6.7 U		6.7	0.726
79-20-9	Methyl Acetate	26 U	UJ, c	26	4.62
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.7 U		6.7	0.853
75-09-2	**Methylene Chloride**	**5.3 J**		26	3.74
100-42-5	Styrene	6.7 U		6.7	0.588
127-18-4	Tetrachloroethene	6.7 U		6.7	0.815
108-88-3	Toluene	6.7 U		6.7	0.617
79-01-6	Trichloroethene	6.7 U		6.7	0.900
75-69-4	Trichlorofluoromethane	6.7 U		6.7	0.988
75-01-4	Vinyl Chloride	6.7 U		6.7	0.492
1330-20-7	Xylene (Total)	6.7 U		6.7	0.560

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB1B**	QC Batch:	90056 -116
Sample #:	**345623**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/16/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB1C**	QC Batch:	90056 -116
Sample #:	**345624**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.5 U		7.5	0.635
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.5 U		7.5	1.13
79-34-5	1,1,2,2-Tetrachloroethane	7.5 U		7.5	0.973
79-00-5	1,1,2-Trichloroethane	7.5 U		7.5	0.884
75-34-3	1,1-Dichloroethane	7.5 U		7.5	1.08
75-35-4	1,1-Dichloroethylene	7.5 U		7.5	1.09
106-93-4	1,2-Dibromoethane	7.5 U		7.5	1.02
96-12-8	1,2-Dibromo-3-chloropropane	15 U		15	3.10
95-50-1	1,2-Dichlorobenzene	7.5 U		7.5	0.721
107-06-2	1,2-Dichloroethane	7.5 U		7.5	0.642
156-59-2	cis-1,2-Dichloroethene	7.5 U		7.5	1.06
156-60-5	trans-1,2-Dichloroethene	7.5 U		7.5	1.05
78-87-5	1,2-Dichloropropane	7.5 U		7.5	0.873
87-61-6	1,2,3-Trichlorobenzene	7.5 U		7.5	0.811
120-82-1	1,2,4-Trichlorobenzene	7.5 U		7.5	0.611
541-73-1	1,3-Dichlorobenzene	7.5 U		7.5	0.399
106-46-7	1,4-Dichlorobenzene	7.5 U		7.5	1.06
78-93-3	**Methyl Ethyl Ketone**	**26 J**		30	7.45
591-78-6	2-Hexanone	15 U	VS,C	15	3.37
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.18
67-64-1	***Acetone**	**54 B**	B,Z	30	7.45
71-43-2	Benzene	7.5 U		7.5	0.785
74-97-5	Bromochloromethane	7.5 U		7.5	1.13
75-27-4	Dichlorobromomethane	7.5 U		7.5	0.746
75-25-2	Bromoform	7.5 U		7.5	0.861
74-83-9	Bromomethane	7.5 U		7.5	2.24
75-15-0	Carbon Disulfide	7.5 U	VS,C	7.5	2.16
56-23-5	Carbon Tetrachloride	7.5 U		7.5	0.694
108-90-7	Chlorobenzene	7.5 U		7.5	0.985
75-00-3	Chloroethane	7.5 U		7.5	2.01
67-66-3	**Chloroform**	**24**		7.5	0.665

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1C**	QC Batch:	90056 -116
Sample #:	**345624**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.49

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.5 U		7.5	1.24
110-82-7	Cyclohexane	15 U		15	0.471
10061-01-5	cis-1,3-Dichloropropene	7.5 U		7.5	0.732
10061-02-6	trans-1,3-Dichloropropene	7.5 U		7.5	0.776
75-71-8	Dichlorodifluoromethane	7.5 U	VJ,c	7.5	0.995
124-48-1	Chlorodibromomethane	7.5 U		7.5	0.770
100-41-4	Ethylbenzene	7.5 U		7.5	0.630
98-82-8	Isopropylbenzene	7.5 U		7.5	0.814
79-20-9	Methyl Acetate	30 U	VJ,c	30	5.17
108-87-2	Methylcyclohexane	15 U		15	1.26
1634-04-4	Methyl(tert)butyl Ether	7.5 U		7.5	0.955
75-09-2	**Methylene Chloride**	**6.4 J**		30	4.19
100-42-5	Styrene	7.5 U		7.5	0.659
127-18-4	Tetrachloroethene	7.5 U		7.5	0.913
108-88-3	Toluene	7.5 U		7.5	0.691
79-01-6	Trichloroethene	7.5 U		7.5	1.01
75-69-4	Trichlorofluoromethane	7.5 U		7.5	1.11
75-01-4	Vinyl Chloride	7.5 U		7.5	0.551
1330-20-7	Xylene (Total)	7.5 U		7.5	0.627

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB1C**	QC Batch:	90056 -116
Sample #:	**345624**	Anal. Batch:	208014
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3A**	QC Batch:	90056 -117
Sample #:	**345625**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**28**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	***Acetone**	**99 B**	Bz	26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U		6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3A**	QC Batch:	90056 -117
Sample #:	**345625**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	**Ethylbenzene**	**0.66 J**		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**6.5 J**		26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.3 J**		6.5	0.603
79-01-6	**Trichloroethene**	**1.9 J**		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3A**	QC Batch:	90056 -117
Sample #:	**345625**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD6**	QC Batch:	90056 -117
Sample #:	**345626**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**32**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	**Acetone**	**160**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U		6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD6**	QC Batch:	90056 -117
Sample #:	**345626**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,e	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**4.3 J**		26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	**Toluene**	**2.6 J**		6.6	0.612
79-01-6	**Trichloroethene**	**1.6 J**		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD6**	QC Batch:	90056 -117
Sample #:	**345626**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3B**	QC Batch:	90056 -117
Sample #:	**345627**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.59

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.9 U		7.9	0.677
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.9 U		7.9	1.21
79-34-5	1,1,2,2-Tetrachloroethane	7.9 U		7.9	1.04
79-00-5	1,1,2-Trichloroethane	7.9 U		7.9	0.943
75-34-3	1,1-Dichloroethane	7.9 U		7.9	1.15
75-35-4	1,1-Dichloroethylene	7.9 U		7.9	1.17
106-93-4	1,2-Dibromoethane	7.9 U		7.9	1.09
96-12-8	1,2-Dibromo-3-chloropropane	16 U		16	3.31
95-50-1	1,2-Dichlorobenzene	7.9 U		7.9	0.770
107-06-2	1,2-Dichloroethane	7.9 U		7.9	0.685
156-59-2	cis-1,2-Dichloroethene	7.9 U		7.9	1.13
156-60-5	trans-1,2-Dichloroethene	7.9 U		7.9	1.12
78-87-5	1,2-Dichloropropane	7.9 U		7.9	0.932
87-61-6	1,2,3-Trichlorobenzene	7.9 U		7.9	0.865
120-82-1	1,2,4-Trichlorobenzene	7.9 U		7.9	0.652
541-73-1	1,3-Dichlorobenzene	7.9 U		7.9	0.426
106-46-7	1,4-Dichlorobenzene	7.9 U		7.9	1.13
78-93-3	**Methyl Ethyl Ketone**	**29 J**		32	7.95
591-78-6	2-Hexanone	16 U		16	3.59
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.32
67-64-1	***Acetone**	**77 B**	B,Z	32	7.95
71-43-2	Benzene	7.9 U		7.9	0.838
74-97-5	Bromochloromethane	7.9 U		7.9	1.21
75-27-4	Dichlorobromomethane	7.9 U		7.9	0.797
75-25-2	Bromoform	7.9 U		7.9	0.919
74-83-9	Bromomethane	7.9 U		7.9	2.39
75-15-0	Carbon Disulfide	7.9 U		7.9	2.31
56-23-5	Carbon Tetrachloride	7.9 U		7.9	0.741
108-90-7	Chlorobenzene	7.9 U		7.9	1.05
75-00-3	Chloroethane	7.9 U		7.9	2.15
67-66-3	Chloroform	7.9 U		7.9	0.709

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3B**	QC Batch:	90056 -117
Sample #:	**345627**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.59

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.9 U		7.9	1.33
110-82-7	Cyclohexane	16 U		16	0.502
10061-01-5	cis-1,3-Dichloropropene	7.9 U		7.9	0.781
10061-02-6	trans-1,3-Dichloropropene	7.9 U		7.9	0.828
75-71-8	Dichlorodifluoromethane	7.9 U		7.9	1.06
124-48-1	Chlorodibromomethane	7.9 U		7.9	0.822
100-41-4	Ethylbenzene	7.9 U		7.9	0.673
98-82-8	Isopropylbenzene	7.9 U		7.9	0.868
79-20-9	Methyl Acetate	32 U	UJ,c	32	5.52
108-87-2	Methylcyclohexane	16 U		16	1.34
1634-04-4	Methyl(tert)butyl Ether	7.9 U		7.9	1.02
75-09-2	**Methylene Chloride**	**6.8 J**		32	4.47
100-42-5	Styrene	7.9 U		7.9	0.703
127-18-4	Tetrachloroethene	7.9 U		7.9	0.975
108-88-3	Toluene	7.9 U		7.9	0.738
79-01-6	Trichloroethene	7.9 U		7.9	1.08
75-69-4	Trichlorofluoromethane	7.9 U		7.9	1.18
75-01-4	Vinyl Chloride	7.9 U		7.9	0.588
1330-20-7	Xylene (Total)	7.9 U		7.9	0.669

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3B**	QC Batch:	90056 -117
Sample #:	**345627**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3C**	QC Batch:	90056 -117
Sample #:	**345628**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.7 U		6.7	0.567
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.7 U		6.7	1.01
79-34-5	1,1,2,2-Tetrachloroethane	6.7 U		6.7	0.868
79-00-5	1,1,2-Trichloroethane	6.7 U		6.7	0.789
75-34-3	1,1-Dichloroethane	6.7 U		6.7	0.963
75-35-4	1,1-Dichloroethylene	6.7 U		6.7	0.975
106-93-4	1,2-Dibromoethane	6.7 U		6.7	0.911
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.77
95-50-1	1,2-Dichlorobenzene	6.7 U		6.7	0.644
107-06-2	1,2-Dichloroethane	6.7 U		6.7	0.573
156-59-2	cis-1,2-Dichloroethene	6.7 U		6.7	0.944
156-60-5	trans-1,2-Dichloroethene	6.7 U		6.7	0.935
78-87-5	1,2-Dichloropropane	6.7 U		6.7	0.779
87-61-6	1,2,3-Trichlorobenzene	6.7 U		6.7	0.724
120-82-1	1,2,4-Trichlorobenzene	6.7 U		6.7	0.545
541-73-1	1,3-Dichlorobenzene	6.7 U		6.7	0.356
106-46-7	1,4-Dichlorobenzene	6.7 U		6.7	0.944
78-93-3	**Methyl Ethyl Ketone**	**25 J**		26	6.65
591-78-6	2-Hexanone	13 U		13	3.01
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.94
67-64-1	***Acetone**	**55 B**	B,Z	26	6.65
71-43-2	Benzene	6.7 U		6.7	0.701
74-97-5	Bromochloromethane	6.7 U		6.7	1.01
75-27-4	Dichlorobromomethane	6.7 U		6.7	0.666
75-25-2	Bromoform	6.7 U		6.7	0.769
74-83-9	Bromomethane	6.7 U		6.7	2.00
75-15-0	Carbon Disulfide	6.7 U		6.7	1.93
56-23-5	Carbon Tetrachloride	6.7 U		6.7	0.620
108-90-7	Chlorobenzene	6.7 U		6.7	0.879
75-00-3	Chloroethane	6.7 U		6.7	1.80
67-66-3	**Chloroform**	**1.1 J**		6.7	0.593

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB3C**	QC Batch:	90056 -117
Sample #:	**345628**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.33

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.7 U		6.7	1.11
110-82-7	Cyclohexane	13 U		13	0.420
10061-01-5	cis-1,3-Dichloropropene	6.7 U		6.7	0.653
10061-02-6	trans-1,3-Dichloropropene	6.7 U		6.7	0.693
75-71-8	Dichlorodifluoromethane	6.7 U		6.7	0.888
124-48-1	Chlorodibromomethane	6.7 U		6.7	0.688
100-41-4	Ethylbenzene	6.7 U		6.7	0.563
98-82-8	Isopropylbenzene	6.7 U		6.7	0.726
79-20-9	Methyl Acetate	26 U	UJ,C	26	4.62
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.7 U		6.7	0.853
75-09-2	**Methylene Chloride**	**5.4 J**		26	3.74
100-42-5	Styrene	6.7 U		6.7	0.588
127-18-4	Tetrachloroethene	6.7 U		6.7	0.815
108-88-3	Toluene	6.7 U		6.7	0.617
79-01-6	Trichloroethene	6.7 U		6.7	0.900
75-69-4	Trichlorofluoromethane	6.7 U		6.7	0.988
75-01-4	Vinyl Chloride	6.7 U		6.7	0.492
1330-20-7	Xylene (Total)	6.7 U		6.7	0.560

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB3C**	QC Batch:	90056 -117
Sample #:	**345628**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB2A**	QC Batch:	90056 -117
Sample #:	**345629**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**30**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	***Acetone**	**100 B**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U		6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2A**	QC Batch:	90056 -117
Sample #:	**345629**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,c	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**6.0 J**		26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2A**	QC Batch:	90056 -117
Sample #:	**345629**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	28	E

NJ, I

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2B**	QC Batch:	90056 -117
Sample #:	**345630**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**23 J**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	***Acetone**	**51 B**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	*Carbon Disulfide	6.6 U	UJ,M	6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	*Chloroethane	6.6 U		6.6	1.78
67-66-3	Chloroform	6.6 U		6.6	0.589

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2B**	QC Batch:	90056 -117
Sample #:	**345630**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	*Methyl Acetate	26 U	UJ,C	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**4.9 J**		26	3.71
100-42-5	*Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2B**	QC Batch:	90056 -117
Sample #:	**345630**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2C**	QC Batch:	90056 -117
Sample #:	**345631**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	0.562
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	1.00
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	0.862
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	0.783
75-34-3	1,1-Dichloroethane	6.6 U		6.6	0.956
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	0.968
106-93-4	1,2-Dibromoethane	6.6 U		6.6	0.904
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.75
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	0.639
107-06-2	1,2-Dichloroethane	6.6 U		6.6	0.569
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	0.937
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	0.928
78-87-5	1,2-Dichloropropane	6.6 U		6.6	0.774
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	0.718
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	0.541
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	0.354
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.937
78-93-3	**Methyl Ethyl Ketone**	**21 J**		26	6.60
591-78-6	2-Hexanone	13 U		13	2.98
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.93
67-64-1	***Acetone**	**37 B**	B,Z	26	6.60
71-43-2	Benzene	6.6 U		6.6	0.696
74-97-5	Bromochloromethane	6.6 U		6.6	1.00
75-27-4	**Dichlorobromomethane**	**1.2 J**		6.6	0.661
75-25-2	Bromoform	6.6 U		6.6	0.763
74-83-9	Bromomethane	6.6 U		6.6	1.98
75-15-0	Carbon Disulfide	6.6 U		6.6	1.91
56-23-5	Carbon Tetrachloride	6.6 U		6.6	0.615
108-90-7	Chlorobenzene	6.6 U		6.6	0.873
75-00-3	Chloroethane	6.6 U		6.6	1.78
67-66-3	**Chloroform**	**15**		6.6	0.589

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB2C**	QC Batch:	90056 -117
Sample #:	**345631**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U		6.6	1.10
110-82-7	Cyclohexane	13 U		13	0.417
10061-01-5	cis-1,3-Dichloropropene	6.6 U		6.6	0.648
10061-02-6	trans-1,3-Dichloropropene	6.6 U		6.6	0.688
75-71-8	Dichlorodifluoromethane	6.6 U		6.6	0.882
124-48-1	Chlorodibromomethane	6.6 U		6.6	0.682
100-41-4	Ethylbenzene	6.6 U		6.6	0.558
98-82-8	Isopropylbenzene	6.6 U		6.6	0.721
79-20-9	Methyl Acetate	26 U	UJ,c	26	4.58
108-87-2	Methylcyclohexane	13 U		13	1.12
1634-04-4	Methyl(tert)butyl Ether	6.6 U		6.6	0.846
75-09-2	**Methylene Chloride**	**4.8 J**		26	3.71
100-42-5	Styrene	6.6 U		6.6	0.583
127-18-4	Tetrachloroethene	6.6 U		6.6	0.809
108-88-3	Toluene	6.6 U		6.6	0.612
79-01-6	Trichloroethene	6.6 U		6.6	0.894
75-69-4	Trichlorofluoromethane	6.6 U		6.6	0.981
75-01-4	Vinyl Chloride	6.6 U		6.6	0.488
1330-20-7	Xylene (Total)	6.6 U		6.6	0.556

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**57SB2C**	QC Batch:	90056 -117
Sample #:	**345631**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4A**	QC Batch:	90056 -117
Sample #:	**345737**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U		7.0	0.601
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U		7.0	1.07
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U		7.0	0.921
79-00-5	1,1,2-Trichloroethane	7.0 U		7.0	0.836
75-34-3	1,1-Dichloroethane	7.0 U		7.0	1.02
75-35-4	1,1-Dichloroethylene	7.0 U		7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U		7.0	0.966
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.93
95-50-1	1,2-Dichlorobenzene	7.0 U		7.0	0.682
107-06-2	1,2-Dichloroethane	7.0 U		7.0	0.608
156-59-2	cis-1,2-Dichloroethene	7.0 U		7.0	1.00
156-60-5	trans-1,2-Dichloroethene	7.0 U		7.0	0.991
78-87-5	1,2-Dichloropropane	7.0 U		7.0	0.826
87-61-6	1,2,3-Trichlorobenzene	7.0 U		7.0	0.767
120-82-1	1,2,4-Trichlorobenzene	7.0 U		7.0	0.578
541-73-1	1,3-Dichlorobenzene	7.0 U		7.0	0.378
106-46-7	1,4-Dichlorobenzene	7.0 U		7.0	1.00
78-93-3	**Methyl Ethyl Ketone**	**30**		14	7.05
591-78-6	2-Hexanone	14 U		14	3.19
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.06
67-64-1	***Acetone**	**55 B**	B,Z	14	7.05
71-43-2	Benzene	7.0 U		7.0	0.743
74-97-5	Bromochloromethane	7.0 U		7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U		7.0	0.706
75-25-2	Bromoform	7.0 U		7.0	0.815
74-83-9	Bromomethane	7.0 U		7.0	2.12
75-15-0	Carbon Disulfide	7.0 U		7.0	2.04
56-23-5	Carbon Tetrachloride	7.0 U		7.0	0.657
108-90-7	Chlorobenzene	7.0 U		7.0	0.932
75-00-3	Chloroethane	7.0 U		7.0	1.90
67-66-3	Chloroform	7.0 U		7.0	0.629

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4A**	QC Batch:	90056 -117
Sample #:	**345737**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.41

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.18
110-82-7	Cyclohexane	14 U		14	0.446
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.692
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.735
75-71-8	Dichlorodifluoromethane	7.0 U		7.0	0.942
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.729
100-41-4	Ethylbenzene	7.0 U		7.0	0.596
98-82-8	Isopropylbenzene	7.0 U		7.0	0.770
79-20-9	Methyl Acetate	14 U	UJc	14	4.89
108-87-2	Methylcyclohexane	14 U		14	1.19
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.904
75-09-2	Methylene Chloride	7.0 U		7.0	3.96
100-42-5	Styrene	7.0 U		7.0	0.623
127-18-4	Tetrachloroethene	7.0 U		7.0	0.864
108-88-3	Toluene	7.0 U		7.0	0.654
79-01-6	Trichloroethene	7.0 U		7.0	0.955
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.05
75-01-4	Vinyl Chloride	7.0 U		7.0	0.522
1330-20-7	Xylene (Total)	7.0 U		7.0	0.594

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4A**	QC Batch:	90056 -117
Sample #:	**345737**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1A**	QC Batch:	90056 -117
Sample #:	**345738**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.545
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.972
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.836
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.759
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.927
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.938
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.877
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.66
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.620
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.552
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.909
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.900
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.750
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.696
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.525
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.343
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.909
78-93-3	**Methyl Ethyl Ketone**	**31**		13	6.40
591-78-6	2-Hexanone	13 U		13	2.89
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.87
67-64-1	***Acetone**	**100 B**	B,Z	13	6.40
71-43-2	Benzene	6.4 U		6.4	0.675
74-97-5	Bromochloromethane	6.4 U		6.4	0.974
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.641
75-25-2	Bromoform	6.4 U		6.4	0.740
74-83-9	Bromomethane	6.4 U		6.4	1.92
75-15-0	Carbon Disulfide	6.4 U		6.4	1.86
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.596
108-90-7	Chlorobenzene	6.4 U		6.4	0.846
75-00-3	Chloroethane	6.4 U		6.4	1.73
67-66-3	Chloroform	6.4 U		6.4	0.571

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1A**	QC Batch:	90056 -117
Sample #:	**345738**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.28

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.07
110-82-7	Cyclohexane	13 U		13	0.404
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.628
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.667
75-71-8	Dichlorodifluoromethane	6.4 U		6.4	0.855
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.662
100-41-4	Ethylbenzene	6.4 U		6.4	0.541
98-82-8	Isopropylbenzene	6.4 U		6.4	0.699
79-20-9	Methyl Acetate	13 U	VJ,C	13	4.44
108-87-2	Methylcyclohexane	13 U		13	1.08
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.820
75-09-2	Methylene Chloride	6.4 U		6.4	3.60
100-42-5	Styrene	6.4 U		6.4	0.566
127-18-4	Tetrachloroethene	6.4 U		6.4	0.785
108-88-3	Toluene	6.4 U		6.4	0.594
79-01-6	Trichloroethene	6.4 U		6.4	0.867
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.951
75-01-4	Vinyl Chloride	6.4 U		6.4	0.474
1330-20-7	Xylene (Total)	6.4 U		6.4	0.539

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1A**	QC Batch:	90056 -117
Sample #:	**345738**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1B**	QC Batch:	90056 -117
Sample #:	**345739**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	0.520
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.926
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	0.797
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	0.723
75-34-3	1,1-Dichloroethane	6.1 U		6.1	0.883
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	0.894
106-93-4	1,2-Dibromoethane	6.1 U		6.1	0.836
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.54
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	0.590
107-06-2	1,2-Dichloroethane	6.1 U		6.1	0.526
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	0.866
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	0.858
78-87-5	1,2-Dichloropropane	6.1 U		6.1	0.715
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	0.664
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	0.500
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	0.327
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.866
78-93-3	**Methyl Ethyl Ketone**	**22**		12	6.10
591-78-6	2-Hexanone	12 U		12	2.76
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.78
67-64-1	***Acetone**	**44 B**	QZ	12	6.10
71-43-2	Benzene	6.1 U		6.1	0.643
74-97-5	Bromochloromethane	6.1 U		6.1	0.928
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.611
75-25-2	Bromoform	6.1 U		6.1	0.705
74-83-9	Bromomethane	6.1 U		6.1	1.83
75-15-0	Carbon Disulfide	6.1 U		6.1	1.77
56-23-5	Carbon Tetrachloride	6.1 U		6.1	0.569
108-90-7	Chlorobenzene	6.1 U		6.1	0.806
75-00-3	Chloroethane	6.1 U		6.1	1.65
67-66-3	Chloroform	6.1 U		6.1	0.544

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1B**	QC Batch:	90056 -117
Sample #:	**345739**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.02
110-82-7	Cyclohexane	12 U		12	0.386
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.599
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.636
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.815
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.631
100-41-4	Ethylbenzene	6.1 U		6.1	0.516
98-82-8	Isopropylbenzene	6.1 U		6.1	0.666
79-20-9	Methyl Acetate	12 U	UJ,C	12	4.23
108-87-2	Methylcyclohexane	12 U		12	1.03
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.782
75-09-2	Methylene Chloride	6.1 U		6.1	3.43
100-42-5	Styrene	6.1 U		6.1	0.539
127-18-4	Tetrachloroethene	6.1 U		6.1	0.748
108-88-3	Toluene	6.1 U		6.1	0.566
79-01-6	Trichloroethene	6.1 U		6.1	0.826
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.906
75-01-4	Vinyl Chloride	6.1 U		6.1	0.451
1330-20-7	Xylene (Total)	6.1 U		6.1	0.514

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1B**	QC Batch:	90056 -117
Sample #:	**345739**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB1C**	QC Batch:	90056 -117
Sample #:	**345740**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.575
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.02
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.882
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.801
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.977
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	0.990
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.925
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.81
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.653
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.582
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.959
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.949
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.791
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.734
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.554
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.362
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.959
78-93-3	**Methyl Ethyl Ketone**	**26**		14	6.75
591-78-6	2-Hexanone	14 U		14	3.05
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.97
67-64-1	***Acetone**	**70 B**	B,Z	14	6.75
71-43-2	Benzene	6.8 U		6.8	0.711
74-97-5	Bromochloromethane	6.8 U		6.8	1.03
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.676
75-25-2	Bromoform	6.8 U		6.8	0.780
74-83-9	Bromomethane	6.8 U		6.8	2.03
75-15-0	Carbon Disulfide	6.8 U		6.8	1.96
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.629
108-90-7	Chlorobenzene	6.8 U		6.8	0.892
75-00-3	Chloroethane	6.8 U		6.8	1.82
67-66-3	Chloroform	6.8 U		6.8	0.602

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1C**	QC Batch:	90056 -117
Sample #:	**345740**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U	6.8	1.13
110-82-7	Cyclohexane	14 U	14	0.427
10061-01-5	cis-1,3-Dichloropropene	6.8 U	6.8	0.663
10061-02-6	trans-1,3-Dichloropropene	6.8 U	6.8	0.703
75-71-8	Dichlorodifluoromethane	6.8 U	6.8	0.902
124-48-1	Chlorodibromomethane	6.8 U	6.8	0.698
100-41-4	Ethylbenzene	6.8 U	6.8	0.571
98-82-8	Isopropylbenzene	6.8 U	6.8	0.737
79-20-9	Methyl Acetate	14 U	UJ,C 14	4.68
108-87-2	Methylcyclohexane	14 U	14	1.14
1634-04-4	Methyl(tert)butyl Ether	6.8 U	6.8	0.865
75-09-2	Methylene Chloride	6.8 U	6.8	3.79
100-42-5	Styrene	6.8 U	6.8	0.597
127-18-4	Tetrachloroethene	6.8 U	6.8	0.828
108-88-3	**Toluene**	**0.89 J**	6.8	0.626
79-01-6	Trichloroethene	6.8 U	6.8	0.914
75-69-4	Trichlorofluoromethane	6.8 U	6.8	1.00
75-01-4	Vinyl Chloride	6.8 U	6.8	0.500
1330-20-7	Xylene (Total)	6.8 U	6.8	0.568

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB1C**	QC Batch:	90056 -117
Sample #:	**345740**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3A**	QC Batch:	90056 -117
Sample #:	**345741**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	**Methyl Ethyl Ketone**	**41**		12	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	**Acetone**	**160**	B,2	12	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U		6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB3A**	QC Batch:	90056 -117
Sample #:	**345741**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	12 U	UJ,C	12	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	Methylene Chloride	6.0 U		6.0	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	Toluene	6.0 U		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**	Prepared:	n/a
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	n/a
		Analyzed:	10/17/03 JDM
Sample ID:	**69SB3A**	Anal. Method:	USEPA-8260B
Sample #:	**345741**	QC Batch:	90056 -117
Matrix:	Soil	Anal. Batch:	208019
		Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD7**	QC Batch:	90056 -117
Sample #:	**345742**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.507
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.903
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.777
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.706
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.862
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.872
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.815
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.48
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.576
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.513
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.845
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.837
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.697
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.647
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.488
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.319
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.845
78-93-3	**Methyl Ethyl Ketone**	**35**		12	5.95
591-78-6	2-Hexanone	12 U		12	2.69
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.74
67-64-1	**Acetone**	**180**	B,Z	12	5.95
71-43-2	Benzene	6.0 U		6.0	0.627
74-97-5	Bromochloromethane	6.0 U		6.0	0.906
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.596
75-25-2	Bromoform	6.0 U		6.0	0.688
74-83-9	Bromomethane	6.0 U		6.0	1.79
75-15-0	Carbon Disulfide	6.0 U		6.0	1.73
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.555
108-90-7	Chlorobenzene	6.0 U		6.0	0.787
75-00-3	Chloroethane	6.0 U		6.0	1.61
67-66-3	Chloroform	6.0 U		6.0	0.531

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD7**	QC Batch:	90056 -117
Sample #:	**345742**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.19

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U		6.0	0.992
110-82-7	Cyclohexane	12 U		12	0.376
10061-01-5	cis-1,3-Dichloropropene	6.0 U		6.0	0.584
10061-02-6	trans-1,3-Dichloropropene	6.0 U		6.0	0.620
75-71-8	Dichlorodifluoromethane	6.0 U		6.0	0.795
124-48-1	Chlorodibromomethane	6.0 U		6.0	0.615
100-41-4	Ethylbenzene	6.0 U		6.0	0.503
98-82-8	Isopropylbenzene	6.0 U		6.0	0.650
79-20-9	Methyl Acetate	12 U	UJ,C	12	4.13
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U		6.0	0.763
75-09-2	Methylene Chloride	6.0 U		6.0	3.34
100-42-5	Styrene	6.0 U		6.0	0.526
127-18-4	Tetrachloroethene	6.0 U		6.0	0.729
108-88-3	**Toluene**	**1.7 J**		6.0	0.552
79-01-6	Trichloroethene	6.0 U		6.0	0.806
75-69-4	Trichlorofluoromethane	6.0 U		6.0	0.884
75-01-4	Vinyl Chloride	6.0 U		6.0	0.440
1330-20-7	Xylene (Total)	6.0 U		6.0	0.501

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD7**	QC Batch:	90056 -117
Sample #:	**345742**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
4-Isopropyltoluene	99-87-6	1.8	Q	NJ,+
Hexanal	66-25-1	17	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB3B**	QC Batch:	90056 -117
Sample #:	**345743**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U	6.1	0.520
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U	6.1	0.926
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U	6.1	0.797
79-00-5	1,1,2-Trichloroethane	6.1 U	6.1	0.723
75-34-3	1,1-Dichloroethane	6.1 U	6.1	0.883
75-35-4	1,1-Dichloroethylene	6.1 U	6.1	0.894
106-93-4	1,2-Dibromoethane	6.1 U	6.1	0.836
96-12-8	1,2-Dibromo-3-chloropropane	12 U	12	2.54
95-50-1	1,2-Dichlorobenzene	6.1 U	6.1	0.590
107-06-2	1,2-Dichloroethane	6.1 U	6.1	0.526
156-59-2	cis-1,2-Dichloroethene	6.1 U	6.1	0.866
156-60-5	trans-1,2-Dichloroethene	6.1 U	6.1	0.858
78-87-5	1,2-Dichloropropane	6.1 U	6.1	0.715
87-61-6	1,2,3-Trichlorobenzene	6.1 U	6.1	0.664
120-82-1	1,2,4-Trichlorobenzene	6.1 U	6.1	0.500
541-73-1	1,3-Dichlorobenzene	6.1 U	6.1	0.327
106-46-7	1,4-Dichlorobenzene	6.1 U	6.1	0.866
78-93-3	**Methyl Ethyl Ketone**	**22**	12	6.10
591-78-6	2-Hexanone	12 U	12	2.76
108-10-1	4-Methyl-2-Pentanone	12 U	12	1.78
67-64-1	***Acetone**	**63 B**	12	6.10
71-43-2	Benzene	6.1 U	6.1	0.643
74-97-5	Bromochloromethane	6.1 U	6.1	0.928
75-27-4	Dichlorobromomethane	6.1 U	6.1	0.611
75-25-2	Bromoform	6.1 U	6.1	0.705
74-83-9	Bromomethane	6.1 U	6.1	1.83
75-15-0	Carbon Disulfide	6.1 U	6.1	1.77
56-23-5	Carbon Tetrachloride	6.1 U	6.1	0.569
108-90-7	Chlorobenzene	6.1 U	6.1	0.806
75-00-3	Chloroethane	6.1 U	6.1	1.65
67-66-3	Chloroform	6.1 U	6.1	0.544

Bz

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3B**	QC Batch:	90056 -117
Sample #:	**345743**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.22

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.02
110-82-7	Cyclohexane	12 U		12	0.386
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.599
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.636
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.815
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.631
100-41-4	Ethylbenzene	6.1 U		6.1	0.516
98-82-8	Isopropylbenzene	6.1 U		6.1	0.666
79-20-9	Methyl Acetate	12 U	UJ,c	12	4.23
108-87-2	Methylcyclohexane	12 U		12	1.03
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.782
75-09-2	Methylene Chloride	6.1 U		6.1	3.43
100-42-5	Styrene	6.1 U		6.1	0.539
127-18-4	Tetrachloroethene	6.1 U		6.1	0.748
108-88-3	Toluene	6.1 U		6.1	0.566
79-01-6	Trichloroethene	6.1 U		6.1	0.826
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.906
75-01-4	Vinyl Chloride	6.1 U		6.1	0.451
1330-20-7	Xylene (Total)	6.1 U		6.1	0.514

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3B**	QC Batch:	90056 -117
Sample #:	**345743**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3C**	QC Batch:	90050 -117
Sample #:	**345744**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.575
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.02
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.882
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.801
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.977
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	0.990
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.925
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.81
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.653
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.582
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.959
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.949
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.791
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.734
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.554
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.362
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.959
78-93-3	**Methyl Ethyl Ketone**	**30**		14	6.75
591-78-6	2-Hexanone	14 U		14	3.05
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.97
67-64-1	***Acetone**	**74 B**	B,2	14	6.75
71-43-2	Benzene	6.8 U		6.8	0.711
74-97-5	Bromochloromethane	6.8 U		6.8	1.03
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.676
75-25-2	Bromoform	6.8 U		6.8	0.780
74-83-9	Bromomethane	6.8 U		6.8	2.03
75-15-0	Carbon Disulfide	6.8 U		6.8	1.96
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.629
108-90-7	Chlorobenzene	6.8 U		6.8	0.892
75-00-3	Chloroethane	6.8 U		6.8	1.82
67-66-3	Chloroform	6.8 U		6.8	0.602

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB3C**	QC Batch:	90050 -117
Sample #:	**345744**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U	6.8	1.13
110-82-7	Cyclohexane	14 U	14	0.427
10061-01-5	cis-1,3-Dichloropropene	6.8 U	6.8	0.663
10061-02-6	trans-1,3-Dichloropropene	6.8 U	6.8	0.703
75-71-8	Dichlorodifluoromethane	6.8 U	6.8	0.902
124-48-1	Chlorodibromomethane	6.8 U	6.8	0.698
100-41-4	Ethylbenzene	6.8 U	6.8	0.571
98-82-8	Isopropylbenzene	6.8 U	6.8	0.737
79-20-9	Methyl Acetate	14 U	UJ,C 14	4.68
108-87-2	Methylcyclohexane	14 U	14	1.14
1634-04-4	Methyl(tert)butyl Ether	6.8 U	6.8	0.865
75-09-2	Methylene Chloride	6.8 U	6.8	3.79
100-42-5	Styrene	6.8 U	6.8	0.597
127-18-4	Tetrachloroethene	6.8 U	6.8	0.828
108-88-3	Toluene	6.8 U	6.8	0.626
79-01-6	Trichloroethene	6.8 U	6.8	0.914
75-69-4	Trichlorofluoromethane	6.8 U	6.8	1.00
75-01-4	Vinyl Chloride	6.8 U	6.8	0.500
1330-20-7	Xylene (Total)	6.8 U	6.8	0.568

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-4**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/17/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB3C**	QC Batch:	90050 -117
Sample #:	**345744**	Anal. Batch:	208019
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	400 U	400	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	66.5
99-09-2	3-Nitroaniline	200 U	200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**35 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	400 U	400	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/31/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	**Benzo (a) Pyrene**	**11 J**		200	6.85
205-99-2	**Benzo (b) Fluoranthene**	**23 J**		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**49 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	**Caprolactam**	**94 J**		400	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	**Chrysene**	**15 J**		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**13 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**190 J**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**23 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**9.0 J**		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**12 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**23 J**	200	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3A**	QC Batch:	90210 -110
Sample #:	**345619**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	320	E	NJ,+
1-Hexadecanol	36653-82-4	120	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	140	E	NJ,+
3-Eicosene, (E)-	74685-33-9	140	E	NJ,+
Eicosane	112-95-8	100	E	NJ,+
Octadecanal	638-66-4	79	E	NJ,+
Phsophoric acid, tris(3-methylphenyl) ester	563-04-2	200	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**31 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**20 J**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**11 J**		220	5.82
105-60-2	**Caprolactam**	**21 J**		400	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**10 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**210 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3B**	QC Batch:	90210 -110
Sample #:	**345620**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	48	E	NJ,†
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	320	E	NJ,†
1-Heptadecanol	1454-85-9	42	E	NJ,†
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	120	E	NJ,†
2-Ethyl-1-Hexanol	104-76-7	36	E	NJ,†
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~360~~	~~E~~	
Stearic Acid	57-11-4	45	E	NJ,†

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U	240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U	240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U	240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U	240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U	240	3.67
120-83-2	2,4-Dichlorophenol	240 U	240	4.93
105-67-9	2,4-Dimethylphenol	240 U	240	11.1
51-28-5	2,4-Dinitrophenol	460 U	460	4.48
121-14-2	2,4-Dinitrotoluene	240 U	240	4.41
606-20-2	2,6-Dinitrotoluene	240 U	240	38.8
91-58-7	2-Chloronaphthalene	240 U	240	3.22
95-57-8	2-Chlorophenol	240 U	240	2.81
91-57-6	2-Methylnaphthalene	240 U	240	3.84
95-48-7	2-Methylphenol	240 U	240	6.78
88-74-4	2-Nitroaniline	240 U	240	6.44
88-75-5	2-Nitrophenol	240 U	240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U	240	77.6
99-09-2	3-Nitroaniline	240 U	240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U	240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U	240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**30 J**	240	7.29
106-47-8	4-Chloroaniline	240 U	240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U	240	4.58
106-44-5	4-Methylphenol	240 U	240	8.92
100-01-6	4-Nitroaniline	240 U	240	10.2
100-02-7	4-Nitrophenol	460 U	460	3.96
83-32-9	Acenaphthene	240 U	240	2.41
208-96-8	Acenaphthylene	240 U	240	2.10
98-86-2	Acetophenone	240 U	240	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U		240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**24 J**		240	2.90
85-68-7	**Butyl Benzyl Phthalate**	**14 J**		240	6.27
105-60-2	**Caprolactam**	**18 J**		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**11 J**	B,X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**380**		240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**68SB3C**	QC Batch:	90210 -110
Sample #:	**345621**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	41	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	530	E	NJ,+
1-Heptadecanol	1454-85-9	30	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	120	E	NJ,+
2-Ethyl-1-Hexanol	104-76-7	39	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~600~~	~~E~~	
Stearic Acid	57-11-4	50	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	400 U		400	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	66.5
99-09-2	3-Nitroaniline	200 U		200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**23 J**	B,X	200	6.25
106-47-8	4-Chloroaniline	200 U		200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	**Benzo (a) Pyrene**	**12 J**		200	6.85
205-99-2	**Benzo (b) Fluoranthene**	**23 J**		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**27 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	**Caprolactam**	**15 J**		400	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	**Chrysene**	**17 J**		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**330**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**30 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**7.0 J**		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**13 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**29 J**	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1A**	QC Batch:	90210 -110
Sample #:	**345622**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	86
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	440	E	NJ+
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	260	E	NJ+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	94	E	NJ+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1100~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**29 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**10 J**		220	5.82
105-60-2	**Caprolactam**	**11 J**		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**10 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**430**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1B**	QC Batch:	90210 -110
Sample #:	**345623**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	810	E	NJ,T
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	540	E	NJ,T
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	130	E	NJ,T
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1700~~	~~E~~	
Stearic Acid	57-11-4	64	E	NJ,T

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	260 U	260	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	260 U	260	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	260 U	260	1.98
95-95-4	2,4,5-Trichlorophenol	260 U	260	5.01
88-06-2	2,4,6-Trichlorophenol	260 U	260	3.93
120-83-2	2,4-Dichlorophenol	260 U	260	5.28
105-67-9	2,4-Dimethylphenol	260 U	260	11.9
51-28-5	2,4-Dinitrophenol	500 U	500	4.80
121-14-2	2,4-Dinitrotoluene	260 U	260	4.73
606-20-2	2,6-Dinitrotoluene	260 U	260	41.6
91-58-7	2-Chloronaphthalene	260 U	260	3.45
95-57-8	2-Chlorophenol	260 U	260	3.02
91-57-6	2-Methylnaphthalene	260 U	260	4.11
95-48-7	2-Methylphenol	260 U	260	7.26
88-74-4	2-Nitroaniline	260 U	260	6.90
88-75-5	2-Nitrophenol	260 U	260	2.55
91-94-1	3,3'-Dichlorobenzidine	260 U	260	83.1
99-09-2	3-Nitroaniline	260 U	260	27.5
534-52-1	4,6-Dinitro-2-Methylphenol	260 U	260	6.77
101-55-3	4-Bromophenyl Phenylether	260 U	260	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**44 J**	260	7.82
106-47-8	4-Chloroaniline	260 U	260	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	260 U	260	4.91
106-44-5	4-Methylphenol	260 U	260	9.56
100-01-6	4-Nitroaniline	260 U	260	10.9
100-02-7	4-Nitrophenol	500 U	500	4.25
83-32-9	Acenaphthene	260 U	260	2.58
208-96-8	Acenaphthylene	260 U	260	2.25
98-86-2	Acetophenone	260 U	260	2.85

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	260 U		260	6.93
1912-24-9	Atrazine	260 U		260	10.3
100-52-7	Benzaldehyde	260 U		260	6.08
56-55-3	Benzo (a) Anthracene	260 U		260	20.0
50-32-8	Benzo (a) Pyrene	260 U		260	8.57
205-99-2	Benzo (b) Fluoranthene	260 U		260	14.6
191-24-2	Benzo (g,h,i,) Perylene	260 U		260	13.1
207-08-9	Benzo (k) Fluoranthene	260 U		260	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	260 U		260	4.71
111-44-4	Bis (2-Chloroethyl) Ether	260 U		260	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**63 J**		260	3.11
85-68-7	**Butyl Benzyl Phthalate**	**30 J**		260	6.72
105-60-2	**Caprolactam**	**36 J**		500	9.57
86-74-8	Carbazole	260 U		260	9.15
218-01-9	Chrysene	260 U		260	15.3
53-70-3	Dibenzo (a,h) Anthracene	260 U		260	8.85
132-64-9	Dibenzofuran	260 U		260	4.74
84-66-2	**Diethylphthalate**	**12 J**	B,X	260	2.85
131-11-3	Dimethylphthalate	260 U		260	4.97
84-74-2	**Di-n-Butylphthalate**	**410**		260	5.73
117-84-0	Di-n-Octylphthalate	260 U		260	4.65
206-44-0	Fluoranthene	260 U		260	3.53
86-73-7	Fluorene	260 U		260	2.52
118-74-1	Hexachlorobenzene	260 U		260	3.77
87-68-3	Hexachlorobutadiene	260 U		260	5.81
77-47-4	Hexachlorocyclopentadiene	260 U		260	2.97
67-72-1	Hexachloroethane	260 U		260	3.50
193-39-5	Indeno (1,2,3-cd) Pyrene	260 U		260	5.88
78-59-1	Isophorone	260 U		260	2.60
91-20-3	Naphthalene	260 U		260	4.13
98-95-3	Nitrobenzene	260 U		260	4.80

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	260 U	260	4.94
86-30-6	N-Nitroso-di-Phenylamine	260 U	260	7.13
87-86-5	Pentachlorophenol	500 U	500	6.59
85-01-8	Phenanthrene	260 U	260	3.45
108-95-2	Phenol	260 U	260	5.94
129-00-0	Pyrene	260 U	260	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB1C**	QC Batch:	90210 -110
Sample #:	**345624**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	79	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	84-64-0	470	E	NJ,+
Bis(2-ethylhexyl)maleate	142-16-5	120	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~2800~~	~~E~~	
Stearic Acid	57-11-4	110	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	**2-Methylnaphthalene**	**6.0 J**	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**46 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	**Acenaphthylene**	**4.0 J**	220	1.95
98-86-2	**Acetophenone**	**36 J**	220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**12 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**20 J**		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**480**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	**Caprolactam**	**43 J**		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**23 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**19 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**360**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**40 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**7.0 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	**Naphthalene**	**4.0 J**		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**27 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**40 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3A**	QC Batch:	90210 -110
Sample #:	**345625**	Anal. Batch:	208744
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	1300	E	NJ,t
1,1'-Biphenyl, 2,3,3',4,4'-pentachloro-	32598-14-4	390	E	NJ,t
1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	84-64-0	330	E	NJ,t
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~4000~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	**2-Methylnaphthalene**	**12 J**		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**38 J**		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	**Acenaphthylene**	**9.0 J**		220	1.95
98-86-2	**Acetophenone**	**75 J**		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**9.0 J**		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**20 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**35 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**15 J**		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**62 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	**Caprolactam**	**25 J**		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**22 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**21 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**230**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**45 J**		220	3.06
86-73-7	**Fluorene**	**3.0 J**		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**12 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	**Naphthalene**	**6.0 J**		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**50 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**44 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD6**	QC Batch:	90210 -110
Sample #:	**345626**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	760	E	NJ1+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	530	E	NJ1+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~590~~	~~E~~	
Phosphoric acid, tris (3-methylphenyl) ester	78-30-8	1400	E	NJ1+
Phsophoric acid, tris(3-methylphenyl) ester	563-04-2	560	E	NJ1+
~~Total PCB's~~	~~XXX PCB~~	~~1100~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	270 U		270	3.94
95-94-3	1,2,4,5-Tetrachloro-benzene	270 U		270	45.9
108-60-1	Bis (2-Chloroisopropyl)-Ether	270 U		270	2.11
95-95-4	2,4,5-Trichlorophenol	270 U		270	5.34
88-06-2	2,4,6-Trichlorophenol	270 U		270	4.19
120-83-2	2,4-Dichlorophenol	270 U		270	5.63
105-67-9	2,4-Dimethylphenol	270 U		270	12.7
51-28-5	2,4-Dinitrophenol	530 U		530	5.12
121-14-2	2,4-Dinitrotoluene	270 U		270	5.04
606-20-2	2,6-Dinitrotoluene	270 U		270	44.3
91-58-7	2-Chloronaphthalene	270 U		270	3.68
95-57-8	2-Chlorophenol	270 U		270	3.22
91-57-6	2-Methylnaphthalene	270 U		270	4.38
95-48-7	2-Methylphenol	270 U		270	7.74
88-74-4	2-Nitroaniline	270 U		270	7.36
88-75-5	2-Nitrophenol	270 U		270	2.72
91-94-1	3,3'-Dichlorobenzidine	270 U		270	107
99-09-2	3-Nitroaniline	270 U		270	53.3
534-52-1	4,6-Dinitro-2-Methylphenol	270 U		270	7.22
101-55-3	4-Bromophenyl Phenylether	270 U		270	5.41
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**	B,X	270	8.34
106-47-8	4-Chloroaniline	270 U	JJC	270	2.02
7005-72-3	4-Chlorophenylphenyl-Ether	270 U		270	5.23
106-44-5	4-Methylphenol	270 U		270	10.2
100-01-6	4-Nitroaniline	270 U		270	11.6
100-02-7	4-Nitrophenol	530 U		530	4.53
83-32-9	Acenaphthene	270 U		270	2.75
208-96-8	Acenaphthylene	270 U		270	2.40
98-86-2	Acetophenone	270 U		270	3.04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	270 U		270	7.39
1912-24-9	Atrazine	270 U		270	11.0
100-52-7	Benzaldehyde	270 U	U,J,C	270	6.48
56-55-3	Benzo (a) Anthracene	270 U		270	21.3
50-32-8	Benzo (a) Pyrene	270 U		270	9.14
205-99-2	Benzo (b) Fluoranthene	270 U		270	15.6
191-24-2	Benzo (g,h,i,) Perylene	270 U		270	14.0
207-08-9	Benzo (k) Fluoranthene	270 U		270	21.4
111-91-1	Bis (2-Chloroethoxy)-Methane	270 U		270	5.02
111-44-4	Bis (2-Chloroethyl) Ether	270 U		270	2.77
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**60 J**	B,Z	270	3.31
85-68-7	Butyl Benzyl Phthalate	270 U		270	7.17
105-60-2	Caprolactam	530 U		530	10.2
86-74-8	Carbazole	270 U		270	9.76
218-01-9	Chrysene	270 U		270	16.3
53-70-3	Dibenzo (a,h) Anthracene	270 U		270	9.44
132-64-9	Dibenzofuran	270 U		270	5.06
84-66-2	Diethylphthalate	270 U		270	3.04
131-11-3	Dimethylphthalate	270 U		270	5.30
84-74-2	**Di-n-Butylphthalate**	**55 J**	B,Z	270	6.11
117-84-0	Di-n-Octylphthalate	270 U		270	4.96
206-44-0	Fluoranthene	270 U		270	3.76
86-73-7	Fluorene	270 U		270	2.69
118-74-1	Hexachlorobenzene	270 U		270	4.02
87-68-3	Hexachlorobutadiene	270 U		270	6.19
77-47-4	Hexachlorocyclopentadiene	270 U		270	3.17
67-72-1	Hexachloroethane	270 U		270	3.73
193-39-5	Indeno (1,2,3-cd) Pyrene	270 U		270	6.27
78-59-1	Isophorone	270 U		270	2.77
91-20-3	Naphthalene	270 U		270	4.40
98-95-3	Nitrobenzene	270 U		270	5.12

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	270 U	270	5.26
86-30-6	N-Nitroso-di-Phenylamine	270 U	270	7.60
87-86-5	Pentachlorophenol	530 U	530	7.02
85-01-8	Phenanthrene	270 U	270	3.68
108-95-2	Phenol	270 U	270	6.34
129-00-0	Pyrene	270 U	270	2.37

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3B**	QC Batch:	90482 -114
Sample #:	**345627**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	56	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	110	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 100014-39-24	28	E	NJ,+
Erucylamide	112-84-5	630	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~220~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJC	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**52 J**	B,Z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**7.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**38 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB3C**	QC Batch:	90482 -114
Sample #:	**345628**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	60	E	NJ,t
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	32	E	NJ,t
1-Heptadecanol	1454-85-9	37	E	NJ,t
Erucylamide	112-84-5	340	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~250~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	BX	220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	**Acenaphthylene**	**2.0 J**	J,1	220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,C	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**30 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**55 J**	J,1	220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**62 J**	B,Z	220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**44 J**		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**7.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**55 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**26 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**42 J**	J,1	220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**18 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**38 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2A**	QC Batch:	90482 -114
Sample #:	**345629**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	51	E	NJ+
Erucylamide	112-84-5	600	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~460~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**	BX	220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,C	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**20 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**12 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**44 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB2B**	QC Batch:	90572 -114
Sample #:	**345630**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	38	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	68	E	NJ+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~290~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U		430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	86.7
99-09-2	3-Nitroaniline	220 U		220	43.3
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U	UJ,c	220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**48 J**	B,z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**5.0 J**	B,X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**38 J**	B,z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB2C**	QC Batch:	90482 -114
Sample #:	**345631**	Anal. Batch:	208316
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	80	E	NJ,t
1,2-Benzenedicarboxylic acid, butyl 8-methylnonyl ester	89-18-9	34	E	NJ,t
1-Hexadecanol	36653-82-4	31	E	NJ,t
1-Pentadecanol	629-76-5	52	E	NJ,t
Erucylamide	112-84-5	330	E	B,x
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~210~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U		460	4.48
121-14-2	2,4-Dinitrotoluene	240 U		240	4.41
606-20-2	2,6-Dinitrotoluene	240 U		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	2-Methylnaphthalene	240 U		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	77.6
99-09-2	3-Nitroaniline	240 U		240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**17 J**	B,X	240	7.29
106-47-8	4-Chloroaniline	240 U	UJ,C	240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	Acenaphthene	240 U		240	2.41
208-96-8	Acenaphthylene	240 U		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	240 U		240	6.47
1912-24-9	Atrazine	240 U		240	9.63
100-52-7	Benzaldehyde	240 U		240	5.67
56-55-3	Benzo (a) Anthracene	240 U		240	18.6
50-32-8	Benzo (a) Pyrene	240 U		240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U		240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U		240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U		240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U		240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U		240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**21 J**	B/Z	240	2.90
85-68-7	Butyl Benzyl Phthalate	240 U		240	6.27
105-60-2	Caprolactam	460 U		460	8.93
86-74-8	Carbazole	240 U		240	8.54
218-01-9	Chrysene	240 U		240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U		240	8.26
132-64-9	Dibenzofuran	240 U		240	4.42
84-66-2	**Diethylphthalate**	**11 J**	B/X	240	2.66
131-11-3	Dimethylphthalate	240 U		240	4.63
84-74-2	**Di-n-Butylphthalate**	**41 J**	B/Z	240	5.35
117-84-0	Di-n-Octylphthalate	240 U		240	4.34
206-44-0	Fluoranthene	240 U		240	3.29
86-73-7	Fluorene	240 U		240	2.35
118-74-1	Hexachlorobenzene	240 U		240	3.51
87-68-3	Hexachlorobutadiene	240 U		240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U		240	2.77
67-72-1	Hexachloroethane	240 U		240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U		240	5.49
78-59-1	Isophorone	240 U		240	2.42
91-20-3	Naphthalene	240 U		240	3.85
98-95-3	Nitrobenzene	240 U		240	4.48

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4A**	QC Batch:	90482 -114
Sample #:	**345737**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	41	E	B,X
1-Octadecanol	112-92-5	31	E	NJ,t
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	65	E	NJ,t
Erucylamide	112-84-5	320	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~400~~	~~E~~	
Oxirane, hexadecyl-	7390-81-0	58	E	NJ,t
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	29	E	NJ,t
Stearic Acid	57-11-4	40	E	NJ,t

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	420 U	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**10 J** B,X	220	6.77
106-47-8	4-Chloroaniline	220 U UJ,C	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	420 U	420	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**21 J**	B/2	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**8.0 J**	B/X	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**300**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1A**	QC Batch:	90482 -114
Sample #:	**345738**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	28	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	43	E	NJ,I
Erucylamide	112-84-5	190	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~300~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U		400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**27 J**		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,c	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,Z	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**63 J**	B,Z	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1B**	QC Batch:	90482 -114
Sample #:	**345739**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	65	E	NJ+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	52	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	74	E	NJ+
Erucylamide	112-84-5	410	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~370~~	~~E~~	
Phenol, (1,1,3,3-tetramethylbutyl)-	27193-28-8	380	E	NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	440 U		440	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U		230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,c	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	**4-Methylphenol**	**10 J**		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	440 U		440	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	Benzo (a) Anthracene	230 U		230	18.6
50-32-8	Benzo (a) Pyrene	230 U		230	7.99
205-99-2	Benzo (b) Fluoranthene	230 U		230	13.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**15 J**	B,2	230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	440 U		440	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	Chrysene	230 U		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**9.0 J**	B,X	230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**38 J**	B,2	230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	Fluoranthene	230 U		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	440 U	440	6.15
85-01-8	Phenanthrene	230 U	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	Pyrene	230 U	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB1C**	QC Batch:	90482 -114
Sample #:	**345740**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	200	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	38	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	45	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~560~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U		200	9.53
51-28-5	2,4-Dinitrophenol	390 U		390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	66.5
99-09-2	3-Nitroaniline	200 U		200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**23 J**	B,X	200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,C	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	390 U		390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,Z	200	2.48
85-68-7	**Butyl Benzyl Phthalate**	**6.0 J**		200	5.38
105-60-2	**Caprolactam**	**14 J**		390	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	B,X	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**61 J**	B,Z	200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**27 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	**Phenanthrene**	**5.0 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**14 J**	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3A**	QC Batch:	90482 -114
Sample #:	**345741**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	48	E	B/X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	59	E	NJ,+
3-Carene	13466-78-9	48	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~770~~	~~E~~	
Phenol, 2,6-dimethoxy-4-(2-propenyl)-	6627-88-9	58	E	NJ,+
beta-Pinene	127-91-3	120	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U	UJ,C	400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**21 J**	B,X	210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,Z	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**5.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**63 J**	B,Z	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**6.0 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U	UJ,C	210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**7.0 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**7.0 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD7**	QC Batch:	90482 -114
Sample #:	**345742**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	48	E	B,X
2,4-bis(1,1-Dimethylethy-1)-phenol	96-76-4	20	E	NJ,T
Erucylamide	112-84-5	460	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~260~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U		400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**28 J**		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ/c	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**20 J**	B,Z	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**65 J**	B,Z	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3B**	QC Batch:	90482 -114
Sample #:	**345743**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	620	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	63	E	B,X
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	78	E	NJ,+
2,4-bis(1,1-Dimethylethy-1)-phenol	96-76-4	24	E	NJ,+
7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8	1000143924 100014-39-24	21	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	440 U		440	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**11 J**	B/X	230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	440 U		440	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	Benzo (a) Anthracene	230 U		230	18.6
50-32-8	Benzo (a) Pyrene	230 U		230	7.99
205-99-2	Benzo (b) Fluoranthene	230 U		230	13.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**17 J**	B,Z	230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	440 U		440	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	Chrysene	230 U		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**6.0 J**	B,X	230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**80 J**	B,Z	230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	Fluoranthene	230 U		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	440 U	440	6.15
85-01-8	Phenanthrene	230 U	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	Pyrene	230 U	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB3C**	QC Batch:	90482 -114
Sample #:	**345744**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	63	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	48	E	B,X
1-Decanol, 2-hexyl-	2425-77-6	39	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	46	E	NJ,+
Squalene	7683-64-9	61	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB3A**	QC Batch:	90709 -114
Sample #:	**345619**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	UL,S	120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	**Chrysene**	**2.0 J**	L,S	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	UL,S	25	1.68
206-44-0	**Fluoranthene**	**5.2 J**	L,S	25	2.04
86-73-7	Fluorene	25 U	UL,S	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	**Pyrene**	**5.8 J**	L,S	25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/29/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB3B**	QC Batch:	90709 -114
Sample #:	**345620**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	VL,S	130	12.2
208-96-8	Acenaphthylene	280 U		280	15.1
120-12-7	Anthracene	28 U		28	0.910
56-55-3	Benzo (a) Anthracene	28 U		28	1.04
50-32-8	Benzo (a) Pyrene	28 U		28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.30
218-01-9	Chrysene	28 U		28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.82
206-44-0	Fluoranthene	28 U		28	2.21
86-73-7	Fluorene	28 U		28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	28 U		28	0.780
129-00-0	Pyrene	28 U		28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**68SB3C**	QC Batch:	90709 -114
Sample #:	**345621**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	VL,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	27 U		27	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	Fluoranthene	27 U		27	2.21
86-73-7	Fluorene	27 U		27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	27 U		27	0.780
129-00-0	Pyrene	27 U		27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB1A**	QC Batch:	90709 -114
Sample #:	**345622**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	86
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	VL,S	120	11.3
208-96-8	Acenaphthylene	240 U	⊥	240	13.9
120-12-7	**Anthracene**	**1.9 J**	L,S	24	0.840
56-55-3	Benzo (a) Anthracene	24 U	VL,S	24	0.960
50-32-8	**Benzo (a) Pyrene**	**18 J**	L,S	24	1.20
205-99-2	**Benzo (b) Fluoranthene**	**14 J**	L,S	24	1.56
191-24-2	**Benzo (g,h,i,) Perylene**	**27**	L,S	24	15.0
207-08-9	**Benzo (k) Fluoranthene**	**8.5 J**	L,S	24	1.20
218-01-9	**Chrysene**	**11 J**	L,S	24	1.44
53-70-3	Dibenzo (a,h) Anthracene	24 U	VL,S	24	1.68
206-44-0	**Fluoranthene**	**57**	L,S	24	2.04
86-73-7	Fluorene	24 U	VL,S	24	1.56
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**11 J**	L,S	24	0.840
91-20-3	Naphthalene	120 U	VL,S	120	9.48
85-01-8	**Phenanthrene**	**24**	L,S	24	0.720
129-00-0	**Pyrene**	**82**	L,S	24	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB1B**	QC Batch:	90709 -114
Sample #:	**345623**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.2
208-96-8	Acenaphthylene	280 U		280	15.1
120-12-7	Anthracene	28 U		28	0.910
56-55-3	Benzo (a) Anthracene	28 U		28	1.04
50-32-8	Benzo (a) Pyrene	28 U		28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.30
218-01-9	Chrysene	28 U		28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.82
206-44-0	Fluoranthene	28 U		28	2.21
86-73-7	Fluorene	28 U		28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	28 U		28	0.780
129-00-0	Pyrene	28 U		28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/30/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB1C**	QC Batch:	90709 -114
Sample #:	**345624**	Anal. Batch:	209213
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.1
208-96-8	Acenaphthylene	310 U	310	17.4
120-12-7	Anthracene	31 U	31	1.05
56-55-3	Benzo (a) Anthracene	31 U	31	1.20
50-32-8	Benzo (a) Pyrene	31 U	31	1.50
205-99-2	Benzo (b) Fluoranthene	31 U	31	1.95
191-24-2	Benzo (g,h,i,) Perylene	31 U	31	18.8
207-08-9	Benzo (k) Fluoranthene	31 U	31	1.50
218-01-9	Chrysene	31 U	31	1.80
53-70-3	Dibenzo (a,h) Anthracene	31 U	31	2.10
206-44-0	Fluoranthene	31 U	31	2.55
86-73-7	Fluorene	31 U	31	1.95
193-39-5	Indeno (1,2,3-cd) Pyrene	31 U	31	1.05
91-20-3	Naphthalene	150 U	150	11.9
85-01-8	Phenanthrene	31 U	31	0.900
129-00-0	Pyrene	31 U	31	1.35

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/19/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB3A**	QC Batch:	90709 -114
Sample #:	**345625**	Anal. Batch:	209783
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	110	10.3
208-96-8	Acenaphthylene	240 U	240	12.8
120-12-7	**Anthracene**	**1.6 J**	24	0.770
56-55-3	Benzo (a) Anthracene	24 U	24	0.880
50-32-8	Benzo (a) Pyrene	24 U	24	1.10
205-99-2	Benzo (b) Fluoranthene	24 U	24	1.43
191-24-2	Benzo (g,h,i,) Perylene	24 U	24	13.8
207-08-9	Benzo (k) Fluoranthene	24 U	24	1.10
218-01-9	**Chrysene**	**5.2 J**	24	1.32
53-70-3	Dibenzo (a,h) Anthracene	24 U	24	1.54
206-44-0	**Fluoranthene**	**46**	24	1.87
86-73-7	Fluorene	24 U	24	1.43
193-39-5	Indeno (1,2,3-cd) Pyrene	24 U	24	0.770
91-20-3	Naphthalene	110 U	110	8.69
85-01-8	**Phenanthrene**	**18 J**	24	0.660
129-00-0	**Pyrene**	**31**	24	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/30/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD6**	QC Batch:	90709 -114
Sample #:	**345626**	Anal. Batch:	209056
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.2
208-96-8	Acenaphthylene	280 U	〃	280	15.1
120-12-7	**Anthracene**	**3.0 J**	L,S	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	UL,S	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	|	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	|	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	|	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	〃	28	1.30
218-01-9	**Chrysene**	**12 J**	L,S	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	UL,S	28	1.82
206-44-0	**Fluoranthene**	**84**	L,S	28	2.21
86-73-7	Fluorene	28 U	UL,S	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	|	28	0.910
91-20-3	Naphthalene	130 U	〃	130	10.3
85-01-8	**Phenanthrene**	**30**	L,S	28	0.780
129-00-0	**Pyrene**	**54**	〃	28	1.17

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB3B**	QC Batch:	90834 -115
Sample #:	**345627**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	160 U	UL,S	160	15.0
208-96-8	Acenaphthylene	330 U		330	18.6
120-12-7	Anthracene	33 U		33	1.12
56-55-3	Benzo (a) Anthracene	33 U		33	1.28
50-32-8	Benzo (a) Pyrene	33 U		33	1.60
205-99-2	Benzo (b) Fluoranthene	33 U		33	2.08
191-24-2	Benzo (g,h,i,) Perylene	33 U		33	20.0
207-08-9	Benzo (k) Fluoranthene	33 U		33	1.60
218-01-9	Chrysene	33 U		33	1.92
53-70-3	Dibenzo (a,h) Anthracene	33 U		33	2.24
206-44-0	Fluoranthene	33 U		33	2.72
86-73-7	Fluorene	33 U		33	2.08
193-39-5	Indeno (1,2,3-cd) Pyrene	33 U		33	1.12
91-20-3	Naphthalene	160 U		160	12.6
85-01-8	Phenanthrene	33 U		33	0.960
129-00-0	Pyrene	33 U		33	1.44

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB3C**	QC Batch:	90834 -115
Sample #:	**345628**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**57SB2A**	QC Batch:	90834 -115
Sample #:	**345629**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	**Anthracene**	**1.5 J**	28	0.910
56-55-3	**Benzo (a) Anthracene**	**7.1 J**	28	1.04
50-32-8	**Benzo (a) Pyrene**	**10 J**	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	**Chrysene**	**9.2 J**	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	**Fluoranthene**	**29**	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**7.2 J**	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**11 J**	28	0.780
129-00-0	**Pyrene**	**20 J**	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB2B**	QC Batch:	90834 -115
Sample #:	**345630**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB2C**	QC Batch:	90834 -115
Sample #:	**345631**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.32

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.4
208-96-8	Acenaphthylene	280 U		280	15.3
120-12-7	Anthracene	28 U		28	0.924
56-55-3	Benzo (a) Anthracene	28 U		28	1.06
50-32-8	Benzo (a) Pyrene	28 U		28	1.32
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.72
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	16.5
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.32
218-01-9	Chrysene	28 U		28	1.58
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.85
206-44-0	Fluoranthene	28 U		28	2.24
86-73-7	Fluorene	28 U		28	1.72
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.924
91-20-3	Naphthalene	130 U		130	10.4
85-01-8	Phenanthrene	28 U		28	0.792
129-00-0	Pyrene	28 U		28	1.19

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB4A**	QC Batch:	90834 -115
Sample #:	**345737**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	300 U	300	16.2
120-12-7	Anthracene	30 U	30	0.980
56-55-3	Benzo (a) Anthracene	30 U	30	1.12
50-32-8	Benzo (a) Pyrene	30 U	30	1.40
205-99-2	Benzo (b) Fluoranthene	30 U	30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U	30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U	30	1.40
218-01-9	Chrysene	30 U	30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U	30	1.96
206-44-0	Fluoranthene	30 U	30	2.38
86-73-7	Fluorene	30 U	30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U	30	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	30 U	30	0.840
129-00-0	Pyrene	30 U	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB1A**	QC Batch:	90834 -115
Sample #:	**345738**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	UL,S	130	12.2
208-96-8	Acenaphthylene	270 U		270	15.1
120-12-7	Anthracene	27 U		27	0.910
56-55-3	Benzo (a) Anthracene	27 U		27	1.04
50-32-8	Benzo (a) Pyrene	27 U		27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U		27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U		27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U		27	1.30
218-01-9	Chrysene	27 U		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U		27	1.82
206-44-0	Fluoranthene	27 U		27	2.21
86-73-7	Fluorene	27 U		27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U		27	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	Phenanthrene	27 U		27	0.780
129-00-0	Pyrene	27 U		27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB1B**	QC Batch:	90834 -115
Sample #:	**345739**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	260 U	260	13.9
120-12-7	Anthracene	26 U	26	0.840
56-55-3	Benzo (a) Anthracene	26 U	26	0.960
50-32-8	Benzo (a) Pyrene	26 U	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.20
218-01-9	Chrysene	26 U	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.68
206-44-0	Fluoranthene	26 U	26	2.04
86-73-7	Fluorene	26 U	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	Phenanthrene	26 U	26	0.720
129-00-0	Pyrene	26 U	26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**69SB1C**	QC Batch:	90834 -115
Sample #:	**345740**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	UL,S	140	13.2
208-96-8	Acenaphthylene	280 U		280	16.2
120-12-7	Anthracene	28 U		28	0.980
56-55-3	Benzo (a) Anthracene	28 U		28	1.12
50-32-8	Benzo (a) Pyrene	28 U		28	1.40
205-99-2	Benzo (b) Fluoranthene	28 U		28	1.82
191-24-2	Benzo (g,h,i,) Perylene	28 U		28	17.5
207-08-9	Benzo (k) Fluoranthene	28 U		28	1.40
218-01-9	Chrysene	28 U		28	1.68
53-70-3	Dibenzo (a,h) Anthracene	28 U		28	1.96
206-44-0	Fluoranthene	28 U		28	2.38
86-73-7	Fluorene	28 U		28	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U		28	0.980
91-20-3	Naphthalene	140 U		140	11.1
85-01-8	Phenanthrene	28 U		28	0.840
129-00-0	Pyrene	28 U		28	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-4**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**69SB3A**
Sample #:	**345741**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/08/03 @ 14:15
Sampler:	B.F. & J.S.
Received:	10/09/03 @ 08:40
Prepared:	10/15/03 by DJM
Prep. Method:	USEPA-8310
Analyzed:	10/28/03 by TAJ
Anal. Method:	USEPA-8310
QC Batch:	90834 -115
Anal. Batch:	208739
Percent Solids:	84
Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	250 U	250	13.9
120-12-7	Anthracene	25 U	25	0.840
56-55-3	Benzo (a) Anthracene	25 U	25	0.960
50-32-8	Benzo (a) Pyrene	25 U	25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U	25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U	25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U	25	1.20
218-01-9	Chrysene	25 U	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	25	1.68
206-44-0	**Fluoranthene**	**3.8 J**	25	2.04
86-73-7	Fluorene	25 U	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U	25	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	**Phenanthrene**	**1.6 J**	25	0.720
129-00-0	**Pyrene**	**2.9 J**	25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD7**	QC Batch:	90834 -115
Sample #:	**345742**	Anal. Batch:	208739
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	VL,S	120	11.3
208-96-8	Acenaphthylene	250 U		250	13.9
120-12-7	Anthracene	25 U		25	0.840
56-55-3	Benzo (a) Anthracene	25 U		25	0.960
50-32-8	Benzo (a) Pyrene	25 U		25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U		25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U		25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U		25	1.20
218-01-9	Chrysene	25 U		25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U		25	1.68
206-44-0	Fluoranthene	25 U		25	2.04
86-73-7	Fluorene	25 U		25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U		25	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	25 U		25	0.720
129-00-0	Pyrene	25 U		25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB3B**	QC Batch:	90834 -115
Sample #:	**345743**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	VL,S	120	11.3
208-96-8	Acenaphthylene	260 U		260	13.9
120-12-7	Anthracene	26 U		26	0.840
56-55-3	Benzo (a) Anthracene	26 U		26	0.960
50-32-8	Benzo (a) Pyrene	26 U		26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U		26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.20
218-01-9	Chrysene	26 U		26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.68
206-44-0	Fluoranthene	26 U		26	2.04
86-73-7	Fluorene	26 U		26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	Phenanthrene	26 U		26	0.720
129-00-0	Pyrene	26 U		26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB3C**	QC Batch:	90834 -115
Sample #:	**345744**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	280 U	280	16.2
120-12-7	Anthracene	28 U	28	0.980
56-55-3	Benzo (a) Anthracene	28 U	28	1.12
50-32-8	Benzo (a) Pyrene	28 U	28	1.40
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.82
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	17.5
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.40
218-01-9	Chrysene	28 U	28	1.68
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.96
206-44-0	Fluoranthene	28 U	28	2.38
86-73-7	Fluorene	28 U	28	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	28 U	28	0.840
129-00-0	Pyrene	28 U	28	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**68SB3A**	QC Batch:	90259 -115
Sample #:	**345619**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**68SB3B**	QC Batch:	90259 -115
Sample #:	**345620**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**68SB3C**	QC Batch:	90259 -115
Sample #:	**345621**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	73
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB1A**	QC Batch:	90259 -115
Sample #:	**345622**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	86
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	UJ,C	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB1B**	QC Batch:	90259 -115
Sample #:	**345623**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U		1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	UJ,c	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-4**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**57SB1C**
Sample #:	**345624**
Matrix:	Soil
Unit:	mg/kg dry

Sampled:	10/07/03 @ 10:30
Sampler:	B.F. & J.S.
Received:	10/08/03 @ 08:50
Prepared:	10/15/03 by DJM
Prep. Method:	USEPA-8330
Analyzed:	10/27/03 by JMK1
Anal. Method:	USEPA-8330
QC Batch:	90259 -115
Anal. Batch:	208354
Percent Solids:	67
Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	UJ,C	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB3A**	QC Batch:	90508 -116
Sample #:	**345625**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U		1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**SBD6**	QC Batch:	90259 -115
Sample #:	**345626**	Anal. Batch:	208354
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	UJ,C	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB3B**	QC Batch:	90508 -116
Sample #:	**345627**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	63
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U		1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB3C**	QC Batch:	90508 -116
Sample #:	**345628**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**57SB2A**	QC Batch:	90508 -116
Sample #:	**345629**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB2B**	QC Batch:	90508 -116
Sample #:	**345630**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**57SB2C**	QC Batch:	90508 -116
Sample #:	**345631**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**57SB4A**	QC Batch:	90508 -116
Sample #:	**345737**	Anal. Batch:	208166
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**	Prepared:	10/16/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/23/03 by JMK1
Sample ID:	**69SB1A**	Anal. Method:	USEPA-8330
Sample #:	**345738**	QC Batch:	90508 -116
Matrix:	Soil	Anal. Batch:	208166
Unit:	mg/kg dry	Percent Solids:	78
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 11:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**69SB1B**	QC Batch:	90508 -116
Sample #:	**345739**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB1C**	QC Batch:	90508 -116
Sample #:	**345740**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	74
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB3A**	QC Batch:	90508 -116
Sample #:	**345741**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**SBD7**	QC Batch:	90508 -116
Sample #:	**345742**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	84
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB3B**	QC Batch:	90508 -116
Sample #:	**345743**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**69SB3C**	QC Batch:	90508 -116
Sample #:	**345744**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	74
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**57SB4A**	QC Batch:	90181 -116
Sample #:	**345737**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	28 U	28	0.357
72-55-9	4,4'-DDE	28 U	28	0.263
50-29-3	4,4'-DDT	28 U	28	0.270
309-00-2	Aldrin	28 U	28	0.456
319-84-6	Alpha-BHC	28 U	28	0.455
57-74-9	A-Chlordane	28 U	28	0.651
5103-74-2	G-Chlordane	28 U	28	1.05
319-85-7	Beta-BHC	28 U	28	1.70
319-86-8	Delta-BHC	28 U	28	1.23
60-57-1	Dieldrin	28 U	28	0.464
115-29-7	Endosulfan I	28 U	28	1.37
33213-65-9	Endosulfan II	28 U	28	0.321
1031-07-8	Endosulfan Sulfate	28 U	28	0.755
72-20-8	Endrin	28 U	28	0.447
7421-93-4	Endrin Aldehyde	28 U	28	1.67
53494-70-5	Endrin Ketone	28 U	28	0.413
58-89-9	Lindane	28 U	28	0.291
76-44-8	Heptachlor	28 U	28	1.06
1024-57-3	Heptachlor Epoxide	28 U	28	0.683
72-43-5	Methoxychlor	28 U	28	0.420
8001-35-2	Toxaphene	240 U	240	35.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-4**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**57SB4A**	QC Batch:	89881 -116
Sample #:	**345737**	Anal. Batch:	208229
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
12674-11-2	PCB-1016	93 U		93	22.4
11104-28-2	PCB-1221	46 U		46	2.80
11141-16-5	PCB-1232	46 U		46	7.00
53469-21-9	PCB-1242	46 U		46	4.20
12672-29-6	PCB-1248	46 U		46	7.00
11097-69-1	**PCB-1254**	**12 J**	J,g	46	4.20
11096-82-5	PCB-1260	46 U		46	9.80

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/14/03 by MSN
		Anal. Method:	USEPA-8151A
Sample ID:	**57SB4A**	QC Batch:	90218 -110
Sample #:	**345737**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	70 U	70	2.80
93-72-1	2,4,5-TP (Silvex)	70 U	70	5.60
94-75-7	2,4-D	280 U	280	22.4
94-82-6	2,4-DB	280 U	280	86.8
75-99-0	Dalapon	350 U	350	79.8
1918-00-9	Dicamba	280 U	280	2.80
120-36-5	Dichlorprop	280 U	280	23.8
~~88-85-7~~	~~*Dinoseb~~	~~280 R~~	~~280~~	~~29.4~~
94-74-6	MCPA	28000 U	28000	1950
93-65-2	MCPP	28000 U	28000	7080

AS 2/12/04

* See attached Statement of Data Qualifications.

See re-extraction

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-4**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**57SB4A**	QC Batch:	90218 -110
Sample #:	**345737DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
~~93-76-5~~	~~2,4,5-T~~	~~70 U~~	~~70~~	~~2.80~~
93-72-1	2,4,5-TP (Silvex)	70 U	70	5.60
94-75-7	2,4-D	~~280 U~~	280	22.4
94-82-6	2,4-DB	280 U	280	86.8
75-99-0	Dalapon	350 U	350	79.8
1918-00-9	Dicamba	280 U	280	2.80
~~120-36-5~~	~~Dichlorprop~~	~~280 U~~	~~280~~	~~23.8~~
88-85-7	Dinoseb	280 U	280	29.4
~~94-74-6~~	~~MCPA~~	~~28000 U~~	~~28000~~	~~1950~~
~~93-65-2~~	~~MCPP~~	~~28000 U~~	~~28000~~	~~7080~~

Use only Dinoseb result, ~~TS~~ 2/12/04

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 08:10
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB3A**
Sample #: **345619**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12200		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	13		0.50	0.0518	mg/kg dry	10/22/03	MSG	USEPA-6020
Arsenic, Total	2.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	111		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.63 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	5.6		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1600		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	40		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	10	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	8.6		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	16600		250	17.9	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	23		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	789		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	939		25	2.06	mg/kg dry	10/23/03	DSC	USEPA-6010B
Mercury, Total	0.028 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	8.8		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	640	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.65 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.054 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	28 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.16 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	31		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	128		20	2.59	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 08:30
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB3B**
Sample #: **345620**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20400		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	1.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	6.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	25		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.91 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.4		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	248 J		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	18		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.8	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	20		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	45100		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	8.6		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1220		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	135		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.040 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	20		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1360	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.040 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	151		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.14 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	44		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	21		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 08:50
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **68SB3C**
Sample #: **345621**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28600		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.094 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	7.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	70		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.7	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.6		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	31		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	20	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	21		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	42700		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	10		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	20600		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	497		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.030 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	46		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	4130	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.78 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	69 J		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	57		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1A**
Sample #: **345622**
Matrix: Soil

Percent Solids: 86

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	11900		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	1.2		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	99		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.44 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	4440		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	20		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	5.8	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	4.9		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	13400		250	17.9	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2700		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	699		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.049 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	6.0		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	528	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.51 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.054 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	33 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.17 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	29		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	52		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:15
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1B**
Sample #: **345623**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	23800		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.21 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	56		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.58 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.8		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1030		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	28		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	8.7	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	13		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	41300		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	29		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1430		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	264		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.035 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1240	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.33 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.028 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	74 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.18 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	69		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	54		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:30
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1C**
Sample #: **345624**
Matrix: Soil

Percent Solids: 67

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	38900		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.15 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	73		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.84 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	4.0		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	88		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	28		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	37300		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	5120		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	354		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.053 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	18		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	3290	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.71 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	343		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.24 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	58		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	97		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 11:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB3A**
Sample #: **345625**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28900		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	102		0.50	1.30	mg/kg dry	10/22/03	MSG	USEPA-6020
Arsenic, Total	5.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	107	J,f	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.45 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	27	J,f	1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1750	J,f	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	268	J,f	25	4.56	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Cobalt, Total	75	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	27		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	47100		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	175		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	1420		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	544		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.11		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	967	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.57 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	76 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.24 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	69		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	895	J,f	40	5.17	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
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Sampled: 10/07/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD6**
Sample #: **345626**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	33000		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	104		0.50	1.30	mg/kg dry	10/22/03	MSC	USEPA-6020
Arsenic, Total	5.3		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	154	J,f	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.39 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	41	J,f	1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	2760	J,f	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	454	J,f	25	4.56	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Cobalt, Total	8.0	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	38		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	46500		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	268		50	1.09	mg/kg dry	10/28/03	JMF	USEPA-6020
Magnesium, Total	1990		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	514		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.13		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1060	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.64 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	97 J	B,p	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.24 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	67		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	1370	J,f	100	12.9	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 11:15
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB3B**
Sample #: **345627**
Matrix: Soil

Percent Solids: 63

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	37400	250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.29 J	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	12	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	62	5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.4 J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.2	1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U	250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	43	5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	23 J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	38	1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	53400	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	4280	250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	518	5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.023 J	0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	28	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	3020 J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.55 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	339	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.28 J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	59	1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	53	4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 11:30
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB3C**
Sample #: **345628**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	29600		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	5.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	52		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	2.0	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.87 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	294		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	31		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	18	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	17		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	35200		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	9.2		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	35000		1250	16.1	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Manganese, Total	828		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	50		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	5900	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.88 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	169		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.22 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	59		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	52		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB2A**
Sample #: **345629**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	32200		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	3.6		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	80		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.48 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	6.7		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1530		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	70		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	6.1	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	18		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	39700		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	49		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1560		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	361		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.16		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	968	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.69 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	312		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.25 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	76		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	160		20	2.59	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 14:20
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB2B**
Sample #: **345630**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	13900		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	39		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.1	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.46 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	250 U		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	9.3		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	26	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	15		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	34500		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	2.6		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
* Magnesium, Total	487		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
* Manganese, Total	1090		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.013 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	999	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.55 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.034 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	161		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
* Thallium, Total	0.11 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	18		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	9.3		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 14:40
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB2C**
Sample #: **345631**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21800		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.073 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	7.1		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	42		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	3.2	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.3		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	207 J		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	33		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	19	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	23		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	39500		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	9.8		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	22300		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	632		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.10 U		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	75		5.0	0.356	mg/kg dry	10/24/03	DWJ	USEPA-6020
Potassium, Total	4570	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.75 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	84 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.18 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	50		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	43		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 09:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB4A**
Sample #: **345737**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	30100		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	6.3		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.7		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	149		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.60 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	1420		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	43		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.7	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	26		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	78700		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	923		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	3200		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.14		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	8.7		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	908	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.57 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.076 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	127		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.30 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	84		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	281		20	2.59	mg/kg dry	10/22/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1A**
Sample #: **345738**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	23700		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	0.35 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.8		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	76		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.34 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.53 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	346		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	36		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	14	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	10		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	34600		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	793		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	1470		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.13		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	10		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	810	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.36 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.043 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	27 J	B,P	100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.30 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	63		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1B**
Sample #: **345739**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17200		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	9.3		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	50		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.30 J	J/S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.97 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	332		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	34		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	15	J/S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	9.4		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	26500		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	15		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	934		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	511		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.052 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1100	J/S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.38 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.036 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	2010		500	90.5	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.20 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	53		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	28		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 12:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1C**
Sample #: **345740**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28400		250	9.15	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Antimony, Total	1.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	12		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	65		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	1.1	J/S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	1.2		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	155 J		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	35		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	9.9	J/S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	25		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	32200		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	17		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	34600		1250	16.1	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Manganese, Total	247		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.042 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	33		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	8480	J/S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.66 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	2460		500	90.5	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.43 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	66		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	55		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3A**
Sample #: **345741**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14000	J,f	50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	19		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	71		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.26 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.1		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	721		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	22		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	11	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	8.7		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	17100	J,f	250	17.9	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	25		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	997		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	914		5.0	0.264	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Mercury, Total	0.041 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	8.5		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	813	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.40 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.051 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	110		100	8.92	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Thallium, Total	0.26 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	35		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD7**
Sample #: **345742**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20400	J,f	50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	14		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.3		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	90		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.48 J	J,s	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	2.5		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	835		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	38		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	10	J,s	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	12		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	24800	J,f	500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	22		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1040		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	1010		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.078 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	879	J,s	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.60 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.050 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	116		100	18.1	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.23 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	49		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	61		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3B**
Sample #: **345743**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21700		50	1.83	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Antimony, Total	12		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	54		5.0	0.106	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Beryllium, Total	0.37 J	J,S	1.0	0.0391	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cadmium, Total	0.77 J		1.0	0.182	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Calcium, Total	521		250	16.6	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Chromium, Total	49		5.0	0.912	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Cobalt, Total	23	J,S	1.0	0.208	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Copper, Total	14		1.0	0.368	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Iron, Total	33600		500	35.8	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	17		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2240		250	3.21	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Manganese, Total	1020		25	1.32	mg/kg dry	10/22/03	KLVM	USEPA-6010B
Mercury, Total	0.069 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	15		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1510	J,S	100	5.00	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Selenium, Total	0.29 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.045 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	393		100	18.1	mg/kg dry	10/23/03	DSC	USEPA-6010B
Thallium, Total	0.26 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	55		1.0	0.207	mg/kg dry	10/16/03	DWJ	USEPA-6010B
Zinc, Total	38		4.0	0.517	mg/kg dry	10/16/03	DWJ	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3C**
Sample #: **345744**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	30400		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	6.1		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	8.3		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	63		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.7	J,S	1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	0.48 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	417		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	56		5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	27		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	46900		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	13		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	17800		250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	491		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.046 J		0.10	0.0077	mg/kg dry	10/14/03	MSS	USEPA-7471A
Nickel, Total	37		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	4180	J,S	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.74 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	544		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.26 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	59		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	48		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:10
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**68SB3A**		
Sample #:	**345619**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.16 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**68SB3B**		
Sample #:	**345620**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 08:50
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**68SB3C**		
Sample #:	**345621**		
Matrix:	Soil	Percent Solids:	73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/07/03 @ 10:00
Sampler: B.F. & J.S.
Received: 10/08/03 @ 08:50

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB1A**
Sample #: **345622**
Matrix: Soil

Percent Solids: 86

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	86	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.10 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB1B**		
Sample #:	**345623**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 10:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB1C**		
Sample #:	**345624**		
Matrix:	Soil	Percent Solids:	67

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	67	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB3A**		
Sample #:	**345625**		
Matrix:	Soil	Percent Solids:	77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.17 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**SBD6**		
Sample #:	**345626**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.16 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB3B**		
Sample #:	**345627**		
Matrix:	Soil	Percent Solids:	63

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	63	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.08 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 11:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB3C**		
Sample #:	**345628**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB2A**		
Sample #:	**345629**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.09 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:20
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**57SB2B**		
Sample #:	**345630**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
* Cyanide, Total	0.08 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/07/03 @ 14:40
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/08/03 @ 08:50
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**57SB2C**		
Sample #:	**345631**		
Matrix:	Soil	Percent Solids:	76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 09:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB4A**
Sample #: **345737**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.05 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1A**
Sample #: **345738**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 11:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB1B**
Sample #: **345739**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**69SB1C**		
Sample #:	**345740**		
Matrix:	Soil	Percent Solids:	74

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	74	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.07 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3A**
Sample #: **345741**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**SBD7**		
Sample #:	**345742**		
Matrix:	Soil	Percent Solids:	84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 14:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
Submittal #:	**36440-4**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**69SB3B**		
Sample #:	**345743**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.06 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 14:45
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-4**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB3C**
Sample #: **345744**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	74	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x acetone		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery							Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?						x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?						x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?								x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.								
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.								x
		1 or more <10%	1 high/low	2 or 3 high/low	2 or 3 all low	2 or 3 all high			
	Positives	L	J	J	L	K			
	Non-detects	R	UJ	UJ	UL	NONE			
	Note: The B qualifier remains over surrogate flagging.								

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

57SB2B CE MSD 74% (79), CS2 33/37% (53), Styrene MSD 48% (50), methylacetate 47/52% (70)

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 21			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentrationof the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ±50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?		x	
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?		x	
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		x	
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?		x	
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 21			
	Number of target compounds in each analysis:66			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: February-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	21			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	21			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer:	AS	**Project Name:**	Radford SSP
Date:	February-04	**Project Number:**	15291974.30000
DV Level:	II III IV	**Laboratory:**	TriMatrix
Review Document:		**SDG No.:**	36440-4
X SW-846 - 8081/8082		**Test Name:**	PEST/PCB
X NFG - Region III Modifications		**Method No.:**	8081A/8082
___ CLP			

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.				x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?				x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?						x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)						x
	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance			
	1 out	high/low	No action	No action			
	2 out	2 high same column	K	No action			
		2 low same column	L, UL	No action			
		mixed same column	J, UJ	No action			
		2 high diff columns	J	Not applicable			
		2 low diff columns	J, UJ	Not applicable			
		mixed diff columns	Professional judgement	Not applicable			
	3 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		2 high, 1 low	K (2 high)	J (1 low 2nd column)			
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)			
		other mixed	J, UJ	Not applicable			
	4 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		Mixed	J, UJ	Not applicable			
	If any recovery is >0% and <10% then L(+)/R(-).						
	If any recovery is 0% then R(+/-).						

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A/SBD1 submitted in SDG 36440-2, BDL for pest and 0.053/0.051 for Aroclor 1254.

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).		x	
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	1	1			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: February-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-4
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

57SB4A collected on 10/08/03, re-extracted on 10/17/03

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD see SDG 36440-1

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A and SDB-3 submitted in SDG 36440-2 were both non-detect.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	1			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

Project Name: Radford SSP
SDG No.: 36440-4
Reviewer: AS
Project No.: 15291974.30000
Date: February-04

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{O}C \pm 2\ ^{O}C$)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: four coolers @ 2.1C, 8.6C, 0.9C, & 0.8C

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x			x			x	

Note:

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			6 + BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (labelled LCS by TriMatrix) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	x					x	x			x		
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%			passed within 80-120%		

Note: A high point added to Al, Ba, Ca, Fe, Mg, Mn, & K curves and the RLs were elevated by 5.

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)												
	< -IDL > IDL < 50% 50% - 79% >120%												
	L(+)/UL(-) K(+) L(+)/R(-) L(+)/UL(-) K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note:

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note:

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?												
	%R > 125% 30%< %R < 74% < 30%		x			x		x				x	
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: 57SB2B Mg by 6010B MSD 121% (111), Tl MSD 84% (87), CN 74% (80)

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: Serial Dilution: 57SB2B - Be, Co, K; post digestion spike recovery passes

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	x				x		x			x		

Note: _____

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: *69SB3C displayed yttrium internal at 148%. The sample was reanalyzed at DF5 elevating MDL but not RL as MDLx3 is still <RL.*

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: 21												
13.1.2	Number of target compounds in each analysis: various												
13.1.3	Number of results rejected and not reported: 0												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%	100%			100%			100%			100%		

Note: _____

Vol Soil Fridge
Big Cart
№ 1152

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
07804517	RFAAP

Project Contact (Name and Phone Number): Donna Rena (804) 731(5-9001)

Samplers: Brett Fisher / John Sponhour

LAB: Tri-Metrix

AIRBILL No: 000034

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] (8015) NERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
57563A	10/7/03 810	5		X	5	F	/	5	X	X	X			X		X							345619
57563B	10/7/03 830	5		X	5	F	/	5	X	X	X			X		X							345620
57563C	10/7/03 850	5		X	5	F	/	5	X	X	X			X		X							345621
57561A	10/7/03 1000	5		X	5	F	/	5	X	X	X			X		X							345622
57561B	10/7/03 1015	5		X	5	F	/	5	X	X	X			X		X							345623
57561C	10/7/03 1050	5		X	5	F	/	5	X	X	X			X		X							345624
57563A	10/7/03 1100	5		X	5	F	/	5	X	X	X			X		X							345625
JBD6	10/7/03 —	5		X	5	F	/	5	X	X	X			X		X							345626
57563B	10/7/03 1115	5		X	5	F	/	5	X	X	X			X		X							345627
57563C	10/7/03 1130	5		X	5	F	/	5	X	X	X			X		X							345628
57562A	10/7/03 1400	5		X	5	F	/	5	X	X	X			X		X							345629
57562B	10/7/03 1420	5		X	5	F	/	5	X	X	X			X		X							345630
57562B MS/MSD	10/7/03 1420	5		X	5	F	/	6	X	X	X			X		X							—
57562C	10/7/03 1440	5		X	5	F	/	5	X	X	X			X		X							345631

T-2

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/7/03 1500				
Relinquished by:	Date/time	Received by: (for lab)	Date/Time: 10/8/03 8:50		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

TMO136 17-5 36440-4

TM0172 Cart 5
Volatile Soil

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1148

Project Number	Project Name
0960317	RFNAP

Project Contact (Name and Phone Number): Darren Penne (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No: 000039

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330)	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /Li/N	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] Herb	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
575B4A	10/8/03 915	5		X	S	F	/	7	X	X	X	X	X	X		X						X	345737
695B1A	10/8/03 1130	5		X	S	F	/	5	X	X	X			X		X							345738
695B1B	10/8/03 1145	5		X	S	F	/	5	X	X	X			X		X							345739
695B1C	10/8/03 1200	5		X	S	F	/	5	X	X	X			X		X							345740
695B3A	10/8/03 1415	5		X	S	F	/	5	X	X	X			X		X							345741
5BD7	10/8/03 —	5		X	S	F	/	5	X	X	X			X		X							345742
695B3B	10/8/03 1430	5		X	S	F	/	5	X	X	X			X		X							345743
695B3C	10/8/03 1445	5		X	S	F	/	5	X	X	X			X		X							345744

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/8/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/9/03 8:40	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-4

19-3

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-5 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_13,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: For the VOC analyses, the method blank for batch 90061-120 contained acetone at 23 ug/Kg and methylene chloride at 4.0 ug/Kg. The method blank for batch 90061-121 contained acetone at 10 ug/Kg. The method blank for batch 90257-121 contained acetone at 10 ug/Kg. The method blank for batch 90037-122 contained methylene chloride at 27 ug/Kg. Positive results less than ten times the blank concentration were flagged "B,z" in the associated samples.

The associated equipment blank EQB5 submitted with sample delivery group 36440-6 displayed positive detections for acetone at 1.6 ug/L and methylene chloride at 0.60 ug/L. The field blank detection for methylene chloride was previously qualified due to a method blank detection. Positive associated soil boring sample results for acetone less than ten times the field blank concentration were previously flagged for method blank detections. No further data qualifying action was taken.

The continuing calibration analyzed on 10/20/03 at 1115 displayed a percent difference greater than the control limit (i.e., 20%) with a negative bias for methyl acetate at 23.6%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for methyl-tert-butyl ether at 22.0%, bromochloromethane at 24.0%, trans-1,3-dichloropropene at 23.3%, dibromochloromethane at 34.3%, bromoform at 33.1%, and 1,2-dibromo-3-chloropropane at 29.0%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/21/03 at 0901 displayed a percent difference greater than the control limit with a negative bias for chloroethane at 24.1%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for trans-1,3-dichloropropene at 23.1%, dibromochloromethane at 24.8%, bromoform at 20.7%, and 1,2-dibromo-3-chloropropane at 31.6%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The continuing calibration analyzed on 10/22/03 at 1151 displayed percent differences greater than the control limit with a negative bias for acetone at 28.4%, 4-methyl-2-pentanone at 26.8%, and 2-hexanone at 27.7%. The associated field sample results were non-detect and were flagged "UJ,c". This continuing calibration also displayed percent differences greater than the control limit with a positive bias for dichlorodifluoromethane at 20.3% and carbon disulfide at 22.5%. The associated field sample results were non-detect, thus, no data qualifying action was required.

The laboratory control spike for batch 90061-120 displayed recoveries greater than the laboratory generated upper control limits for bromoform at 133% and chlorodibromomethane at 135%. The laboratory control spike for batch 90061-121 displayed recoveries greater than the laboratory generated upper control limits for 1,2-dibromo-3-chloropropane at 132% and methyl acetate at 131%. The laboratory control spike for batch 90257-121 displayed recoveries greater than the laboratory generated upper control limits for 1,2-dibromo-3-chloropropane at 132% and methyl acetate at 131%. The laboratory control spike for batch 90037-122 displayed recoveries greater than the laboratory generated upper control limit (i.e., 139%) for carbon disulfide at 142%. The associated field sample results were non-detect while the laboratory control spike displayed a positive bias. No data qualifying action was required.

The matrix spike pair for sample 13SB7C displayed several percent recoveries less than the laboratory generated lower control limits. The matrix spike pair was reanalyzed and both of the matrix spikes displayed low recoveries again. The parent sample results for acetone and methylene chloride were previously flagged for method blank detections and no further data qualifying action was taken. All other parent sample results were non-detect and were flagged "UJ,m" for all recoveries that indicated a negative bias. This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits. The parent sample was positive for methyl ethyl ketone and this result was flagged "J,d". The matrix spike displayed a recovery greater than the upper control limit (i.e., 130%) for 1,2-dibromo-3-chloropropane. The laboratory control spike for this batch displayed a similar recovery and the associated parent sample result was non-detect. No data qualifying action was taken based on the matrix spike anomaly for 1,2-dibromo-3-chloropropane.

Sample 13SB12C displayed an internal standard area count less than the lower control limit (i.e., 50%) for 1,4-dichlorobenzene-d_4 at 42%. This sample was reanalyzed with similar results. Only the initial analysis was reported and should be used for data interpretation. All associated field sample results were non-detect and were flagged "UJ,i".

For the SVOC analyses, the method blank for extraction batch 90482-114 displayed positive detections for bis(2-ethylhexyl)phthalate at 26 ug/Kg and di-n-butylphthalate at 11 ug/Kg. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The equipment blank EQB5 contained bis(2-ethylhexyl)phthalate at 0.35 ug/L, butyl benzyl phthalate at 0.060 ug/L, and several tentatively identified compounds (TICs). The equipment blank detections for these phthalates were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than five times the blank concentration of the TICs were flagged "B,x" in the associated soil boring field samples.

The continuing calibration analyzed on 11/01/03 at 0653 displayed a percent difference greater than the control limit (i.e., 20%) with a negative bias for 4-chloroaniline at 21.7%. The

continuing calibration analyzed on 11/01/03 at 2117 displayed a percent difference greater than the control limit with a negative bias for 2,4-dinitrophenol at 39.2%. The continuing calibration analyzed on 11/02/03 at 1249 displayed percent differences greater than the control limit with a negative bias for hexachlorocyclopentadiene at 28.0% and 2,4-dinitrophenol at 22.4%. The associated field sample results were non-detect and were flagged "UJ,c".

The laboratory control spike for batch 90482-114 displayed recoveries greater than the laboratory generated upper control limits for 2,4,5-trichlorophenol at 128%, 2,6-dinitrotoluene at 123%, 2-nitroaniline at 127%, 3,3'-dichlorobenzidine at 117%, acenaphthylene at 118%, benzo(b)fluoranthene at 125%, benzo(g,h,i)perylene at 130%, carbazole at 127%, dibenzo(a,h) anthracene at 126%, diethylphthalate at 119%, dimethylphthalate at 118%, fluorene at 121%, hexachlorocyclopentadiene at 115%, and indeno(1,2,3-cd)pyrene at 125%. The laboratory control spike for batch 90572-114 displayed a recovery greater than the laboratory generated upper control limit (i.e., 113%) for 3,3'-dichlorobenzidine at 120%. Positive associated field sample results were flagged "J,l".

The matrix spike pair for sample 13SB7C displayed percent recoveries less than the laboratory generated lower control limits for 2,4-dinitrophenol (15%/23%), 4-chloroaniline (26%), and hexachlorocyclopentadiene (12%/12%). The parent sample result for 2,4-dinitrophenol was previously flagged for a negative bias anomaly in the continuing calibration. Since the matrix spike recoveries were greater than the project QAPP lower limit (i.e., 10%), no data qualifying action was taken based on these anomalies. This matrix spike pair displayed percent recoveries greater than the laboratory generated upper control limits for 4-bromophenyl phenyl ether (114%), atrazine (124%/128%), benzo(k)fluoranthene (127%/134%), bis(2-ethylhexyl) phthalate (125%), butyl benzyl phthalate (121%), and fluorene (131%/127%). This matrix spike pair also displayed a relative percent difference greater than the laboratory generated control limit (i.e., 32%) for 2,4-dinitrophenol at 39%. All associated parent sample results were non-detect or previously flagged due to a method blank detection for bis(2-ethylhexyl) phthalate while the matrix spike recoveries exhibited a positive bias or imprecision. Since the matrix spike recoveries were less than the project QAPP upper limit (i.e., 150%), no data qualifying action was taken based on these anomalies.

The field duplicate pair (13SB12B and SBD8) displayed a relative percent difference greater than the control limit (i.e., 35%) for di-n-butylphthalate at 37.5%. These two results were flagged positive and were flagged "J,f".

Samples 13SB12B and SBD8 displayed concentrations that exceed the linear range of the analytical instrument initial calibration. These results were flagged "J,g". The samples were re-analyzed at a dilution factor of two and display acceptable results for these compounds that should be used for data interpretation.

For the PAH analyses, the 2-fluorobiphenyl surrogate percent recoveries were less than the laboratory generated lower control limit (i.e., 49%) for 69SB2B at 47%, 69SB2C at 46%, and 13SB11B at 45%. Positive associated field sample results were flagged "L,s" while non-detects were flagged "UL,s".

The field duplicate pair (13SB9A and SBD9) displayed relative percent differences greater than the control limit (i.e., 35%) for benzo(g,h,i)perylene at 77%, fluoranthene at 83%, and pyrene at 74%. The field duplicate pair results were positive for these compounds and were flagged "J,f".

For the explosive analyses, the continuing calibration analyzed on 10/23/03 at 0859 displayed a percent difference greater than the control limit (i.e., 15%) with a negative bias for 3-nitrotoluene at 16.5%. The continuing calibration analyzed on 10/23/03 at 1358 displayed a percent difference greater than the control limit with a negative bias for RDX at 23.0%. The continuing calibration analyzed on 10/23/03 at 1426 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 15.1%. The continuing calibration analyzed on 10/23/03 at 1952 displayed a percent difference greater than the control limit with a negative bias for RDX at 21.0%. The continuing calibration analyzed on 10/23/03 at 2019 displayed a percent difference greater than the control limit with a negative bias for 3-nitrotoluene at 18.3%. The positive associated field sample result was flagged "J,c" while non-detects were flagged "UJ,c". The continuing calibrations analyzed on 10/24/03 at 0119 and 0646 displayed percent differences greater than the control limit with a positive bias for 2,6-dinitrotoluene at 16.0% and 15.2%, respectively. The associated field sample results were non-detect for 2,6-dinitrotoluene while the continuing calibration displayed a positive bias. No data qualifying action was required.

The confirmation opening continuing calibration analyzed on 11/11/03 at 0817 displayed a percent difference greater than the control limit with a negative bias for RDX at 20.8%. The confirmation closing continuing calibration analyzed on 11/11/03 at 1317 displayed percent differences greater than the control limit with a negative bias for 2,4-dinitrotoluene at 15.1% and RDX at 35.8%. The laboratory reported the higher of the two concentrations for the positive 2,4-dinitrotoluene results from the primary column. The associated field sample results for RDX were previously flagged for a negative bias for the primary column continuing calibration. No further data qualifying action was taken based on these confirmation continuing calibration anomalies.

For the pesticide analyses, the continuing calibration analyzed on 10/31/03 at 0413 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias for endrin at 21.6% and 4,4'-DDD at 19.9% on the front column. The associated field sample results were non-detect for endrin and 4,4'-DDD while the continuing calibration displayed a positive bias. No data qualifying action was required.

For the PCB analyses, the continuing calibration analyzed on 10/17/03 at 2007 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias for aroclor 1016 at 17.7% and aroclor 1260 at 25.0% on the front column. The associated field sample results were non-detect while the continuing calibration displayed a positive bias. No data qualifying action was required.

For the herbicide analyses, the laboratory control spike for batch 90218-110 displayed a recovery less than the laboratory generated lower control limit (i.e., 50%) for dinoseb at 0% and a recovery greater than the laboratory generated upper control limit (i.e., 91%) for MCPP at 117%. The associated field sample results were non-detect for MCPP while the laboratory control spike displayed a positive bias, therefore, no data qualifying action was required. All dinoseb results from the original extraction were rejected and manually removed from the result forms by the reviewer. Only dinoseb results from the re-extraction should be used for data interpretation.

The surrogate recoveries were greater than the upper laboratory generated control limit (i.e., 114%) for both the original and re-extraction of sample 69SB2A. Since the associated field sample results were non-detect, no data qualifying action was required.

The closing continuing calibration displayed a percent difference greater than the control limit (i.e., 15%) with a positive bias for dicamba at 29.6% on column one and silvex at 17.0% on column two. The associated field sample results were non-detect. No data qualifying action was required.

For the metal analyses by 6020, the method blank for batch 90043-117 contained antimony at 0.082 mg/Kg and silver at 0.0060 mg/Kg. The method blank for batch 90112-120 contained lead at 0.098 mg/Kg. The associated positive field sample results less than five times the method blank concentrations were flagged "B,p". The equipment blank EQB5 contained chromium at 4.5 ug/L and thallium at 0.5 ug/L. The associated positive field sample results less than five times the equipment blank concentrations were flagged "B,x".

Samples 13SB11B and 13SB8A contained concentration of lead that interfered with the internal standard response for bismuth. The bismuth internal standard is used to quantitate thallium detections. TriMatrix used an alternate internal standard, holmium, and performed a seven replicate method detection limit (MDL) study for thallium using this alternate internal standard. The MDL for thallium using the holmium internal standard (0.0358 mg/Kg) could not be incorporated into the electronic data deliverable (EDD). The concentration of the thallium MDL for these two samples was manually corrected by URS within the EDD.

For the metal analyses by 6010B, the method blank for batch 90177-120 contained cobalt at 0.374 mg/Kg and sodium at 8.95 mg/Kg. The method blank for batch 90187-117 contained cobalt at 0.43 mg/Kg and iron at 14.9 mg/Kg. The associated positive field sample results were greater than five times the blank concentrations. No data qualifying action was required. The equipment blank EQB5 contained beryllium at 0.3 ug/L, iron at 7.6 ug/L, and sodium at 280 ug/L. The equipment blank results for beryllium, iron, and sodium were previously qualified due to method blank detections. No further data qualifying action was required.

The matrix spike pair performed on sample 13SB7C displayed percent recoveries greater than the laboratory generated upper control limits for calcium (133/129%), chromium (119/114%), and magnesium (127/142%). The associated field sample results were positive and were flagged "J,m", unless previously flagged for due to an equipment blank detection. The serial dilution performed on sample 13SB7C displayed percent differences greater than the control limit (i.e., 10%) for cobalt at 53.8% and copper at 21.1%. All associated field sample results were positive and were flagged "J,s".

The internal standard recovery was greater than the laboratory upper control limit (i.e., 120%) for yttrium during the neat analyses of samples 13SB7A at 135%, 13SB7B at 138%, 13SB7C at 149%, 13SB11A at 146%, 13SB11C at 152%, 13SB10A at 134%, 13SB10B at 137%, 13SB9A at 151%, and SBD9 at 151%. The samples were reanalyzed at a dilution factor of five and display acceptable internal standard recoveries. The associated field sample results for beryllium were reported from the dilution and display elevated method detection limits. Since the reporting limits were greater than three times the elevated method detection limits, the reporting limits were not elevated based on the dilution factor.

Correctable Anomalies: None.

Comments: Field coolers were received at the laboratory with internal temperatures less than the lower control limit (i.e., 2°C) at 0.9, 0.8, and 0.4 °C. Since the sample aliquots were not frozen and the containers were intact, no data qualifying action was taken.

Sample 69SB2C was analyzed at a medium level for VOC due to severe loss of internal standards for a neat original and a neat re-analysis. The sample reporting limits are appropriately elevated.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. The GIS-Key format is limited to 12 characters for a TIC CAS number. One SVOC TIC detection exceeded this limitation for samples 13SB10A and SBD9. The laboratory reported the CAS number without the dashes. The reviewer manually entered the dashes for evaluation purposes on the hardcopy result forms included in this report.

The concentrations reported for lead by SW6020 for samples 13SB11B at 26500 mg/Kg, 13SB8A at 8620 mg/Kg, 13SB12C at 1140 mg/Kg, and 13SB9A at 434 mg/Kg were greater than the concentrations not reported for lead from the SW6010B analyses for the same samples at 277 mg/Kg, 101 mg/Kg, 956 mg/Kg, and 378 mg/Kg, respectively. The two analyses have separate digestates. There was no evidence of laboratory contamination present in the method blanks. Due to the small initial volumes used for digestion, there may be fragments of lead that create heterogeneity.

No anomalies were encountered if a given fraction was not mentioned. All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP
Duplicate Statistics

13SB9A and SBD9

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/Fail
Volatiles											
methyl ethyl ketone	ug/Kg	26	130	41		33		22%	8.0	104	Pass
acetone	ug/Kg	26	130	140		130		7.4%	10	104	Pass
methylene chloride	ug/Kg	26	130	5.7	J	5.7	J	0.0%	0.0	104	N/A
toluene	ug/Kg	6.4	32	2.7	J	0.69	J	119%	**2.0**	26	N/A
Semi-Volatiles											
2,4-dinitrotoluene	ug/Kg	220	1100	220		23	J	162%	197	880	N/A
4-chloro-3-methylphenol	ug/Kg	220	1100	25	J	8	J	103%	17	880	N/A
acenaphthene	ug/Kg	220	1100	10	J	7	J	35%	3.0	880	N/A
acephthylene	ug/Kg	220	1100	7.0	J	3	J	80%	4.0	880	N/A
anthracene	ug/Kg	220	1100	25	J	18	J	33%	7.0	880	N/A
benzo(a)anthracene	ug/Kg	220	1100	200	J	140	J	35%	60	880	N/A
benxo(a)pyrene	ug/Kg	220	1100	140	J	120	J	15%	20	880	N/A
benzo(b)fluoranthene	ug/Kg	220	1100	240		170	J	34%	70	880	N/A
benzo(g,h,i)perylene	ug/Kg	220	1100	46	J	58	J	23%	12	880	N/A
benzo(k)fluoranthene	ug/Kg	220	1100	93	J	85	J	9.0%	8.0	880	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	220	1100	43	J	33	J	26%	10	880	N/A
carbazole	ug/Kg	220	1100	220	U	37	J	142%	183	880	N/A
chrysene	ug/Kg	220	1100	220		160	J	32%	60	880	N/A
dibenzo(a,h)anthracene	ug/Kg	220	1100	13	J	18	J	32%	5.0	880	N/A
diethylphthalate	ug/Kg	220	1100	230		44	J	136%	186	880	N/A
dimethylphthalate	ug/Kg	220	1100	18	J	210	U	168%	192	880	N/A
di-n-butylphthalate	ug/Kg	220	1100	580		430		30%	**150**	880	Pass
fluoranthene	ug/Kg	220	1100	260		190	J	31%	70	880	N/A
fluorene	ug/Kg	220	1100	6.0	J	4.0	J	40%	2.0	880	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	220	1100	43	J	52	J	19%	9.0	880	N/A
n-nitroso-di-phenylamine	ug/Kg	220	1100	25	J	46	J	59%	21	880	N/A
phenanthene	ug/Kg	220	1100	79	J	60	J	27%	19.0	880	N/A
pyrene	ug/Kg	220	1100	230		170	J	30%	60.0	880	N/A
Polyaromatic Hydrocarbons											
acenaphthene	ug/Kg	130	650	17	J	130	U	154%	113	520	N/A
anthracene	ug/Kg	26	130	38		15		87%	**23**	104	N/A
benzo(a)anthracene	ug/Kg	26	130	130		61		72%	**69**	104	N/A
benxo(a)pyrene	ug/Kg	26	130	170		73		80%	**97**	104	N/A
benzo(b)fluoranthene	ug/Kg	26	130	120		56		73%	**64**	104	N/A
benzo(g,h,i)perylene	ug/Kg	26	130	540		240		**77%**	300	104	**Fail**
benzo(k)fluoranthene	ug/Kg	26	130	77		36		73%	**41**	104	N/A
chrysene	ug/Kg	26	130	150		74		68%	**76**	104	N/A
fluoranthene	ug/Kg	26	130	290		120		**83%**	170	104	**Fail**
fluorene	ug/Kg	26	130	11	J	26	U	81%	15	104	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	26	130	100		46		74%	**54**	104	N/A
phenanthene	ug/Kg	26	130	130		50		89%	**80**	104	N/A
pyrene	ug/Kg	26	130	240		110		**74%**	130	104	**Fail**
Explosives											
BDL											
Pesticides											
BDL											
Polychlorinated Biphenyls											
BDL											
Herbicides											
BDL											
Metals											
aluminum	mg/Kg	50	250	20400		18600		9.2%	1800	200	Pass
antimony	mg/Kg	0.50	2.5	0.095	J	0.10	J	5.1%	0.005	2	N/A
arsenic	mg/Kg	0.40	2.0	2.7		2.4		12%	0.3	1.6	Pass
barium	mg/Kg	5.0	25	175		178		2%	3	20	Pass
beryllium	mg/Kg	1.0	5.0	1.2		1.1		9%	0.1	4	Pass
cadmium	mg/Kg	1.0	5.0	2.2		2.4		9%	0.2	4	Pass
calcium	mg/Kg	250	1250	1890		2070		9%	180	1000	Pass
chromium	mg/Kg	5.0	25	36		34		6%	2	20	Pass
cobalt	mg/Kg	1.0	5.0	13		13		0.0%	0	4	Pass
copper	mg/Kg	2.0	10.0	25		26		3.9%	1	8	Pass
iron	mg/Kg	200	1000	36500		35900		1.7%	600	800	Pass
lead	mg/Kg	50.0	250.0	434		396		9%	38	200	Pass
magnesium	mg/Kg	250	1250	3690		3690		0.0%	0	1000	Pass
manganese	mg/Kg	25.0	125	1240		1390		11%	150	100	Pass
mercury	mg/Kg	0.10	0.50	0.043	J	0.043	J	0%	0	0.4	N/A
nickel	mg/Kg	0.50	2.5	19		17		11%	2	2	Pass
potassium	mg/Kg	100	500	1980		1910		3.6%	70	400	Pass
selenium	mg/Kg	1.0	5.0	0.93	J	0.84	J	10%	0.09	4	N/A
silver	mg/Kg	3.0	15	0.12	J	0.12	J	0.0%	0	12	N/A
sodium	mg/Kg	100	500	44	J	45	J	2.2%	1	400	N/A
thallium	mg/Kg	0.50	2.5	0.78		0.95		20%	0.17	2	Pass
vanadium	mg/Kg	1.0	5.0	37		35		6%	2	4	Pass
zinc	mg/Kg	100	500	1010		969		4%	41	400	Pass
Cyanide											
Total Cyanide	mg/Kg	0.50	2.5	0.35	J	0.26	J	30%	0.09	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

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Duplicate Statistics

13SB12B and SBD8

	Units	RL	5xRL	Sample Conc	Duplicate Conc	%RPD	Delta	4xRL	Pass/ Fail
Volatiles									
methyl ethyl ketone	ug/Kg	28	140	25 J	27 J	7.7%	2	112	N/A
acetone	ug/Kg	28	140	55 B	62 B	12%	7	112	N/A
methylene chloride	ug/Kg	28	140	6.9 B	6.1 B	12%	0.8	112	N/A
benzene	ug/Kg	7.0	35	7.0 U	1.0 J	150%	**6**	28	N/A
Semi-Volatiles									
2,4-dinitrotoluene	ug/Kg	240	1200	700	1500	73%	**800**	960	Pass
2,6-dinitrotoluene	ug/Kg	240	1200	61 J	56 J	8.5%	5	960	N/A
4-chloro-3-methylphenol	ug/Kg	240	1200	18 J	23 J	24%	5	960	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	240	1200	360	300	18%	60	960	Pass
diethylphthalate	ug/Kg	240	1200	2200	2400	8.7%	200	960	Pass
dimethylphthalate	ug/Kg	240	1200	32 J	250 U	155%	218	960	N/A
di-n-butylphthalate	ug/Kg	240	1200	1300	1900	**37.5%**	600	960	**Fail**
fluoranthene	ug/Kg	240	1200	240 U	21 J	168%	219	960	N/A
n-nitroso-di-phenylamine	ug/Kg	240	1200	900	700	25%	200	960	Pass
phenanthrene	ug/Kg	240	1200	240 U	9.0 J	186%	231	960	N/A
pyrene	ug/Kg	240	1200	240 U	16 J	175%	224	960	N/A
Polyaromatic Hydrocarbons									
benzo(a)anthracene	ug/Kg	30	150	1.7 J	6 J	116%	4.7	120	N/A
benzo(a)pyrene	ug/Kg	30	150	30 U	8 J	116%	22	120	N/A
benzo(b)fluoranthene	ug/Kg	30	150	30 U	7 J	127%	23.3	120	N/A
benzo(g,h,i)perylene	ug/Kg	30	150	30 U	21 J	35%	9	120	N/A
chrysene	ug/Kg	30	150	30 U	7 J	127%	23.3	120	N/A
fluoranthene	ug/Kg	30	150	7.4 J	16 J	74%	8.6	120	N/A
indeon(1,2,3-cd)pyrene	ug/Kg	30	150	30 U	7 J	126%	23.2	120	N/A
phenanthrene	ug/Kg	30	150	2.2 J	3 J	20%	0.5	120	N/A
pyrene	ug/Kg	30	150	3.9 J	10 J	88%	6.1	120	N/A
Explosives									
fluoranthene	mg/Kg	0.50	2.5	0.50 U	0.32 J	44%	0.18	2	N/A
indeon(1,2,3-cd)pyrene	mg/Kg	0.50	2.5	0.55	0.56	2%	0.01	2	Pass
phenanthrene	mg/Kg	0.50	2.5	0.19 J	0.50 U	90%	0.31	2	N/A
pyrene	mg/Kg	0.50	2.5	0.29 J	0.50 U	53%	0.21	2	N/A
Metals									
aluminum	mg/Kg	50	250	9910	8930	10%	980	200	Pass
antimony	mg/Kg	0.50	2.5	1.1	1.30	17%	0.2	2	Pass
arsenic	mg/Kg	0.40	2.0	1.2	1.2	0.0%	0	1.6	Pass
barium	mg/Kg	5.0	25	106	102	3.8%	4	20	Pass
cadmium	mg/Kg	1.0	5.0	1.4	1.6	13%	0.2	4	Pass
calcium	mg/Kg	250	1250	4820	4640	3.8%	180	1000	Pass
chromium	mg/Kg	5.0	25	27	26	3.8%	1	20	Pass
cobalt	mg/Kg	1.0	5.0	6.4	6	1.6%	0.1	4	Pass
copper	mg/Kg	2.0	10.0	37	36	2.7%	1	8	Pass
iron	mg/Kg	100	500	15000	14700	2.0%	300	400	Pass
lead	mg/Kg	50.0	250.0	325	318	2.2%	7	200	Pass
magnesium	mg/Kg	250	1250	3270	3050	7.0%	220	1000	Pass
manganese	mg/Kg	5.0	25	280	291	3.9%	11	20	Pass
mercury	mg/Kg	0.10	0.50	0.041 J	0.035 J	16%	0.006	0.4	N/A
nickel	mg/Kg	0.50	2.5	11	10	14%	1.4	2	Pass
potassium	mg/Kg	100	500	1420	1290	9.6%	130	400	Pass
selenium	mg/Kg	1.0	5.0	0.39 J	0.41 J	5%	0.02	4	N/A
silver	mg/Kg	3.0	15	0.027 J	0.030 J	11%	0.003	12	N/A
sodium	mg/Kg	100	500	252	88 J	96%	**164**	400	N/A
thallium	mg/Kg	0.50	2.5	0.23 J	0.15 J	42%	0.08	2	N/A
vanadium	mg/Kg	1.0	5.0	17	17	0.0%	0	4	Pass
zinc	mg/Kg	4.0	20	377	426	12%	49	16	Pass
Cyanide									
Total Cyanide	mg/Kg	0.50	2.5	0.39 J	0.23 J	52%	0.16	2	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

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Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-5	345745	69SB2A	SO	10/08/03
36440-5	345746	69SB2B	SO	10/08/03
36440-5	345747	69SB2C	SO	10/08/03
36440-5	345748	57SB4B	SO	10/08/03
36440-5	345883	13SB7A	SO	10/09/03
36440-5	345884	13SB7B	SO	10/09/03
36440-5	345885	13SB7C	SO	10/09/03
36440-5	345886	13SB12A	SO	10/09/03
36440-5	345887	13SB12B	SO	10/09/03
36440-5	345888	SBD8	SO	10/09/03
36440-5	345889	13SB12C	SO	10/09/03
36440-5	345890	13SB11A	SO	10/09/03
36440-5	345891	13SB11B	SO	10/09/03
36440-5	345892	13SB11C	SO	10/09/03
36440-5	345893	13SB10A	SO	10/09/03
36440-5	345894	13SB10B	SO	10/09/03
36440-5	345895	13SB10C	SO	10/09/03
36440-5	345896	13SB9A	SO	10/09/03
36440-5	345897	SBD9	SO	10/09/03
36440-5	345898	13SB9B	SO	10/09/03
36440-5	345899	13SB9C	SO	10/09/03
36440-5	345900	13SB8A	SO	10/09/03
36440-5	345901	13SB8B	SO	10/09/03

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2A**	QC Batch:	90061 -120
Sample #:	**345745**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.784
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.712
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.869
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.880
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.581
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.517
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.852
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.844
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.703
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.653
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.492
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.322
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.852
78-93-3	**Methyl Ethyl Ketone**	**30**		24	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	***Acetone**	**110 B**	B,Z	24	6.00
71-43-2	Benzene	6.0 U		6.0	0.632
74-97-5	Bromochloromethane	6.0 U		6.0	0.913
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.601
75-25-2	Bromoform	6.0 U		6.0	0.694
74-83-9	Bromomethane	6.0 U		6.0	1.80
75-15-0	Carbon Disulfide	6.0 U		6.0	1.74
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.559
108-90-7	Chlorobenzene	6.0 U		6.0	0.793
75-00-3	Chloroethane	6.0 U		6.0	1.62
67-66-3	Chloroform	6.0 U		6.0	0.535

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2A**	QC Batch:	90061 -120
Sample #:	**345745**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U	6.0	1.00
110-82-7	Cyclohexane	12 U	12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.0 U	6.0	0.589
10061-02-6	trans-1,3-Dichloropropene	6.0 U	6.0	0.625
75-71-8	Dichlorodifluoromethane	6.0 U	6.0	0.802
124-48-1	Chlorodibromomethane	6.0 U	6.0	0.620
100-41-4	Ethylbenzene	6.0 U	6.0	0.508
98-82-8	Isopropylbenzene	6.0 U	6.0	0.655
79-20-9	Methyl Acetate	24 U	UJ,c 24	4.16
108-87-2	Methylcyclohexane	12 U	12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U	6.0	0.769
75-09-2	Methylene Chloride	24 U	24	3.37
100-42-5	Styrene	6.0 U	6.0	0.530
127-18-4	Tetrachloroethene	6.0 U	6.0	0.736
108-88-3	Toluene	6.0 U	6.0	0.557
79-01-6	Trichloroethene	6.0 U	6.0	0.812
75-69-4	Trichlorofluoromethane	6.0 U	6.0	0.892
75-01-4	Vinyl Chloride	6.0 U	6.0	0.444
1330-20-7	Xylene (Total)	6.0 U	6.0	0.505

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2A**	QC Batch:	90061 -120
Sample #:	**345745**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Hexanal	66-25-1	17	E	NJ, +

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB2B**	QC Batch:	90061 -120
Sample #:	**345746**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.3 U		6.3	0.537
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.3 U		6.3	0.956
79-34-5	1,1,2,2-Tetrachloroethane	6.3 U		6.3	0.823
79-00-5	1,1,2-Trichloroethane	6.3 U		6.3	0.747
75-34-3	1,1-Dichloroethane	6.3 U		6.3	0.912
75-35-4	1,1-Dichloroethylene	6.3 U		6.3	0.924
106-93-4	1,2-Dibromoethane	6.3 U		6.3	0.863
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.62
95-50-1	1,2-Dichlorobenzene	6.3 U		6.3	0.610
107-06-2	1,2-Dichloroethane	6.3 U		6.3	0.543
156-59-2	cis-1,2-Dichloroethene	6.3 U		6.3	0.895
156-60-5	trans-1,2-Dichloroethene	6.3 U		6.3	0.886
78-87-5	1,2-Dichloropropane	6.3 U		6.3	0.738
87-61-6	1,2,3-Trichlorobenzene	6.3 U		6.3	0.685
120-82-1	1,2,4-Trichlorobenzene	6.3 U		6.3	0.517
541-73-1	1,3-Dichlorobenzene	6.3 U		6.3	0.338
106-46-7	1,4-Dichlorobenzene	6.3 U		6.3	0.895
78-93-3	**Methyl Ethyl Ketone**	**23 J**		26	6.30
591-78-6	2-Hexanone	13 U		13	2.85
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.84
67-64-1	***Acetone**	**65 B**	B,Z	26	6.30
71-43-2	Benzene	6.3 U		6.3	0.664
74-97-5	Bromochloromethane	6.3 U		6.3	0.959
75-27-4	Dichlorobromomethane	6.3 U		6.3	0.631
75-25-2	Bromoform	6.3 U		6.3	0.728
74-83-9	Bromomethane	6.3 U		6.3	1.89
75-15-0	Carbon Disulfide	6.3 U		6.3	1.83
56-23-5	Carbon Tetrachloride	6.3 U		6.3	0.587
108-90-7	Chlorobenzene	6.3 U		6.3	0.833
75-00-3	Chloroethane	6.3 U		6.3	1.70
67-66-3	Chloroform	6.3 U		6.3	0.562

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2B**	QC Batch:	90061 -120
Sample #:	**345746**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.3 U	6.3	1.05
110-82-7	Cyclohexane	13 U	13	0.398
10061-01-5	cis-1,3-Dichloropropene	6.3 U	6.3	0.619
10061-02-6	trans-1,3-Dichloropropene	6.3 U	6.3	0.656
75-71-8	Dichlorodifluoromethane	6.3 U	6.3	0.842
124-48-1	Chlorodibromomethane	6.3 U	6.3	0.651
100-41-4	Ethylbenzene	6.3 U	6.3	0.533
98-82-8	Isopropylbenzene	6.3 U	6.3	0.688
79-20-9	Methyl Acetate	26 U	UJ,C 26	4.37
108-87-2	Methylcyclohexane	13 U	13	1.06
1634-04-4	Methyl(tert)butyl Ether	6.3 U	6.3	0.808
75-09-2	Methylene Chloride	26 U	26	3.54
100-42-5	Styrene	6.3 U	6.3	0.557
127-18-4	Tetrachloroethene	6.3 U	6.3	0.772
108-88-3	Toluene	6.3 U	6.3	0.585
79-01-6	Trichloroethene	6.3 U	6.3	0.853
75-69-4	Trichlorofluoromethane	6.3 U	6.3	0.936
75-01-4	Vinyl Chloride	6.3 U	6.3	0.466
1330-20-7	Xylene (Total)	6.3 U	6.3	0.530

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2B**	QC Batch:	90061 -120
Sample #:	**345746**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**69SB2C**	QC Batch:	90037 -122
Sample #:	**345747**	Anal. Batch:	208078
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	67 U		67	9.23
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	67 U		67	11.6
79-34-5	1,1,2,2-Tetrachloroethane	67 U		67	9.62
79-00-5	1,1,2-Trichloroethane	67 U		67	9.23
75-34-3	1,1-Dichloroethane	67 U		67	3.71
75-35-4	1,1-Dichloroethylene	67 U		67	8.65
106-93-4	1,2-Dibromoethane	67 U		67	11.1
96-12-8	1,2-Dibromo-3-chloropropane	130 U		130	17.6
95-50-1	1,2-Dichlorobenzene	67 U		67	10.7
107-06-2	1,2-Dichloroethane	67 U		67	7.22
156-59-2	cis-1,2-Dichloroethene	67 U		67	9.04
156-60-5	trans-1,2-Dichloroethene	67 U		67	9.30
78-87-5	1,2-Dichloropropane	67 U		67	16.6
87-61-6	1,2,3-Trichlorobenzene	67 U		67	14.8
120-82-1	1,2,4-Trichlorobenzene	67 U		67	12.3
541-73-1	1,3-Dichlorobenzene	67 U		67	10.4
106-46-7	1,4-Dichlorobenzene	67 U		67	8.06
78-93-3	**Methyl Ethyl Ketone**	**260 J**		670	27.0
591-78-6	2-Hexanone	670 U	UJ,c	670	29.6
108-10-1	4-Methyl-2-Pentanone	670 U	UJ,c	670	23.7
67-64-1	Acetone	670 U	UJ,c	670	69.6
71-43-2	Benzene	67 U		67	1.40
74-97-5	Bromochloromethane	67 U		67	4.93
75-27-4	Dichlorobromomethane	130 U		130	28.1
75-25-2	Bromoform	67 U		67	7.15
74-83-9	Bromomethane	67 U		67	17.4
75-15-0	Carbon Disulfide	67 U		67	3.86
56-23-5	Carbon Tetrachloride	67 U		67	7.48
108-90-7	Chlorobenzene	67 U		67	10.2
75-00-3	Chloroethane	67 U		67	11.7
67-66-3	Chloroform	67 U		67	6.57

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2C**	QC Batch:	90037 -122
Sample #:	**345747**	Anal. Batch:	208078
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	67 U	67	6.70
110-82-7	Cyclohexane	670 U	670	14.0
10061-01-5	cis-1,3-Dichloropropene	67 U	67	12.3
10061-02-6	trans-1,3-Dichloropropene	67 U	67	7.61
75-71-8	Dichlorodifluoromethane	67 U	67	7.80
124-48-1	Chlorodibromomethane	67 U	67	7.02
100-41-4	Ethylbenzene	67 U	67	12.7
98-82-8	Isopropylbenzene	67 U	67	5.86
79-20-9	Methyl Acetate	670 U	670	15.1
108-87-2	Methylcyclohexane	670 U	670	10.9
1634-04-4	Methyl(tert)butyl Ether	67 U	67	5.01
75-09-2	**Methylene Chloride**	**42 J** B,2	67	7.61
100-42-5	Styrene	67 U	67	8.91
127-18-4	Tetrachloroethene	67 U	67	12.5
108-88-3	Toluene	67 U	67	13.9
79-01-6	Trichloroethene	67 U	67	13.8
75-69-4	Trichlorofluoromethane	67 U	67	3.30
75-01-4	Vinyl Chloride	67 U	67	7.74
1330-20-7	Xylene (Total)	200 U	200	34.5

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**69SB2C**	QC Batch:	90037 -122
Sample #:	**345747**	Anal. Batch:	208078
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4B**	QC Batch:	90061 -120
Sample #:	**345748**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.575
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.02
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.882
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.801
75-34-3	1,1-Dichloroethane	6.8 U		6.8	0.977
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	0.990
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.925
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.81
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.653
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.582
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.959
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.949
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.791
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.734
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.554
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.362
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.959
78-93-3	**Methyl Ethyl Ketone**	**27 J**		28	6.75
591-78-6	2-Hexanone	14 U		14	3.05
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.97
67-64-1	***Acetone**	**66 B**	B, Z	28	6.75
71-43-2	Benzene	6.8 U		6.8	0.711
74-97-5	Bromochloromethane	6.8 U		6.8	1.03
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.676
75-25-2	Bromoform	6.8 U		6.8	0.780
74-83-9	Bromomethane	6.8 U		6.8	2.03
75-15-0	Carbon Disulfide	6.8 U		6.8	1.96
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.629
108-90-7	Chlorobenzene	6.8 U		6.8	0.892
75-00-3	Chloroethane	6.8 U		6.8	1.82
67-66-3	Chloroform	6.8 U		6.8	0.602

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4B**	QC Batch:	90061 -120
Sample #:	**345748**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.35

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.13
110-82-7	Cyclohexane	14 U		14	0.427
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.663
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.703
75-71-8	Dichlorodifluoromethane	6.8 U		6.8	0.902
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.698
100-41-4	Ethylbenzene	6.8 U		6.8	0.571
98-82-8	Isopropylbenzene	6.8 U		6.8	0.737
79-20-9	Methyl Acetate	28 U	UJ, C	28	4.68
108-87-2	Methylcyclohexane	14 U		14	1.14
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.865
75-09-2	Methylene Chloride	28 U		28	3.79
100-42-5	Styrene	6.8 U		6.8	0.597
127-18-4	Tetrachloroethene	6.8 U		6.8	0.828
108-88-3	Toluene	6.8 U		6.8	0.626
79-01-6	Trichloroethene	6.8 U		6.8	0.914
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.00
75-01-4	Vinyl Chloride	6.8 U		6.8	0.500
1330-20-7	Xylene (Total)	6.8 U		6.8	0.568

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**57SB4B**	QC Batch:	90061 -120
Sample #:	**345748**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7A**	QC Batch:	90061 -120
Sample #:	**345883**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	0.784
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	0.712
75-34-3	1,1-Dichloroethane	6.1 U		6.1	0.869
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	0.880
106-93-4	1,2-Dibromoethane	6.1 U		6.1	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	0.581
107-06-2	1,2-Dichloroethane	6.1 U		6.1	0.517
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	0.852
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	0.844
78-87-5	1,2-Dichloropropane	6.1 U		6.1	0.703
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	0.653
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	0.492
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	0.322
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.852
78-93-3	**Methyl Ethyl Ketone**	**38**		24	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	**Acetone**	**140**	B,Z	24	6.00
71-43-2	Benzene	6.1 U		6.1	0.632
74-97-5	Bromochloromethane	6.1 U		6.1	0.913
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.601
75-25-2	Bromoform	6.1 U		6.1	0.694
74-83-9	Bromomethane	6.1 U		6.1	1.80
75-15-0	Carbon Disulfide	6.1 U		6.1	1.74
56-23-5	Carbon Tetrachloride	6.1 U		6.1	0.559
108-90-7	Chlorobenzene	6.1 U		6.1	0.793
75-00-3	Chloroethane	6.1 U		6.1	1.62
67-66-3	Chloroform	6.1 U		6.1	0.535

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7A**	QC Batch:	90061 -120
Sample #:	**345883**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U		6.1	1.00
110-82-7	Cyclohexane	12 U		12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.1 U		6.1	0.589
10061-02-6	trans-1,3-Dichloropropene	6.1 U		6.1	0.625
75-71-8	Dichlorodifluoromethane	6.1 U		6.1	0.802
124-48-1	Chlorodibromomethane	6.1 U		6.1	0.620
100-41-4	Ethylbenzene	6.1 U		6.1	0.508
98-82-8	Isopropylbenzene	6.1 U		6.1	0.655
79-20-9	Methyl Acetate	24 U	UJ,C	24	4.16
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.1 U		6.1	0.769
75-09-2	**Methylene Chloride**	**6.4 J**	B,Z	24	3.37
100-42-5	Styrene	6.1 U		6.1	0.530
127-18-4	Tetrachloroethene	6.1 U		6.1	0.736
108-88-3	Toluene	6.1 U		6.1	0.557
79-01-6	Trichloroethene	6.1 U		6.1	0.812
75-69-4	Trichlorofluoromethane	6.1 U		6.1	0.892
75-01-4	Vinyl Chloride	6.1 U		6.1	0.444
1330-20-7	Xylene (Total)	6.1 U		6.1	0.505

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7A**	QC Batch:	90061 -120
Sample #:	**345883**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	13	E NJ, +

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7B**	QC Batch:	90061 -120
Sample #:	**345884**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.784
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.712
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.869
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.880
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.581
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.517
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	0.852
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.844
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.703
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.653
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.492
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.322
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.852
78-93-3	**Methyl Ethyl Ketone**	**37**		25	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	**Acetone**	**130**	B,Z	25	6.00
71-43-2	Benzene	6.2 U		6.2	0.632
74-97-5	Bromochloromethane	6.2 U		6.2	0.913
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.601
75-25-2	Bromoform	6.2 U		6.2	0.694
74-83-9	Bromomethane	6.2 U		6.2	1.80
75-15-0	Carbon Disulfide	6.2 U		6.2	1.74
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.559
108-90-7	Chlorobenzene	6.2 U		6.2	0.793
75-00-3	Chloroethane	6.2 U		6.2	1.62
67-66-3	Chloroform	6.2 U		6.2	0.535

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7B**	QC Batch:	90061 -120
Sample #:	**345884**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U		6.2	1.00
110-82-7	Cyclohexane	12 U		12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.2 U		6.2	0.589
10061-02-6	trans-1,3-Dichloropropene	6.2 U		6.2	0.625
75-71-8	Dichlorodifluoromethane	6.2 U		6.2	0.802
124-48-1	Chlorodibromomethane	6.2 U		6.2	0.620
100-41-4	Ethylbenzene	6.2 U		6.2	0.508
98-82-8	Isopropylbenzene	6.2 U		6.2	0.655
79-20-9	Methyl Acetate	25 U	UJ,C	25	4.16
108-87-2	Methylcyclohexane	12 U		12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.2 U		6.2	0.769
75-09-2	**Methylene Chloride**	**6.8 J**	B,Z	25	3.37
100-42-5	Styrene	6.2 U		6.2	0.530
127-18-4	Tetrachloroethene	6.2 U		6.2	0.736
108-88-3	Toluene	6.2 U		6.2	0.557
79-01-6	Trichloroethene	6.2 U		6.2	0.812
75-69-4	Trichlorofluoromethane	6.2 U		6.2	0.892
75-01-4	Vinyl Chloride	6.2 U		6.2	0.444
1330-20-7	Xylene (Total)	6.2 U		6.2	0.505

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7B**	QC Batch:	90061 -120
Sample #:	**345884**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7C**	QC Batch:	90061 -120
Sample #:	**345885**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	*1,1,1-Trichloroethane	6.3 U	UJ,M	6.3	0.537
76-13-1	*1,1,2-Trichloro-1,2,2-trifluoroethane	6.3 U	UJ,M	6.3	0.956
79-34-5	*1,1,2,2-Tetrachloroethane	6.3 U		6.3	0.823
79-00-5	1,1,2-Trichloroethane	6.3 U		6.3	0.747
75-34-3	1,1-Dichloroethane	6.3 U		6.3	0.912
75-35-4	*1,1-Dichloroethylene	6.3 U	UJ,M	6.3	0.924
106-93-4	*1,2-Dibromoethane	6.3 U	UJ,M	6.3	0.863
96-12-8	*1,2-Dibromo-3-chloropropane	13 U		13	2.62
95-50-1	*1,2-Dichlorobenzene	6.3 U	UJ,M	6.3	0.610
107-06-2	1,2-Dichloroethane	6.3 U		6.3	0.543
156-59-2	cis-1,2-Dichloroethene	6.3 U		6.3	0.895
156-60-5	*trans-1,2-Dichloroethene	6.3 U	UJ,M	6.3	0.886
78-87-5	1,2-Dichloropropane	6.3 U		6.3	0.738
87-61-6	*1,2,3-Trichlorobenzene	6.3 U	UJ,M	6.3	0.685
120-82-1	*1,2,4-Trichlorobenzene	6.3 U	UJ,M	6.3	0.517
541-73-1	*1,3-Dichlorobenzene	6.3 U	UJ,M	6.3	0.338
106-46-7	*1,4-Dichlorobenzene	6.3 U	UJ,M	6.3	0.895
78-93-3	***Methyl Ethyl Ketone**	**29**	J,d	25	6.30
591-78-6	*2-Hexanone	13 U		13	2.85
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.84
67-64-1	***Acetone**	**110 B**	B,Z	25	6.30
71-43-2	*Benzene	6.3 U	UJ,M	6.3	0.664
74-97-5	Bromochloromethane	6.3 U		6.3	0.959
75-27-4	*Dichlorobromomethane	6.3 U		6.3	0.631
75-25-2	*Bromoform	6.3 U		6.3	0.728
74-83-9	Bromomethane	6.3 U		6.3	1.89
75-15-0	*Carbon Disulfide	6.3 U	UJ,M	6.3	1.83
56-23-5	*Carbon Tetrachloride	6.3 U	UJ,M	6.3	0.587
108-90-7	*Chlorobenzene	6.3 U	UJ,M	6.3	0.833
75-00-3	*Chloroethane	6.3 U	UJ,M	6.3	1.70
67-66-3	Chloroform	6.3 U		6.3	0.562

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7C**	QC Batch:	90061 -120
Sample #:	**345885**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.26

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.3 U		6.3	1.05
110-82-7	*Cyclohexane	13 U	UJ,M	13	0.398
10061-01-5	*cis-1,3-Dichloropropene	6.3 U		6.3	0.619
10061-02-6	*trans-1,3-Dichloropropene	6.3 U		6.3	0.656
75-71-8	*Dichlorodifluoromethane	6.3 U	UJ,M	6.3	0.842
124-48-1	*Chlorodibromomethane	6.3 U		6.3	0.651
100-41-4	*Ethylbenzene	6.3 U	UJ,M	6.3	0.533
98-82-8	*Isopropylbenzene	6.3 U	UJ,M	6.3	0.688
79-20-9	*Methyl Acetate	25 U	UJ,C	25	4.37
108-87-2	*Methylcyclohexane	13 U		13	1.06
1634-04-4	Methyl(tert)butyl Ether	6.3 U		6.3	0.808
75-09-2	***Methylene Chloride**	**7.2 J**	B,Z	25	3.54
100-42-5	*Styrene	6.3 U	UJ,M	6.3	0.557
127-18-4	*Tetrachloroethene	6.3 U	UJ,M	6.3	0.772
108-88-3	*Toluene	6.3 U	UJ,M	6.3	0.585
79-01-6	*Trichloroethene	6.3 U		6.3	0.853
75-69-4	*Trichlorofluoromethane	6.3 U	UJ,M	6.3	0.936
75-01-4	Vinyl Chloride	6.3 U		6.3	0.466
1330-20-7	*Xylene (Total)	6.3 U	UJ,M	6.3	0.530

* See attached Statement of Data Qualifications.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB7C**	QC Batch:	90061 -120
Sample #:	**345885**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12A**	QC Batch:	90061 -120
Sample #:	**345886**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.849
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.771
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.941
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.953
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.629
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.560
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.923
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.914
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.762
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.707
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.533
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.348
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.923
78-93-3	**Methyl Ethyl Ketone**	**26**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	***Acetone**	**49 B**	B, Z	26	6.50
71-43-2	Benzene	6.4 U		6.4	0.685
74-97-5	Bromochloromethane	6.4 U		6.4	0.989
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.651
75-25-2	Bromoform	6.4 U		6.4	0.751
74-83-9	Bromomethane	6.4 U		6.4	1.95
75-15-0	Carbon Disulfide	6.4 U		6.4	1.89
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.606
108-90-7	Chlorobenzene	6.4 U		6.4	0.859
75-00-3	Chloroethane	6.4 U		6.4	1.76
67-66-3	Chloroform	6.4 U		6.4	0.580

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12A**	QC Batch:	90061 -120
Sample #:	**345886**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U		6.4	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.4 U		6.4	0.638
10061-02-6	trans-1,3-Dichloropropene	6.4 U		6.4	0.677
75-71-8	Dichlorodifluoromethane	6.4 U		6.4	0.868
124-48-1	Chlorodibromomethane	6.4 U		6.4	0.672
100-41-4	Ethylbenzene	6.4 U		6.4	0.550
98-82-8	Isopropylbenzene	6.4 U		6.4	0.710
79-20-9	Methyl Acetate	26 U	UJ, c	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.4 U		6.4	0.833
75-09-2	**Methylene Chloride**	**4.7 J**	B, Z	26	3.65
100-42-5	Styrene	6.4 U		6.4	0.575
127-18-4	Tetrachloroethene	6.4 U		6.4	0.797
108-88-3	**Toluene**	**1.2 J**		6.4	0.603
79-01-6	Trichloroethene	6.4 U		6.4	0.880
75-69-4	Trichlorofluoromethane	6.4 U		6.4	0.966
75-01-4	Vinyl Chloride	6.4 U		6.4	0.481
1330-20-7	Xylene (Total)	6.4 U		6.4	0.547

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**	Prepared:	n/a
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	n/a
		Analyzed:	10/20/03 JDM
Sample ID:	**13SB12A**	Anal. Method:	USEPA-8260B
Sample #:	**345886**	QC Batch:	90061 -120
Matrix:	Soil	Anal. Batch:	208021
		Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12B**	QC Batch:	90061 -120
Sample #:	**345887**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U	7.0	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U	7.0	1.06
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U	7.0	0.914
79-00-5	1,1,2-Trichloroethane	7.0 U	7.0	0.830
75-34-3	1,1-Dichloroethane	7.0 U	7.0	1.01
75-35-4	1,1-Dichloroethylene	7.0 U	7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U	7.0	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U	14	2.91
95-50-1	1,2-Dichlorobenzene	7.0 U	7.0	0.678
107-06-2	1,2-Dichloroethane	7.0 U	7.0	0.603
156-59-2	cis-1,2-Dichloroethene	7.0 U	7.0	0.994
156-60-5	trans-1,2-Dichloroethene	7.0 U	7.0	0.984
78-87-5	1,2-Dichloropropane	7.0 U	7.0	0.820
87-61-6	1,2,3-Trichlorobenzene	7.0 U	7.0	0.762
120-82-1	1,2,4-Trichlorobenzene	7.0 U	7.0	0.574
541-73-1	1,3-Dichlorobenzene	7.0 U	7.0	0.375
106-46-7	1,4-Dichlorobenzene	7.0 U	7.0	0.994
78-93-3	**Methyl Ethyl Ketone**	**25 J**	28	7.00
591-78-6	2-Hexanone	14 U	14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U	14	2.04
67-64-1	***Acetone**	**55 B** B,Z	28	7.00
71-43-2	Benzene	7.0 U	7.0	0.738
74-97-5	Bromochloromethane	7.0 U	7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U	7.0	0.701
75-25-2	Bromoform	7.0 U	7.0	0.809
74-83-9	Bromomethane	7.0 U	7.0	2.10
75-15-0	Carbon Disulfide	7.0 U	7.0	2.03
56-23-5	Carbon Tetrachloride	7.0 U	7.0	0.652
108-90-7	Chlorobenzene	7.0 U	7.0	0.925
75-00-3	Chloroethane	7.0 U	7.0	1.89
67-66-3	Chloroform	7.0 U	7.0	0.624

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12B**	QC Batch:	90061 -120
Sample #:	**345887**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.17
110-82-7	Cyclohexane	14 U		14	0.442
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.687
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.729
75-71-8	Dichlorodifluoromethane	7.0 U		7.0	0.935
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.724
100-41-4	Ethylbenzene	7.0 U		7.0	0.592
98-82-8	Isopropylbenzene	7.0 U		7.0	0.764
79-20-9	Methyl Acetate	28 U	VJ/c	28	4.86
108-87-2	Methylcyclohexane	14 U		14	1.18
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.897
75-09-2	**Methylene Chloride**	**6.9 J**	B,Z	28	3.93
100-42-5	Styrene	7.0 U		7.0	0.619
127-18-4	Tetrachloroethene	7.0 U		7.0	0.858
108-88-3	Toluene	7.0 U		7.0	0.650
79-01-6	Trichloroethene	7.0 U		7.0	0.948
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.04
75-01-4	Vinyl Chloride	7.0 U		7.0	0.518
1330-20-7	Xylene (Total)	7.0 U		7.0	0.589

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12B**	QC Batch:	90061 -120
Sample #:	**345887**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD8**	QC Batch:	90061 -120
Sample #:	**345888**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.5 U	7.5	0.639
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.5 U	7.5	1.14
79-34-5	1,1,2,2-Tetrachloroethane	7.5 U	7.5	0.980
79-00-5	1,1,2-Trichloroethane	7.5 U	7.5	0.890
75-34-3	1,1-Dichloroethane	7.5 U	7.5	1.09
75-35-4	1,1-Dichloroethylene	7.5 U	7.5	1.10
106-93-4	1,2-Dibromoethane	7.5 U	7.5	1.03
96-12-8	1,2-Dibromo-3-chloropropane	15 U	15	3.12
95-50-1	1,2-Dichlorobenzene	7.5 U	7.5	0.726
107-06-2	1,2-Dichloroethane	7.5 U	7.5	0.647
156-59-2	cis-1,2-Dichloroethene	7.5 U	7.5	1.07
156-60-5	trans-1,2-Dichloroethene	7.5 U	7.5	1.05
78-87-5	1,2-Dichloropropane	7.5 U	7.5	0.879
87-61-6	1,2,3-Trichlorobenzene	7.5 U	7.5	0.816
120-82-1	1,2,4-Trichlorobenzene	7.5 U	7.5	0.615
541-73-1	1,3-Dichlorobenzene	7.5 U	7.5	0.402
106-46-7	1,4-Dichlorobenzene	7.5 U	7.5	1.07
78-93-3	**Methyl Ethyl Ketone**	**27 J**	30	7.50
591-78-6	2-Hexanone	15 U	15	3.39
108-10-1	4-Methyl-2-Pentanone	15 U	15	2.19
67-64-1	***Acetone**	**62 B** B,Z	30	7.50
71-43-2	**Benzene**	**1.0 J**	7.5	0.791
74-97-5	Bromochloromethane	7.5 U	7.5	1.14
75-27-4	Dichlorobromomethane	7.5 U	7.5	0.752
75-25-2	Bromoform	7.5 U	7.5	0.867
74-83-9	Bromomethane	7.5 U	7.5	2.25
75-15-0	Carbon Disulfide	7.5 U	7.5	2.18
56-23-5	Carbon Tetrachloride	7.5 U	7.5	0.699
108-90-7	Chlorobenzene	7.5 U	7.5	0.992
75-00-3	Chloroethane	7.5 U	7.5	2.03
67-66-3	Chloroform	7.5 U	7.5	0.669

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD8**	QC Batch:	90061 -120
Sample #:	**345888**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.5 U		7.5	1.25
110-82-7	Cyclohexane	15 U		15	0.474
10061-01-5	cis-1,3-Dichloropropene	7.5 U		7.5	0.737
10061-02-6	trans-1,3-Dichloropropene	7.5 U		7.5	0.782
75-71-8	Dichlorodifluoromethane	7.5 U		7.5	1.00
124-48-1	Chlorodibromomethane	7.5 U		7.5	0.776
100-41-4	Ethylbenzene	7.5 U		7.5	0.635
98-82-8	Isopropylbenzene	7.5 U		7.5	0.819
79-20-9	Methyl Acetate	30 U	VJ,C	30	5.21
108-87-2	Methylcyclohexane	15 U		15	1.27
1634-04-4	Methyl(tert)butyl Ether	7.5 U		7.5	0.962
75-09-2	**Methylene Chloride**	**6.1 J**	B,Z	30	4.22
100-42-5	Styrene	7.5 U		7.5	0.663
127-18-4	Tetrachloroethene	7.5 U		7.5	0.920
108-88-3	Toluene	7.5 U		7.5	0.696
79-01-6	Trichloroethene	7.5 U		7.5	1.02
75-69-4	Trichlorofluoromethane	7.5 U		7.5	1.11
75-01-4	Vinyl Chloride	7.5 U		7.5	0.555
1330-20-7	Xylene (Total)	7.5 U		7.5	0.632

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD8**	QC Batch:	90061 -120
Sample #:	**345888**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB12C**	QC Batch:	90061 -120
Sample #:	**345889**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	8.1 U		8.1	0.682
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	8.1 U		8.1	1.21
79-34-5	*1,1,2,2-Tetrachloroethane	8.1 UJ	UJ,i	8.1	1.04
79-00-5	1,1,2-Trichloroethane	8.1 U		8.1	0.949
75-34-3	1,1-Dichloroethane	8.1 U		8.1	1.16
75-35-4	1,1-Dichloroethylene	8.1 U		8.1	1.17
106-93-4	1,2-Dibromoethane	8.1 U		8.1	1.10
96-12-8	*1,2-Dibromo-3-chloropropane	16 UJ	UJ,i	16	3.33
95-50-1	*1,2-Dichlorobenzene	8.1 UJ	UJ,i	8.1	0.774
107-06-2	1,2-Dichloroethane	8.1 U		8.1	0.690
156-59-2	cis-1,2-Dichloroethene	8.1 U		8.1	1.14
156-60-5	trans-1,2-Dichloroethene	8.1 U		8.1	1.12
78-87-5	1,2-Dichloropropane	8.1 U		8.1	0.938
87-61-6	*1,2,3-Trichlorobenzene	8.1 UJ	UJ,i	8.1	0.870
120-82-1	*1,2,4-Trichlorobenzene	8.1 UJ	UJ,i	8.1	0.656
541-73-1	*1,3-Dichlorobenzene	8.1 UJ	UJ,i	8.1	0.429
106-46-7	*1,4-Dichlorobenzene	8.1 UJ	UJ,i	8.1	1.14
78-93-3	Methyl Ethyl Ketone	32 U		32	8.00
591-78-6	2-Hexanone	16 U		16	3.62
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.34
67-64-1	***Acetone**	**63 B**	B,z	32	8.00
71-43-2	Benzene	8.1 U		8.1	0.843
74-97-5	Bromochloromethane	8.1 U		8.1	1.22
75-27-4	Dichlorobromomethane	8.1 U		8.1	0.802
75-25-2	Bromoform	8.1 U		8.1	0.925
74-83-9	Bromomethane	8.1 U		8.1	2.40
75-15-0	Carbon Disulfide	8.1 U		8.1	2.32
56-23-5	Carbon Tetrachloride	8.1 U		8.1	0.746
108-90-7	Chlorobenzene	8.1 U		8.1	1.06
75-00-3	Chloroethane	8.1 U		8.1	2.16
67-66-3	Chloroform	8.1 U		8.1	0.714

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12C**	QC Batch:	90061 -120
Sample #:	**345889**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	8.1 U		8.1	1.33
110-82-7	Cyclohexane	16 U		16	0.506
10061-01-5	cis-1,3-Dichloropropene	8.1 U		8.1	0.786
10061-02-6	trans-1,3-Dichloropropene	8.1 U		8.1	0.834
75-71-8	Dichlorodifluoromethane	8.1 U		8.1	1.07
124-48-1	Chlorodibromomethane	8.1 U		8.1	0.827
100-41-4	Ethylbenzene	8.1 U		8.1	0.677
98-82-8	*Isopropylbenzene	8.1 UJ	UJ;	8.1	0.874
79-20-9	Methyl Acetate	32 U	UJ,C	32	5.55
108-87-2	Methylcyclohexane	16 U		16	1.35
1634-04-4	Methyl(tert)butyl Ether	8.1 U		8.1	1.03
75-09-2	Methylene Chloride	32 U		32	4.50
100-42-5	Styrene	8.1 U		8.1	0.707
127-18-4	Tetrachloroethene	8.1 U		8.1	0.981
108-88-3	Toluene	8.1 U		8.1	0.742
79-01-6	Trichloroethene	8.1 U		8.1	1.08
75-69-4	Trichlorofluoromethane	8.1 U		8.1	1.19
75-01-4	Vinyl Chloride	8.1 U		8.1	0.592
1330-20-7	Xylene (Total)	8.1 U		8.1	0.674

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB12C**	QC Batch:	90061 -120
Sample #:	**345889**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	62
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
Ethyl Ether	60-29-7	28	Q	NJ, +

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11A**	QC Batch:	90061 -120
Sample #:	**345890**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U	6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U	6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U	6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U	6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U	6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U	6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U	6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U	13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U	6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U	6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U	6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U	6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U	6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U	6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U	6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U	6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U	6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**45**	26	6.50
591-78-6	2-Hexanone	13 U	13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U	13	1.90
67-64-1	**Acetone**	**240**	26	6.50
71-43-2	**Benzene**	**0.91 J**	6.5	0.685
74-97-5	Bromochloromethane	6.5 U	6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U	6.5	0.651
75-25-2	Bromoform	6.5 U	6.5	0.751
74-83-9	Bromomethane	6.5 U	6.5	1.95
75-15-0	Carbon Disulfide	6.5 U	6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U	6.5	0.606
108-90-7	Chlorobenzene	6.5 U	6.5	0.859
75-00-3	Chloroethane	6.5 U	6.5	1.76
67-66-3	Chloroform	6.5 U	6.5	0.580

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11A**	QC Batch:	90061 -120
Sample #:	**345890**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	Ethylbenzene	6.5 U		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	VJ,C	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**7.3 J**	B,Z	26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.9 J**		6.5	0.603
79-01-6	**Trichloroethene**	**9.6**		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11A**	QC Batch:	90061 -120
Sample #:	**345890**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11B**	QC Batch:	90061 -120
Sample #:	**345891**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	5.7 U		5.7	0.469
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	5.7 U		5.7	0.835
79-34-5	1,1,2,2-Tetrachloroethane	5.7 U		5.7	0.718
79-00-5	1,1,2-Trichloroethane	5.7 U		5.7	0.652
75-34-3	1,1-Dichloroethane	5.7 U		5.7	0.796
75-35-4	1,1-Dichloroethylene	5.7 U		5.7	0.806
106-93-4	1,2-Dibromoethane	5.7 U		5.7	0.754
96-12-8	1,2-Dibromo-3-chloropropane	11 U		11	2.29
95-50-1	1,2-Dichlorobenzene	5.7 U		5.7	0.532
107-06-2	1,2-Dichloroethane	5.7 U		5.7	0.474
156-59-2	**cis-1,2-Dichloroethene**	**1.9 J**		5.7	0.781
156-60-5	trans-1,2-Dichloroethene	5.7 U		5.7	0.773
78-87-5	1,2-Dichloropropane	5.7 U		5.7	0.645
87-61-6	1,2,3-Trichlorobenzene	5.7 U		5.7	0.598
120-82-1	1,2,4-Trichlorobenzene	5.7 U		5.7	0.451
541-73-1	1,3-Dichlorobenzene	5.7 U		5.7	0.295
106-46-7	1,4-Dichlorobenzene	5.7 U		5.7	0.781
78-93-3	**Methyl Ethyl Ketone**	**32**		23	5.50
591-78-6	2-Hexanone	11 U		11	2.49
108-10-1	4-Methyl-2-Pentanone	11 U		11	1.61
67-64-1	**Acetone**	**150**	B,Z	23	5.50
71-43-2	**Benzene**	**1.5 J**		5.7	0.580
74-97-5	Bromochloromethane	5.7 U		5.7	0.837
75-27-4	Dichlorobromomethane	5.7 U		5.7	0.551
75-25-2	Bromoform	5.7 U		5.7	0.636
74-83-9	Bromomethane	5.7 U		5.7	1.65
75-15-0	Carbon Disulfide	5.7 U		5.7	1.60
56-23-5	Carbon Tetrachloride	5.7 U		5.7	0.513
108-90-7	Chlorobenzene	5.7 U		5.7	0.727
75-00-3	Chloroethane	5.7 U		5.7	1.49
67-66-3	Chloroform	5.7 U		5.7	0.491

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11B**	QC Batch:	90061 -120
Sample #:	**345891**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	5.7 U		5.7	0.917
110-82-7	Cyclohexane	11 U		11	0.348
10061-01-5	cis-1,3-Dichloropropene	5.7 U		5.7	0.540
10061-02-6	trans-1,3-Dichloropropene	5.7 U		5.7	0.573
75-71-8	Dichlorodifluoromethane	5.7 U		5.7	0.735
124-48-1	Chlorodibromomethane	5.7 U		5.7	0.569
100-41-4	Ethylbenzene	5.7 U		5.7	0.465
98-82-8	Isopropylbenzene	5.7 U		5.7	0.601
79-20-9	Methyl Acetate	23 U	UJ,C	23	3.82
108-87-2	Methylcyclohexane	11 U		11	0.930
1634-04-4	Methyl(tert)butyl Ether	5.7 U		5.7	0.705
75-09-2	**Methylene Chloride**	**6.1 J**	B,Z	23	3.09
100-42-5	Styrene	5.7 U		5.7	0.486
127-18-4	Tetrachloroethene	5.7 U		5.7	0.674
108-88-3	**Toluene**	**1.4 J**		5.7	0.510
79-01-6	**Trichloroethene**	**31**		5.7	0.745
75-69-4	Trichlorofluoromethane	5.7 U		5.7	0.817
75-01-4	Vinyl Chloride	5.7 U		5.7	0.407
1330-20-7	Xylene (Total)	5.7 U		5.7	0.463

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11B**	QC Batch:	90061 -120
Sample #:	**345891**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	8.9	E

NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB11C**	QC Batch:	90061 -120
Sample #:	**345892**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U	6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U	6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U	6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U	6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U	6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U	6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U	6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U	13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U	6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U	6.5	0.560
156-59-2	**cis-1,2-Dichloroethene**	**4.2 J**	6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U	6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U	6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U	6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U	6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U	6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U	6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**40**	26	6.50
591-78-6	2-Hexanone	13 U	13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U	13	1.90
67-64-1	**Acetone**	**200** B,Z	26	6.50
71-43-2	**Benzene**	**1.5 J**	6.5	0.685
74-97-5	Bromochloromethane	6.5 U	6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U	6.5	0.651
75-25-2	Bromoform	6.5 U	6.5	0.751
74-83-9	Bromomethane	6.5 U	6.5	1.95
75-15-0	Carbon Disulfide	6.5 U	6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U	6.5	0.606
108-90-7	Chlorobenzene	6.5 U	6.5	0.859
75-00-3	Chloroethane	6.5 U	6.5	1.76
67-66-3	Chloroform	6.5 U	6.5	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11C**	QC Batch:	90061 -120
Sample #:	**345892**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	Ethylbenzene	6.5 U		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	UJ/C	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**5.8 J**	B/Z	26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.1 J**		6.5	0.603
79-01-6	**Trichloroethene**	**57**		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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Individual sample results relate only to the sample tested.
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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB11C**	QC Batch:	90061 -120
Sample #:	**345892**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	4.7	E

NJA

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10A**	QC Batch:	90061 -120
Sample #:	**345893**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.0 U	7.0	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.0 U	7.0	1.06
79-34-5	1,1,2,2-Tetrachloroethane	7.0 U	7.0	0.914
79-00-5	1,1,2-Trichloroethane	7.0 U	7.0	0.830
75-34-3	1,1-Dichloroethane	7.0 U	7.0	1.01
75-35-4	1,1-Dichloroethylene	7.0 U	7.0	1.03
106-93-4	1,2-Dibromoethane	7.0 U	7.0	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U	14	2.91
95-50-1	1,2-Dichlorobenzene	7.0 U	7.0	0.678
107-06-2	1,2-Dichloroethane	7.0 U	7.0	0.603
156-59-2	cis-1,2-Dichloroethene	7.0 U	7.0	0.994
156-60-5	trans-1,2-Dichloroethene	7.0 U	7.0	0.984
78-87-5	1,2-Dichloropropane	7.0 U	7.0	0.820
87-61-6	1,2,3-Trichlorobenzene	7.0 U	7.0	0.762
120-82-1	**1,2,4-Trichlorobenzene**	**0.96 J**	7.0	0.574
541-73-1	1,3-Dichlorobenzene	7.0 U	7.0	0.375
106-46-7	1,4-Dichlorobenzene	7.0 U	7.0	0.994
78-93-3	**Methyl Ethyl Ketone**	**39**	28	7.00
591-78-6	2-Hexanone	14 U	14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U	14	2.04
67-64-1	**Acetone**	**320**	28	7.00
71-43-2	Benzene	7.0 U	7.0	0.738
74-97-5	Bromochloromethane	7.0 U	7.0	1.07
75-27-4	Dichlorobromomethane	7.0 U	7.0	0.701
75-25-2	Bromoform	7.0 U	7.0	0.809
74-83-9	Bromomethane	7.0 U	7.0	2.10
75-15-0	Carbon Disulfide	7.0 U	7.0	2.03
56-23-5	Carbon Tetrachloride	7.0 U	7.0	0.652
108-90-7	Chlorobenzene	7.0 U	7.0	0.925
75-00-3	Chloroethane	7.0 U	7.0	1.89
67-66-3	Chloroform	7.0 U	7.0	0.624

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10A**	QC Batch:	90061 -120
Sample #:	**345893**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	7.0 U		7.0	1.17
110-82-7	Cyclohexane	14 U		14	0.442
10061-01-5	cis-1,3-Dichloropropene	7.0 U		7.0	0.687
10061-02-6	trans-1,3-Dichloropropene	7.0 U		7.0	0.729
75-71-8	Dichlorodifluoromethane	7.0 U		7.0	0.935
124-48-1	Chlorodibromomethane	7.0 U		7.0	0.724
100-41-4	Ethylbenzene	7.0 U		7.0	0.592
98-82-8	Isopropylbenzene	7.0 U		7.0	0.764
79-20-9	Methyl Acetate	28 U	UJ,C	28	4.86
108-87-2	Methylcyclohexane	14 U		14	1.18
1634-04-4	Methyl(tert)butyl Ether	7.0 U		7.0	0.897
75-09-2	**Methylene Chloride**	**11 J**	B,Z	28	3.93
100-42-5	Styrene	7.0 U		7.0	0.619
127-18-4	Tetrachloroethene	7.0 U		7.0	0.858
108-88-3	**Toluene**	**3.5 J**		7.0	0.650
79-01-6	Trichloroethene	7.0 U		7.0	0.948
75-69-4	Trichlorofluoromethane	7.0 U		7.0	1.04
75-01-4	Vinyl Chloride	7.0 U		7.0	0.518
1330-20-7	Xylene (Total)	7.0 U		7.0	0.589

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10A**	QC Batch:	90061 -120
Sample #:	**345893**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	350	E

NJ/+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB10B**	QC Batch:	90061 -120
Sample #:	**345894**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**39**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**180**	B,Z	26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U		6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB10B**	QC Batch:	90061 -120
Sample #:	**345894**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	1.08
110-82-7	Cyclohexane	13 U		13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.672
100-41-4	Ethylbenzene	6.5 U		6.5	0.550
98-82-8	Isopropylbenzene	6.5 U		6.5	0.710
79-20-9	Methyl Acetate	26 U	VJC	26	4.51
108-87-2	Methylcyclohexane	13 U		13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	0.833
75-09-2	**Methylene Chloride**	**6.6 J**	B/Z	26	3.65
100-42-5	Styrene	6.5 U		6.5	0.575
127-18-4	Tetrachloroethene	6.5 U		6.5	0.797
108-88-3	**Toluene**	**1.0 J**		6.5	0.603
79-01-6	Trichloroethene	6.5 U		6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.966
75-01-4	Vinyl Chloride	6.5 U		6.5	0.481
1330-20-7	Xylene (Total)	6.5 U		6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10B**	QC Batch:	90061 -120
Sample #:	**345894**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	9.0	E

NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB10C**	QC Batch:	90061 -120
Sample #:	**345895**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.06
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.914
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.830
75-34-3	1,1-Dichloroethane	6.8 U		6.8	1.01
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	1.03
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.91
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.678
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.603
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.994
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.984
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.820
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.762
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.574
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.375
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.994
78-93-3	**Methyl Ethyl Ketone**	**36**		27	7.00
591-78-6	2-Hexanone	14 U		14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.04
67-64-1	**Acetone**	**160**	B,Z	27	7.00
71-43-2	Benzene	6.8 U		6.8	0.738
74-97-5	Bromochloromethane	6.8 U		6.8	1.07
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.701
75-25-2	Bromoform	6.8 U		6.8	0.809
74-83-9	Bromomethane	6.8 U		6.8	2.10
75-15-0	Carbon Disulfide	6.8 U		6.8	2.03
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.652
108-90-7	Chlorobenzene	6.8 U		6.8	0.925
75-00-3	Chloroethane	6.8 U		6.8	1.89
67-66-3	Chloroform	6.8 U		6.8	0.624

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10C**	QC Batch:	90061 -120
Sample #:	**345895**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U		6.8	1.17
110-82-7	Cyclohexane	14 U		14	0.442
10061-01-5	cis-1,3-Dichloropropene	6.8 U		6.8	0.687
10061-02-6	trans-1,3-Dichloropropene	6.8 U		6.8	0.729
75-71-8	Dichlorodifluoromethane	6.8 U		6.8	0.935
124-48-1	Chlorodibromomethane	6.8 U		6.8	0.724
100-41-4	Ethylbenzene	6.8 U		6.8	0.592
98-82-8	Isopropylbenzene	6.8 U		6.8	0.764
79-20-9	Methyl Acetate	27 U		27	4.86
108-87-2	Methylcyclohexane	14 U		14	1.18
1634-04-4	Methyl(tert)butyl Ether	6.8 U		6.8	0.897
75-09-2	**Methylene Chloride**	**7.4 J**	B,Z	27	3.93
100-42-5	Styrene	6.8 U		6.8	0.619
127-18-4	Tetrachloroethene	6.8 U		6.8	0.858
108-88-3	Toluene	6.8 U		6.8	0.650
79-01-6	Trichloroethene	6.8 U		6.8	0.948
75-69-4	Trichlorofluoromethane	6.8 U		6.8	1.04
75-01-4	Vinyl Chloride	6.8 U		6.8	0.518
1330-20-7	Xylene (Total)	6.8 U		6.8	0.589

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/20/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB10C**	QC Batch:	90061 -120
Sample #:	**345895**	Anal. Batch:	208021
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9A**	QC Batch:	90061 -121
Sample #:	**345896**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.849
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.771
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.941
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.953
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.629
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.560
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.923
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.914
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.762
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.707
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.533
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.348
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.923
78-93-3	**Methyl Ethyl Ketone**	**41**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**140**		26	6.50
71-43-2	Benzene	6.4 U		6.4	0.685
74-97-5	Bromochloromethane	6.4 U		6.4	0.989
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.651
75-25-2	Bromoform	6.4 U		6.4	0.751
74-83-9	Bromomethane	6.4 U		6.4	1.95
75-15-0	Carbon Disulfide	6.4 U		6.4	1.89
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.606
108-90-7	Chlorobenzene	6.4 U		6.4	0.859
75-00-3	Chloroethane	6.4 U	VJ,c	6.4	1.76
67-66-3	Chloroform	6.4 U		6.4	0.580

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9A**	QC Batch:	90061 -121
Sample #:	**345896**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U	6.4	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.4 U	6.4	0.638
10061-02-6	trans-1,3-Dichloropropene	6.4 U	6.4	0.677
75-71-8	Dichlorodifluoromethane	6.4 U	6.4	0.868
124-48-1	Chlorodibromomethane	6.4 U	6.4	0.672
100-41-4	Ethylbenzene	6.4 U	6.4	0.550
98-82-8	Isopropylbenzene	6.4 U	6.4	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.4 U	6.4	0.833
75-09-2	**Methylene Chloride**	**5.7 J**	26	3.65
100-42-5	Styrene	6.4 U	6.4	0.575
127-18-4	Tetrachloroethene	6.4 U	6.4	0.797
108-88-3	**Toluene**	**2.7 J**	6.4	0.603
79-01-6	Trichloroethene	6.4 U	6.4	0.880
75-69-4	Trichlorofluoromethane	6.4 U	6.4	0.966
75-01-4	Vinyl Chloride	6.4 U	6.4	0.481
1330-20-7	Xylene (Total)	6.4 U	6.4	0.547

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9A**	QC Batch:	90061 -121
Sample #:	**345896**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD9**	QC Batch:	90061 -121
Sample #:	**345897**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	0.784
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	0.712
75-34-3	1,1-Dichloroethane	6.2 U		6.2	0.869
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	0.880
106-93-4	1,2-Dibromoethane	6.2 U		6.2	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	0.581
107-06-2	1,2-Dichloroethane	6.2 U		6.2	0.517
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	0.852
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	0.844
78-87-5	1,2-Dichloropropane	6.2 U		6.2	0.703
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	0.653
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	0.492
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	0.322
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.852
78-93-3	**Methyl Ethyl Ketone**	**33**		25	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	**Acetone**	**130**		25	6.00
71-43-2	Benzene	6.2 U		6.2	0.632
74-97-5	Bromochloromethane	6.2 U		6.2	0.913
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.601
75-25-2	Bromoform	6.2 U		6.2	0.694
74-83-9	Bromomethane	6.2 U		6.2	1.80
75-15-0	Carbon Disulfide	6.2 U		6.2	1.74
56-23-5	Carbon Tetrachloride	6.2 U		6.2	0.559
108-90-7	Chlorobenzene	6.2 U		6.2	0.793
75-00-3	Chloroethane	6.2 U	UJc	6.2	1.62
67-66-3	Chloroform	6.2 U		6.2	0.535

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD9**	QC Batch:	90061 -121
Sample #:	**345897**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U	6.2	1.00
110-82-7	Cyclohexane	12 U	12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.2 U	6.2	0.589
10061-02-6	trans-1,3-Dichloropropene	6.2 U	6.2	0.625
75-71-8	Dichlorodifluoromethane	6.2 U	6.2	0.802
124-48-1	Chlorodibromomethane	6.2 U	6.2	0.620
100-41-4	Ethylbenzene	6.2 U	6.2	0.508
98-82-8	Isopropylbenzene	6.2 U	6.2	0.655
79-20-9	Methyl Acetate	25 U	25	4.16
108-87-2	Methylcyclohexane	12 U	12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.2 U	6.2	0.769
75-09-2	**Methylene Chloride**	**5.7 J**	25	3.37
100-42-5	Styrene	6.2 U	6.2	0.530
127-18-4	Tetrachloroethene	6.2 U	6.2	0.736
108-88-3	**Toluene**	**0.69 J**	6.2	0.557
79-01-6	Trichloroethene	6.2 U	6.2	0.812
75-69-4	Trichlorofluoromethane	6.2 U	6.2	0.892
75-01-4	Vinyl Chloride	6.2 U	6.2	0.444
1330-20-7	Xylene (Total)	6.2 U	6.2	0.505

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Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD9**	QC Batch:	90061 -121
Sample #:	**345897**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9B**	QC Batch:	90061 -121
Sample #:	**345898**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	0.596
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	1.06
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	0.914
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	0.830
75-34-3	1,1-Dichloroethane	6.8 U		6.8	1.01
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	1.03
106-93-4	1,2-Dibromoethane	6.8 U		6.8	0.959
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	2.91
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	0.678
107-06-2	1,2-Dichloroethane	6.8 U		6.8	0.603
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	0.994
156-60-5	trans-1,2-Dichloroethene	6.8 U		6.8	0.984
78-87-5	1,2-Dichloropropane	6.8 U		6.8	0.820
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	0.762
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	0.574
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	0.375
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.994
78-93-3	**Methyl Ethyl Ketone**	**400**		27	7.00
591-78-6	2-Hexanone	14 U		14	3.16
108-10-1	4-Methyl-2-Pentanone	14 U		14	2.04
67-64-1	**Acetone**	**140**		27	7.00
71-43-2	Benzene	6.8 U		6.8	0.738
74-97-5	Bromochloromethane	6.8 U		6.8	1.07
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.701
75-25-2	Bromoform	6.8 U		6.8	0.809
74-83-9	Bromomethane	6.8 U		6.8	2.10
75-15-0	Carbon Disulfide	6.8 U		6.8	2.03
56-23-5	Carbon Tetrachloride	6.8 U		6.8	0.652
108-90-7	Chlorobenzene	6.8 U		6.8	0.925
75-00-3	Chloroethane	6.8 U	VJ,C	6.8	1.89
67-66-3	Chloroform	6.8 U		6.8	0.624

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Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9B**	QC Batch:	90061 -121
Sample #:	**345898**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U	6.8	1.17
110-82-7	Cyclohexane	14 U	14	0.442
10061-01-5	cis-1,3-Dichloropropene	6.8 U	6.8	0.687
10061-02-6	trans-1,3-Dichloropropene	6.8 U	6.8	0.729
75-71-8	Dichlorodifluoromethane	6.8 U	6.8	0.935
124-48-1	Chlorodibromomethane	6.8 U	6.8	0.724
100-41-4	Ethylbenzene	6.8 U	6.8	0.592
98-82-8	Isopropylbenzene	6.8 U	6.8	0.764
79-20-9	Methyl Acetate	27 U	27	4.86
108-87-2	Methylcyclohexane	14 U	14	1.18
1634-04-4	Methyl(tert)butyl Ether	6.8 U	6.8	0.897
75-09-2	**Methylene Chloride**	**5.5 J**	27	3.93
100-42-5	Styrene	6.8 U	6.8	0.619
127-18-4	Tetrachloroethene	6.8 U	6.8	0.858
108-88-3	Toluene	6.8 U	6.8	0.650
79-01-6	Trichloroethene	6.8 U	6.8	0.948
75-69-4	Trichlorofluoromethane	6.8 U	6.8	1.04
75-01-4	Vinyl Chloride	6.8 U	6.8	0.518
1330-20-7	Xylene (Total)	6.8 U	6.8	0.589

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9B**	QC Batch:	90061 -121
Sample #:	**345898**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
Hexanal	66-25-1	8.6	E NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9C**	QC Batch:	90257 -121
Sample #:	**345899**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	0.849
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	0.771
75-34-3	1,1-Dichloroethane	6.4 U		6.4	0.941
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	0.953
106-93-4	1,2-Dibromoethane	6.4 U		6.4	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	0.629
107-06-2	1,2-Dichloroethane	6.4 U		6.4	0.560
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	0.923
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	0.914
78-87-5	1,2-Dichloropropane	6.4 U		6.4	0.762
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	0.707
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	0.533
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	0.348
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.923
78-93-3	**Methyl Ethyl Ketone**	**24 J**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**31**	B,Z	26	6.50
71-43-2	Benzene	6.4 U		6.4	0.685
74-97-5	Bromochloromethane	6.4 U		6.4	0.989
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.651
75-25-2	Bromoform	6.4 U		6.4	0.751
74-83-9	Bromomethane	6.4 U		6.4	1.95
75-15-0	Carbon Disulfide	6.4 U		6.4	1.89
56-23-5	Carbon Tetrachloride	6.4 U		6.4	0.606
108-90-7	Chlorobenzene	6.4 U		6.4	0.859
75-00-3	Chloroethane	6.4 U	VJ,C	6.4	1.76
67-66-3	Chloroform	6.4 U		6.4	0.580

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9C**	QC Batch:	90257 -121
Sample #:	**345899**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U	6.4	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.4 U	6.4	0.638
10061-02-6	trans-1,3-Dichloropropene	6.4 U	6.4	0.677
75-71-8	Dichlorodifluoromethane	6.4 U	6.4	0.868
124-48-1	Chlorodibromomethane	6.4 U	6.4	0.672
100-41-4	Ethylbenzene	6.4 U	6.4	0.550
98-82-8	Isopropylbenzene	6.4 U	6.4	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.4 U	6.4	0.833
75-09-2	**Methylene Chloride**	**5.0 J**	26	3.65
100-42-5	Styrene	6.4 U	6.4	0.575
127-18-4	Tetrachloroethene	6.4 U	6.4	0.797
108-88-3	Toluene	6.4 U	6.4	0.603
79-01-6	Trichloroethene	6.4 U	6.4	0.880
75-69-4	Trichlorofluoromethane	6.4 U	6.4	0.966
75-01-4	Vinyl Chloride	6.4 U	6.4	0.481
1330-20-7	Xylene (Total)	6.4 U	6.4	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB9C**	QC Batch:	90257 -121
Sample #:	**345899**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SB8A**	QC Batch:	90257 -121
Sample #:	**345900**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**30**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**120**		26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U	VJc	6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8A**	QC Batch:	90257 -121
Sample #:	**345900**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U	6.5	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U	6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U	6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U	6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U	6.5	0.672
100-41-4	Ethylbenzene	6.5 U	6.5	0.550
98-82-8	Isopropylbenzene	6.5 U	6.5	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U	6.5	0.833
75-09-2	**Methylene Chloride**	**4.1 J**	26	3.65
100-42-5	Styrene	6.5 U	6.5	0.575
127-18-4	Tetrachloroethene	6.5 U	6.5	0.797
108-88-3	**Toluene**	**0.66 J**	6.5	0.603
79-01-6	Trichloroethene	6.5 U	6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U	6.5	0.966
75-01-4	Vinyl Chloride	6.5 U	6.5	0.481
1330-20-7	Xylene (Total)	6.5 U	6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8A**	QC Batch:	90257 -121
Sample #:	**345900**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	CAS Number	Result (ug/kg dr	Qualifier
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8B**	QC Batch:	90257 -121
Sample #:	**345901**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	0.554
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.987
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	0.849
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	0.771
75-34-3	1,1-Dichloroethane	6.5 U		6.5	0.941
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	0.953
106-93-4	1,2-Dibromoethane	6.5 U		6.5	0.891
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	2.70
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	0.629
107-06-2	1,2-Dichloroethane	6.5 U		6.5	0.560
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	0.923
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	0.914
78-87-5	1,2-Dichloropropane	6.5 U		6.5	0.762
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	0.707
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	0.533
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	0.348
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.923
78-93-3	**Methyl Ethyl Ketone**	**25 J**		26	6.50
591-78-6	2-Hexanone	13 U		13	2.94
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.90
67-64-1	**Acetone**	**77**	B,Z	26	6.50
71-43-2	Benzene	6.5 U		6.5	0.685
74-97-5	Bromochloromethane	6.5 U		6.5	0.989
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.651
75-25-2	Bromoform	6.5 U		6.5	0.751
74-83-9	Bromomethane	6.5 U		6.5	1.95
75-15-0	Carbon Disulfide	6.5 U		6.5	1.89
56-23-5	Carbon Tetrachloride	6.5 U		6.5	0.606
108-90-7	Chlorobenzene	6.5 U		6.5	0.859
75-00-3	Chloroethane	6.5 U	UJ,C	6.5	1.76
67-66-3	Chloroform	6.5 U		6.5	0.580

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8B**	QC Batch:	90257 -121
Sample #:	**345901**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U	6.5	1.08
110-82-7	Cyclohexane	13 U	13	0.411
10061-01-5	cis-1,3-Dichloropropene	6.5 U	6.5	0.638
10061-02-6	trans-1,3-Dichloropropene	6.5 U	6.5	0.677
75-71-8	Dichlorodifluoromethane	6.5 U	6.5	0.868
124-48-1	Chlorodibromomethane	6.5 U	6.5	0.672
100-41-4	Ethylbenzene	6.5 U	6.5	0.550
98-82-8	Isopropylbenzene	6.5 U	6.5	0.710
79-20-9	Methyl Acetate	26 U	26	4.51
108-87-2	Methylcyclohexane	13 U	13	1.10
1634-04-4	Methyl(tert)butyl Ether	6.5 U	6.5	0.833
75-09-2	**Methylene Chloride**	**5.6 J**	26	3.65
100-42-5	Styrene	6.5 U	6.5	0.575
127-18-4	Tetrachloroethene	6.5 U	6.5	0.797
108-88-3	Toluene	6.5 U	6.5	0.603
79-01-6	Trichloroethene	6.5 U	6.5	0.880
75-69-4	Trichlorofluoromethane	6.5 U	6.5	0.966
75-01-4	Vinyl Chloride	6.5 U	6.5	0.481
1330-20-7	Xylene (Total)	6.5 U	6.5	0.547

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	n/a
Submittal #:	**36440-5**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SB8B**	QC Batch:	90257 -121
Sample #:	**345901**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U	200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U	200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U	200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U	200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U	200	3.14
120-83-2	2,4-Dichlorophenol	200 U	200	4.22
105-67-9	2,4-Dimethylphenol	200 U	200	9.53
51-28-5	2,4-Dinitrophenol	400 U	400	3.84
121-14-2	2,4-Dinitrotoluene	200 U	200	3.78
606-20-2	2,6-Dinitrotoluene	200 U	200	33.2
91-58-7	2-Chloronaphthalene	200 U	200	2.76
95-57-8	2-Chlorophenol	200 U	200	2.41
91-57-6	2-Methylnaphthalene	200 U	200	3.29
95-48-7	2-Methylphenol	200 U	200	5.81
88-74-4	2-Nitroaniline	200 U	200	5.52
88-75-5	2-Nitrophenol	200 U	200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U	200	66.5
99-09-2	3-Nitroaniline	200 U	200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U	200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U	200	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**12 J**	200	6.25
106-47-8	4-Chloroaniline	200 U	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U	200	3.92
106-44-5	4-Methylphenol	200 U	200	7.64
100-01-6	4-Nitroaniline	200 U	200	8.70
100-02-7	4-Nitrophenol	400 U	400	3.40
83-32-9	Acenaphthene	200 U	200	2.06
208-96-8	Acenaphthylene	200 U	200	1.80
98-86-2	Acetophenone	200 U	200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**	B,Z	200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	200 U		200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**6.0 J**	J,I	200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**53 J**	B,Z	200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	**Fluoranthene**	**8.0 J**		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**5.0 J**	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	**Pyrene**	**9.0 J**	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2A**	QC Batch:	90482 -114
Sample #:	**345745**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	190	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	38	E	B,X
D-Friedoolean-14-ene, 3-methoxy-, (3.beta.)-	14021-23-9	210	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~600~~	~~E~~	~~AS~~ 2/18/03

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U		420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**12 J**		220	6.77
106-47-8	4-Chloroaniline	220 U	VJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**15 J**	B,Z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**4.0 J**	J,1	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**50 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2B**	QC Batch:	90482 -114
Sample #:	**345746**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	57	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	34	E	NJ,+
Erucylamide	112-84-5	190	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~270~~	~~E~~	

AS 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.72
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.34
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.41
120-83-2	2,4-Dichlorophenol	230 U		230	4.58
105-67-9	2,4-Dimethylphenol	230 U		230	10.3
51-28-5	2,4-Dinitrophenol	440 U		440	4.16
121-14-2	2,4-Dinitrotoluene	230 U		230	4.10
606-20-2	2,6-Dinitrotoluene	230 U		230	36.0
91-58-7	2-Chloronaphthalene	230 U		230	2.99
95-57-8	2-Chlorophenol	230 U		230	2.61
91-57-6	2-Methylnaphthalene	230 U		230	3.56
95-48-7	2-Methylphenol	230 U		230	6.29
88-74-4	2-Nitroaniline	230 U		230	5.98
88-75-5	2-Nitrophenol	230 U		230	2.21
91-94-1	3,3'-Dichlorobenzidine	230 U		230	72.0
99-09-2	3-Nitroaniline	230 U		230	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	5.86
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**		230	6.77
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.25
106-44-5	4-Methylphenol	230 U		230	8.28
100-01-6	4-Nitroaniline	230 U		230	9.43
100-02-7	4-Nitrophenol	440 U		440	3.68
83-32-9	Acenaphthene	230 U		230	2.24
208-96-8	Acenaphthylene	230 U		230	1.95
98-86-2	Acetophenone	230 U		230	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.01
1912-24-9	Atrazine	230 U		230	8.94
100-52-7	Benzaldehyde	230 U		230	5.27
56-55-3	Benzo (a) Anthracene	230 U		230	17.3
50-32-8	Benzo (a) Pyrene	230 U		230	7.42
205-99-2	Benzo (b) Fluoranthene	230 U		230	12.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	11.3
207-08-9	Benzo (k) Fluoranthene	230 U		230	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.08
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**16 J**	B,Z	230	2.69
85-68-7	Butyl Benzyl Phthalate	230 U		230	5.82
105-60-2	Caprolactam	440 U		440	8.29
86-74-8	Carbazole	230 U		230	7.93
218-01-9	Chrysene	230 U		230	13.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	7.67
132-64-9	Dibenzofuran	230 U		230	4.11
84-66-2	**Diethylphthalate**	**5.0 J**	J,I	230	2.47
131-11-3	Dimethylphthalate	230 U		230	4.30
84-74-2	**Di-n-Butylphthalate**	**70 J**	B,Z	230	4.97
117-84-0	Di-n-Octylphthalate	230 U		230	4.03
206-44-0	Fluoranthene	230 U		230	3.06
86-73-7	Fluorene	230 U		230	2.18
118-74-1	Hexachlorobenzene	230 U		230	3.26
87-68-3	Hexachlorobutadiene	230 U		230	5.03
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.57
67-72-1	Hexachloroethane	230 U		230	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.10
78-59-1	Isophorone	230 U		230	2.25
91-20-3	Naphthalene	230 U		230	3.58
98-95-3	Nitrobenzene	230 U		230	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.28
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.18
87-86-5	Pentachlorophenol	440 U	440	5.71
85-01-8	Phenanthrene	230 U	230	2.99
108-95-2	Phenol	230 U	230	5.15
129-00-0	Pyrene	230 U	230	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**69SB2C**	QC Batch:	90482 -114
Sample #:	**345747**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	75
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	76	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	63	E	NJ,+
Erucylamide	112-84-5	380	E	B X
Ethanol, 2-(hexadecyloxy)-	2136-71-2	42	E	NJ,+
Squalene	7683-64-9	46	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	440 U		440	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**		230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	440 U		440	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	Benzo (a) Anthracene	230 U		230	18.6
50-32-8	Benzo (a) Pyrene	230 U		230	7.99
205-99-2	Benzo (b) Fluoranthene	230 U		230	13.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**24 J**	B,2	230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	440 U		440	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	Chrysene	230 U		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**6.0 J**	J,1	230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**76 J**	B,2	230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	Fluoranthene	230 U		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U		230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	440 U	440	6.15
85-01-8	Phenanthrene	230 U	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	Pyrene	230 U	230	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**57SB4B**	QC Batch:	90482 -114
Sample #:	**345748**	Anal. Batch:	208743
Matrix:	Soil	Percent Solids:	74
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	160	E	NJ,+
1-Hexadecanol	36653-82-4	48	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	58	E	NJ,+
4-(1,1,3,3-Tetramethyl Butyl)-Phenol	140-66-9	29	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~150~~	~~E~~	~~+~~ KS 2/18/04
Phenol, 4-(1,1-dimethylpropyl)-	80-46-6	720	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	400 U	UJ,c	400	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**		210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	**Benzo (a) Pyrene**	**18 J**		210	6.85
205-99-2	**Benzo (b) Fluoranthene**	**25 J**	J,1	210	11.7
191-24-2	**Benzo (g,h,i,) Perylene**	**11 J**	J,1	210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**19 J**	B,2	210	2.48
85-68-7	**Butyl Benzyl Phthalate**	**6.0 J**		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	**Chrysene**	**24 J**		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**9.0 J**	J,1	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**70 J**	B,2	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**9.0 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**10 J**	J,1	210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**4.0 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**6.0 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7A**	QC Batch:	90482 -114
Sample #:	**345883**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	69	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	50	E	B,X
Erucylamide	112-84-5	300	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~170~~	~~E~~	AS 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	410 U	VJC	410	3.84
121-14-2	2,4-Dinitrotoluene	210 U		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**16 J**		210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U		410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/01/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	**Benzo (a) Pyrene**	**11 J**		210	6.85
205-99-2	**Benzo (b) Fluoranthene**	**17 J**	J,1	210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**18 J**	B,2	210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U		410	7.66
86-74-8	Carbazole	210 U		210	7.32
218-01-9	**Chrysene**	**16 J**		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**8.0 J**	J,1	210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**85 J**	B,2	210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	N-Nitroso-di-Phenylamine	210 U	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/01/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7B**	QC Batch:	90482 -114
Sample #:	**345884**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	140	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	42	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~330~~	~~E~~	AB 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,C	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**8.0 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**17 J**	B,Z	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**6.0 J**	J,I	220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**120 J**	B,Z	220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB7C**	QC Batch:	90482 -114
Sample #:	**345885**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	79
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	200	E	NJ+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	36	E	B,X
Erucylamide	112-84-5	120	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~500~~	~~E~~	~~B,X~~ ts 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	420 U VJ,C	420	4.16
121-14-2	**2,4-Dinitrotoluene**	**710**	220	4.10
606-20-2	**2,6-Dinitrotoluene**	**210 J**	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	420 U	420	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	220 U	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	Benzo (a) Anthracene	220 U	220	17.3
50-32-8	Benzo (a) Pyrene	220 U	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**13 J**	220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U	220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**71 J**	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U	220	5.82
105-60-2	Caprolactam	420 U	420	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	Chrysene	220 U	220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**950**	220	2.47
131-11-3	Dimethylphthalate	220 U	220	4.30
84-74-2	**Di-n-Butylphthalate**	**680**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**25 J**	220	3.06
86-73-7	Fluorene	220 U	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	Naphthalene	220 U	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**630**	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	**Phenanthrene**	**15 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**21 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12A**	QC Batch:	90572 -114
Sample #:	**345886**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	120	E	NJ,t
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	290	E	NJ,t
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	350	E	NJ,t
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	280	E	NJ,t
Erucylamide	112-84-5	330	E	B,x
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~670~~	~~E~~	~~*~~ 2/18/04
Triacetin	102-76-1	140	E	NJ,t
Urea, N,N'-dimethyl-N,N'-diphenyl-	611-92-7	910	E	NJ,t

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U	UJ,C	460	4.48
121-14-2	**2,4-Dinitrotoluene**	**700**		240	4.41
606-20-2	**2,6-Dinitrotoluene**	**61 J**		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	2-Methylnaphthalene	240 U		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	77.6
99-09-2	3-Nitroaniline	240 U		240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**18 J**		240	7.29
106-47-8	4-Chloroaniline	240 U		240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	Acenaphthene	240 U		240	2.41
208-96-8	Acenaphthylene	240 U		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	240 U	240	6.47
1912-24-9	Atrazine	240 U	240	9.63
100-52-7	Benzaldehyde	240 U	240	5.67
56-55-3	Benzo (a) Anthracene	240 U	240	18.6
50-32-8	Benzo (a) Pyrene	240 U	240	7.99
205-99-2	Benzo (b) Fluoranthene	240 U	240	13.7
191-24-2	Benzo (g,h,i,) Perylene	240 U	240	12.2
207-08-9	Benzo (k) Fluoranthene	240 U	240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U	240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U	240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**360**	240	2.90
85-68-7	Butyl Benzyl Phthalate	240 U	240	6.27
105-60-2	Caprolactam	460 U	460	8.93
86-74-8	Carbazole	240 U	240	8.54
218-01-9	Chrysene	240 U	240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U	240	8.26
132-64-9	Dibenzofuran	240 U	240	4.42
* ~~84-66-2~~	~~**Diethylphthalate**~~	~~**2000 E**~~ J,R	~~240~~	~~2.66~~ ~~*~~ 2/18/04
131-11-3	**Dimethylphthalate**	**32 J**	240	4.63
* ~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**1200 E**~~ J,R	~~240~~	~~5.35~~ ~~*~~ 2/18/04
117-84-0	Di-n-Octylphthalate	240 U	240	4.34
206-44-0	Fluoranthene	240 U	240	3.29
86-73-7	Fluorene	240 U	240	2.35
118-74-1	Hexachlorobenzene	240 U	240	3.51
87-68-3	Hexachlorobutadiene	240 U	240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U	240	2.77
67-72-1	Hexachloroethane	240 U	240	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	240 U	240	5.49
78-59-1	Isophorone	240 U	240	2.42
91-20-3	Naphthalene	240 U	240	3.85
98-95-3	Nitrobenzene	240 U	240	4.48

* See Dilution for these results, *s 2/18/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	**N-Nitroso-di-Phenylamine**	**900**	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	Phenanthrene	240 U	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	Pyrene	240 U	240	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	270	E	NJ,+
2-Ethyl-hexanoic Acid	149-57-5	180	E	NJ,+
7H-Dibenzo (a,g) carbazole	207-84-1	280	E	NJ,+
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	260	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	900	E	NJ,+
Octacosane	630-02-4	180	E	NJ,+
Triacetin	102-76-1	1300	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	2.8

AK 2/18/04

Do not use, See undiluted results

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	480 U		480	6.89
95-94-3	1,2,4,5-Tetrachloro-benzene	480 U		480	80.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	480 U		480	3.70
95-95-4	2,4,5-Trichlorophenol	480 U		480	9.35
88-06-2	2,4,6-Trichlorophenol	480 U		480	7.34
120-83-2	2,4-Dichlorophenol	480 U		480	9.86
105-67-9	2,4-Dimethylphenol	480 U		480	22.2
51-28-5	2,4-Dinitrophenol	930 U	UJC	930	8.96
121-14-2	**2,4-Dinitrotoluene**	**690**		480	8.82
606-20-2	2,6-Dinitrotoluene	480 U		480	77.6
91-58-7	2-Chloronaphthalene	480 U		480	6.44
95-57-8	2-Chlorophenol	480 U		480	5.63
91-57-6	2-Methylnaphthalene	480 U		480	7.67
95-48-7	2-Methylphenol	480 U		480	13.6
88-74-4	2-Nitroaniline	480 U		480	12.9
88-75-5	2-Nitrophenol	480 U		480	4.76
91-94-1	3,3'-Dichlorobenzidine	480 U		480	155
99-09-2	3-Nitroaniline	480 U		480	51.2
534-52-1	4,6-Dinitro-2-Methylphenol	480 U		480	12.6
101-55-3	4-Bromophenyl Phenylether	480 U		480	9.46
59-50-7	**4-Chloro-3-Methylphenol**	**17 J**		480	14.6
106-47-8	4-Chloroaniline	480 U		480	3.53
7005-72-3	4-Chlorophenylphenyl-Ether	480 U		480	9.16
106-44-5	4-Methylphenol	480 U		480	17.8
100-01-6	4-Nitroaniline	480 U		480	20.3
100-02-7	4-Nitrophenol	930 U		930	7.92
83-32-9	Acenaphthene	480 U		480	4.82
208-96-8	Acenaphthylene	480 U		480	4.20
98-86-2	Acetophenone	480 U		480	5.32

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	2.8

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	480 U		480	12.9
1912-24-9	Atrazine	480 U		480	19.3
100-52-7	Benzaldehyde	480 U		480	11.3
56-55-3	Benzo (a) Anthracene	480 U		480	37.2
50-32-8	Benzo (a) Pyrene	480 U		480	16.0
205-99-2	Benzo (b) Fluoranthene	480 U		480	27.3
191-24-2	Benzo (g,h,i,) Perylene	480 U		480	24.4
207-08-9	Benzo (k) Fluoranthene	480 U		480	37.5
111-91-1	Bis (2-Chloroethoxy)-Methane	480 U		480	8.79
111-44-4	Bis (2-Chloroethyl) Ether	480 U		480	4.84
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**420 J**		480	5.80
85-68-7	Butyl Benzyl Phthalate	480 U		480	12.5
105-60-2	Caprolactam	930 U		930	17.9
86-74-8	Carbazole	480 U		480	17.1
218-01-9	Chrysene	480 U		480	28.6
53-70-3	Dibenzo (a,h) Anthracene	480 U		480	16.5
132-64-9	Dibenzofuran	480 U		480	8.85
84-66-2	**Diethylphthalate**	**2200**		480	5.32
131-11-3	**Dimethylphthalate**	**33 J**		480	9.27
84-74-2	**Di-n-Butylphthalate**	**1300**	J,f	480	10.7
117-84-0	Di-n-Octylphthalate	480 U		480	8.68
206-44-0	**Fluoranthene**	**7.0 J**		480	6.58
86-73-7	Fluorene	480 U		480	4.70
118-74-1	Hexachlorobenzene	480 U		480	7.03
87-68-3	Hexachlorobutadiene	480 U		480	10.8
77-47-4	Hexachlorocyclopentadiene	480 U	UJ,c	480	5.54
67-72-1	Hexachloroethane	480 U		480	6.54
193-39-5	Indeno (1,2,3-cd) Pyrene	480 U		480	11.0
78-59-1	Isophorone	480 U		480	4.84
91-20-3	Naphthalene	480 U		480	7.70
98-95-3	Nitrobenzene	480 U		480	8.96

2-18-04

2/18/04

* Use only these two results from this run

2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12B**	QC Batch:	90572 -114
Sample #:	**345887DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	2.8

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	480 U	480	9.21
86-30-6	**N-Nitroso-di-Phenylamine**	**1200**	480	13.3
87-86-5	Pentachlorophenol	930 U	930	12.3
85-01-8	Phenanthrene	480 U	480	6.44
108-95-2	Phenol	480 U	480	11.1
129-00-0	**Pyrene**	**7.0 J**	480	4.14

Do not use, ✱ 2/18/04
See neat run.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	250 U	250	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	250 U	250	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	250 U	250	1.98
95-95-4	2,4,5-Trichlorophenol	250 U	250	5.01
88-06-2	2,4,6-Trichlorophenol	250 U	250	3.93
120-83-2	2,4-Dichlorophenol	250 U	250	5.28
105-67-9	2,4-Dimethylphenol	250 U	250	11.9
51-28-5	2,4-Dinitrophenol	490 U UJ,c	490	4.80
~~121-14-2~~	~~**2,4-Dinitrotoluene**~~	~~**1500 E**~~ J,q	250	~~4.73~~ see dilution 4, 2/18/04
606-20-2	**2,6-Dinitrotoluene**	**56 J**	250	41.6
91-58-7	2-Chloronaphthalene	250 U	250	3.45
95-57-8	2-Chlorophenol	250 U	250	3.02
91-57-6	2-Methylnaphthalene	250 U	250	4.11
95-48-7	2-Methylphenol	250 U	250	7.26
88-74-4	2-Nitroaniline	250 U	250	6.90
88-75-5	2-Nitrophenol	250 U	250	2.55
91-94-1	3,3'-Dichlorobenzidine	250 U	250	83.1
99-09-2	3-Nitroaniline	250 U	250	27.5
534-52-1	4,6-Dinitro-2-Methylphenol	250 U	250	6.77
101-55-3	4-Bromophenyl Phenylether	250 U	250	5.07
59-50-7	**4-Chloro-3-Methylphenol**	**23 J**	250	7.82
106-47-8	4-Chloroaniline	250 U	250	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	250 U	250	4.91
106-44-5	4-Methylphenol	250 U	250	9.56
100-01-6	4-Nitroaniline	250 U	250	10.9
100-02-7	4-Nitrophenol	490 U	490	4.25
83-32-9	Acenaphthene	250 U	250	2.58
208-96-8	Acenaphthylene	250 U	250	2.25
98-86-2	Acetophenone	250 U	250	2.85

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL	
120-12-7	Anthracene	250 U	250	6.93	
1912-24-9	Atrazine	250 U	250	10.3	
100-52-7	Benzaldehyde	250 U	250	6.08	
56-55-3	Benzo (a) Anthracene	250 U	250	20.0	
50-32-8	Benzo (a) Pyrene	250 U	250	8.57	
205-99-2	Benzo (b) Fluoranthene	250 U	250	14.6	
191-24-2	Benzo (g,h,i,) Perylene	250 U	250	13.1	
207-08-9	Benzo (k) Fluoranthene	250 U	250	20.1	
111-91-1	Bis (2-Chloroethoxy)-Methane	250 U	250	4.71	
111-44-4	Bis (2-Chloroethyl) Ether	250 U	250	2.60	
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**300**	250	3.11	
85-68-7	Butyl Benzyl Phthalate	250 U	250	6.72	
105-60-2	Caprolactam	490 U	490	9.57	
86-74-8	Carbazole	250 U	250	9.15	
218-01-9	Chrysene	250 U	250	15.3	
53-70-3	Dibenzo (a,h) Anthracene	250 U	250	8.85	
132-64-9	Dibenzofuran	250 U	250	4.74	
~~84-66-2~~	~~**Diethylphthalate**~~	~~**2200 E**~~ J,q	250	2.85	see dilution 1, 2/18/04
131-11-3	Dimethylphthalate	250 U	250	4.97	
~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**1800 E**~~ J,q	250	5.73	see dilution 1, 2/18/04
117-84-0	Di-n-Octylphthalate	250 U	250	4.65	
206-44-0	**Fluoranthene**	**21 J**	250	3.53	
86-73-7	Fluorene	250 U	250	2.52	
118-74-1	Hexachlorobenzene	250 U	250	3.77	
87-68-3	Hexachlorobutadiene	250 U	250	5.81	
77-47-4	Hexachlorocyclopentadiene	250 U	250	2.97	
67-72-1	Hexachloroethane	250 U	250	3.50	
193-39-5	Indeno (1,2,3-cd) Pyrene	250 U	250	5.88	
78-59-1	Isophorone	250 U	250	2.60	
91-20-3	Naphthalene	250 U	250	4.13	
98-95-3	Nitrobenzene	250 U	250	4.80	

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	250 U	250	4.94
86-30-6	**N-Nitroso-di-Phenylamine**	**700**	250	7.13
87-86-5	Pentachlorophenol	490 U	490	6.59
85-01-8	**Phenanthrene**	**9.0 J**	250	3.45
108-95-2	Phenol	250 U	250	5.94
129-00-0	**Pyrene**	**16 J**	250	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	67
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,1'-Biphenyl, bis(1-methylethyl)-	69009-90-1	66	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	400	E	NJ,+
2-Ethyl-hexanoic Acid	149-57-5	140	E	NJ,+
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	160	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	600	E	NJ,+
Erucylamide	112-84-5	440	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~560~~	~~E~~	~~+~~ 2/18/04
Triacetin	102-76-1	1000	E	NJ,+
Triphenyl Phosphate	115-86-6	200	E	NJ,+
Urea, N,N'-dimethyl-N,N'-diphenyl-	611-92-7	100	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	510 U	510	7.38
95-94-3	1,2,4,5-Tetrachloro-benzene	510 U	510	86.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	510 U	510	3.96
95-95-4	2,4,5-Trichlorophenol	510 U	510	10.0
88-06-2	2,4,6-Trichlorophenol	510 U	510	7.86
120-83-2	2,4-Dichlorophenol	510 U	510	10.6
105-67-9	2,4-Dimethylphenol	510 U	510	23.8
51-28-5	2,4-Dinitrophenol	980 U	980	9.60
121-14-2	**2,4-Dinitrotoluene**	**1500**	510	9.45
606-20-2	2,6-Dinitrotoluene	510 U	510	83.1
91-58-7	2-Chloronaphthalene	510 U	510	6.90
95-57-8	2-Chlorophenol	510 U	510	6.03
91-57-6	2-Methylnaphthalene	510 U	510	8.22
95-48-7	2-Methylphenol	510 U	510	14.5
88-74-4	2-Nitroaniline	510 U	510	13.8
88-75-5	2-Nitrophenol	510 U	510	5.10
91-94-1	3,3'-Dichlorobenzidine	510 U	510	166
99-09-2	3-Nitroaniline	510 U	510	54.9
534-52-1	4,6-Dinitro-2-Methylphenol	510 U	510	13.5
101-55-3	4-Bromophenyl Phenylether	510 U	510	10.1
59-50-7	**4-Chloro-3-Methylphenol**	**19 J**	510	15.6
106-47-8	4-Chloroaniline	510 U	510	3.78
7005-72-3	4-Chlorophenylphenyl-Ether	510 U	510	9.81
106-44-5	4-Methylphenol	510 U	510	19.1
100-01-6	4-Nitroaniline	510 U	510	21.8
100-02-7	4-Nitrophenol	980 U	980	8.49
83-32-9	Acenaphthene	510 U	510	5.16
208-96-8	Acenaphthylene	510 U	510	4.50
98-86-2	Acetophenone	510 U	510	5.70

UJ,C ✱ 2/18/04 ✱ 2/18/04

✱ Use only this result, ✱ 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	510 U	510	13.9
1912-24-9	Atrazine	510 U	510	20.6
100-52-7	Benzaldehyde	510 U	510	12.2
56-55-3	Benzo (a) Anthracene	510 U	510	39.9
50-32-8	Benzo (a) Pyrene	510 U	510	17.1
205-99-2	Benzo (b) Fluoranthene	510 U	510	29.3
191-24-2	Benzo (g,h,i,) Perylene	510 U	510	26.2
207-08-9	Benzo (k) Fluoranthene	510 U	510	40.2
111-91-1	Bis (2-Chloroethoxy)-Methane	510 U	510	9.42
111-44-4	Bis (2-Chloroethyl) Ether	510 U	510	5.19
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**320 J**	510	6.21
85-68-7	Butyl Benzyl Phthalate	510 U	510	13.4
105-60-2	Caprolactam	980 U	980	19.1
86-74-8	Carbazole	510 U	510	18.3
218-01-9	Chrysene	510 U	510	30.6
53-70-3	Dibenzo (a,h) Anthracene	510 U	510	17.7
132-64-9	Dibenzofuran	510 U	510	9.48
84-66-2	**Diethylphthalate**	**2400**	510	5.70
131-11-3	Dimethylphthalate	510 U	510	9.93
84-74-2	**Di-n-Butylphthalate**	**1900** J,f	510	11.5
117-84-0	Di-n-Octylphthalate	510 U	510	9.30
206-44-0	**Fluoranthene**	**21 J**	510	7.05
86-73-7	Fluorene	510 U	510	5.04
118-74-1	Hexachlorobenzene	510 U	510	7.53
87-68-3	Hexachlorobutadiene	510 U	510	11.6
77-47-4	Hexachlorocyclopentadiene	510 U UJ,c	510	5.94
67-72-1	Hexachloroethane	510 U	510	7.00
193-39-5	Indeno (1,2,3-cd) Pyrene	510 U	510	11.8
78-59-1	Isophorone	510 U	510	5.19
91-20-3	Naphthalene	510 U	510	8.25
98-95-3	Nitrobenzene	510 U	510	9.60

* Use only these results, AS 2/18/04

AS 2/18/04

AS 2/18/04

AS 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD8**	QC Batch:	90572 -114
Sample #:	**345888DL**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	510 U	510	9.87
86-30-6	**N-Nitroso-di-Phenylamine**	**820**	510	14.3
87-86-5	Pentachlorophenol	980 U	980	13.2
85-01-8	**Phenanthrene**	**8.0 J**	510	6.90
108-95-2	Phenol	510 U	510	11.9
129-00-0	**Pyrene**	**22 J**	510	4.44

Do not use See next analysis, TS 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	270 U		270	3.94
95-94-3	1,2,4,5-Tetrachloro-benzene	270 U		270	45.9
108-60-1	Bis (2-Chloroisopropyl)-Ether	270 U		270	2.11
95-95-4	2,4,5-Trichlorophenol	270 U		270	5.34
88-06-2	2,4,6-Trichlorophenol	270 U		270	4.19
120-83-2	2,4-Dichlorophenol	270 U		270	5.63
105-67-9	2,4-Dimethylphenol	270 U		270	12.7
51-28-5	2,4-Dinitrophenol	530 U	VJ,C	530	5.12
121-14-2	**2,4-Dinitrotoluene**	**65 J**		270	5.04
606-20-2	2,6-Dinitrotoluene	270 U		270	44.3
91-58-7	2-Chloronaphthalene	270 U		270	3.68
95-57-8	2-Chlorophenol	270 U		270	3.22
91-57-6	2-Methylnaphthalene	270 U		270	4.38
95-48-7	2-Methylphenol	270 U		270	7.74
88-74-4	2-Nitroaniline	270 U		270	7.36
88-75-5	2-Nitrophenol	270 U		270	2.72
91-94-1	3,3'-Dichlorobenzidine	270 U		270	88.6
99-09-2	3-Nitroaniline	270 U		270	29.3
534-52-1	4,6-Dinitro-2-Methylphenol	270 U		270	7.22
101-55-3	4-Bromophenyl Phenylether	270 U		270	5.41
59-50-7	**4-Chloro-3-Methylphenol**	**24 J**		270	8.34
106-47-8	4-Chloroaniline	270 U		270	2.02
7005-72-3	4-Chlorophenylphenyl-Ether	270 U		270	5.23
106-44-5	4-Methylphenol	270 U		270	10.2
100-01-6	4-Nitroaniline	270 U		270	11.6
100-02-7	4-Nitrophenol	530 U		530	4.53
83-32-9	**Acenaphthene**	**3.0 J**		270	2.75
208-96-8	Acenaphthylene	270 U		270	2.40
98-86-2	Acetophenone	270 U		270	3.04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	270 U	270	7.39
1912-24-9	Atrazine	270 U	270	11.0
100-52-7	Benzaldehyde	270 U	270	6.48
56-55-3	**Benzo (a) Anthracene**	**25 J**	270	21.3
50-32-8	**Benzo (a) Pyrene**	**21 J**	270	9.14
205-99-2	**Benzo (b) Fluoranthene**	**40 J**	270	15.6
191-24-2	Benzo (g,h,i,) Perylene	270 U	270	14.0
207-08-9	**Benzo (k) Fluoranthene**	**22 J**	270	21.4
111-91-1	Bis (2-Chloroethoxy)-Methane	270 U	270	5.02
111-44-4	Bis (2-Chloroethyl) Ether	270 U	270	2.77
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1000**	270	3.31
85-68-7	Butyl Benzyl Phthalate	270 U	270	7.17
105-60-2	Caprolactam	530 U	530	10.2
86-74-8	Carbazole	270 U	270	9.76
218-01-9	**Chrysene**	**24 J**	270	16.3
53-70-3	Dibenzo (a,h) Anthracene	270 U	270	9.44
132-64-9	Dibenzofuran	270 U	270	5.06
84-66-2	**Diethylphthalate**	**940**	270	3.04
131-11-3	Dimethylphthalate	270 U	270	5.30
84-74-2	**Di-n-Butylphthalate**	**650**	270	6.11
117-84-0	Di-n-Octylphthalate	270 U	270	4.96
206-44-0	**Fluoranthene**	**59 J**	270	3.76
86-73-7	**Fluorene**	**4.0 J**	270	2.69
118-74-1	Hexachlorobenzene	270 U	270	4.02
87-68-3	Hexachlorobutadiene	270 U	270	6.19
77-47-4	Hexachlorocyclopentadiene	270 U	270	3.17
67-72-1	Hexachloroethane	270 U	270	3.73
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**10 J**	270	6.27
78-59-1	Isophorone	270 U	270	2.77
91-20-3	**Naphthalene**	**15 J**	270	4.40
98-95-3	Nitrobenzene	270 U	270	5.12

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	270 U	270	5.26
86-30-6	**N-Nitroso-di-Phenylamine**	**480**	270	7.60
87-86-5	Pentachlorophenol	530 U	530	7.02
85-01-8	**Phenanthrene**	**52 J**	270	3.68
108-95-2	Phenol	270 U	270	6.34
129-00-0	**Pyrene**	**54 J**	270	2.37

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB12C**	QC Batch:	90572 -114
Sample #:	**345889**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	62
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,1'-Biphenyl, (1,1-dimethylethoxy)-	72101-19-0	360	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	460	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	250	E	NJ,+
Ether, bis(p-tert-butylphenyl)	24085-65-2	830	E	NJ,+
Triacetin	102-76-1	240	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U	VJ,c	430	4.16
121-14-2	**2,4-Dinitrotoluene**	**35 J**		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	**2-Methylnaphthalene**	**5.0 J**		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**9.0 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	**Acenaphthene**	**8.0 J**		220	2.24
208-96-8	**Acenaphthylene**	**2.0 J**		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**15 J**	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	**Benzo (a) Anthracene**	**51 J**	220	17.3
50-32-8	**Benzo (a) Pyrene**	**44 J**	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**78 J**	220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**25 J**	220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**28 J**	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**59 J**	220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**13 J**	220	5.82
105-60-2	Caprolactam	430 U	430	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	**Chrysene**	**57 J**	220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**93 J**	220	2.47
131-11-3	Dimethylphthalate	220 U	220	4.30
84-74-2	**Di-n-Butylphthalate**	**360**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**150 J**	220	3.06
86-73-7	**Fluorene**	**6.0 J**	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**22 J**	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	**Naphthalene**	**4.0 J**	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**200 J**	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**63 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**110 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11A**	QC Batch:	90572 -114
Sample #:	**345890**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	500	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	360	E	NJ,+
1-Heneicosanol	15594-90-8	220	E	NJ,+
Benzene, 2-methyl-1,3,5-trinitro-	118-96-7	280	E	NJ,+
Butyl Ester Octadecanioc	123-95-5	130	E	NJ,+
Erucylamide	112-84-5	140	E	B,X NJ,+
Ethanol, 2-(hexadecyloxy)-	2136-71-2	390	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~2200~~	~~E~~	AB 2/18/04
Stigmast-4-en-3-one	1058-61-3	140	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	190 U		190	2.71
95-94-3	1,2,4,5-Tetrachloro-benzene	190 U		190	31.6
108-60-1	Bis (2-Chloroisopropyl)-Ether	190 U		190	1.45
95-95-4	2,4,5-Trichlorophenol	190 U		190	3.67
88-06-2	2,4,6-Trichlorophenol	190 U		190	2.88
120-83-2	2,4-Dichlorophenol	190 U		190	3.87
105-67-9	2,4-Dimethylphenol	190 U		190	8.73
51-28-5	2,4-Dinitrophenol	380 U	UJ,c	380	3.52
121-14-2	**2,4-Dinitrotoluene**	**87 J**		190	3.47
606-20-2	**2,6-Dinitrotoluene**	**32 J**		190	30.5
91-58-7	2-Chloronaphthalene	190 U		190	2.53
95-57-8	2-Chlorophenol	190 U		190	2.21
91-57-6	2-Methylnaphthalene	190 U		190	3.01
95-48-7	2-Methylphenol	190 U		190	5.32
88-74-4	2-Nitroaniline	190 U		190	5.06
88-75-5	2-Nitrophenol	190 U		190	1.87
91-94-1	3,3'-Dichlorobenzidine	190 U		190	60.9
99-09-2	3-Nitroaniline	190 U		190	20.1
534-52-1	4,6-Dinitro-2-Methylphenol	190 U		190	4.96
101-55-3	4-Bromophenyl Phenylether	190 U		190	3.72
59-50-7	**4-Chloro-3-Methylphenol**	**13 J**		190	5.73
106-47-8	4-Chloroaniline	190 U		190	1.39
7005-72-3	4-Chlorophenylphenyl-Ether	190 U		190	3.60
106-44-5	4-Methylphenol	190 U		190	7.01
100-01-6	4-Nitroaniline	190 U		190	7.98
100-02-7	4-Nitrophenol	380 U		380	3.11
83-32-9	Acenaphthene	190 U		190	1.89
208-96-8	**Acenaphthylene**	**2.0 J**		190	1.65
98-86-2	Acetophenone	190 U		190	2.09

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	190 U	190	5.08
1912-24-9	Atrazine	190 U	190	7.57
100-52-7	Benzaldehyde	190 U	190	4.46
56-55-3	Benzo (a) Anthracene	190 U	190	14.6
50-32-8	**Benzo (a) Pyrene**	**7.0 J**	190	6.28
205-99-2	**Benzo (b) Fluoranthene**	**13 J**	190	10.7
191-24-2	Benzo (g,h,i,) Perylene	190 U	190	9.59
207-08-9	Benzo (k) Fluoranthene	190 U	190	14.7
111-91-1	Bis (2-Chloroethoxy)-Methane	190 U	190	3.45
111-44-4	Bis (2-Chloroethyl) Ether	190 U	190	1.90
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**380**	190	2.28
85-68-7	**Butyl Benzyl Phthalate**	**24 J**	190	4.93
105-60-2	Caprolactam	380 U	380	7.02
86-74-8	Carbazole	190 U	190	6.71
218-01-9	Chrysene	190 U	190	11.2
53-70-3	Dibenzo (a,h) Anthracene	190 U	190	6.49
132-64-9	Dibenzofuran	190 U	190	3.48
84-66-2	**Diethylphthalate**	**39 J**	190	2.09
131-11-3	**Dimethylphthalate**	**550**	190	3.64
84-74-2	**Di-n-Butylphthalate**	**600**	190	4.20
117-84-0	Di-n-Octylphthalate	190 U	190	3.41
206-44-0	**Fluoranthene**	**12 J**	190	2.59
86-73-7	Fluorene	190 U	190	1.85
118-74-1	Hexachlorobenzene	190 U	190	2.76
87-68-3	Hexachlorobutadiene	190 U	190	4.26
77-47-4	Hexachlorocyclopentadiene	190 U	190	2.18
67-72-1	Hexachloroethane	190 U	190	2.57
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**5.0 J**	190	4.31
78-59-1	Isophorone	190 U	190	1.90
91-20-3	Naphthalene	190 U	190	3.03
98-95-3	Nitrobenzene	190 U	190	3.52

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	190 U	190	3.62
86-30-6	**N-Nitroso-di-Phenylamine**	**950**	190	5.23
87-86-5	Pentachlorophenol	380 U	380	4.83
85-01-8	**Phenanthrene**	**9.0 J**	190	2.53
108-95-2	Phenol	190 U	190	4.36
129-00-0	**Pyrene**	**11 J**	190	1.63

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11B**	QC Batch:	90572 -114
Sample #:	**345891**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	88
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	430	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	150	E	NJ,+
Bis(2-ethylhexyl)maleate	142-16-5	120	E	NJ,+
Erucylamide	112-84-5	510	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~4500~~	~~E~~	~~A~~ 2/19/04
Triphenyl Phosphate	115-86-6	110	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U UJ,c	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	2-Methylnaphthalene	220 U	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	Acenaphthene	220 U	220	2.24
208-96-8	Acenaphthylene	220 U	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**14 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**24 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**17 J**		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**540**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**40 J**		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**16 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**6.0 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**320**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**16 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ,C	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**16 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**7.0 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**14 J**	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB11C**	QC Batch:	90572 -114
Sample #:	**345892**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	84-64-0	310	E	NJ,+
Bis(2-ethylhexyl)maleate	142-16-5	140	E	NJ,+
Erucylamide	112-84-5	180	E	BJX
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~4900~~	~~E~~	~~BJ~~ 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	240 U		240	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	240 U		240	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	240 U		240	1.85
95-95-4	2,4,5-Trichlorophenol	240 U		240	4.68
88-06-2	2,4,6-Trichlorophenol	240 U		240	3.67
120-83-2	2,4-Dichlorophenol	240 U		240	4.93
105-67-9	2,4-Dimethylphenol	240 U		240	11.1
51-28-5	2,4-Dinitrophenol	460 U	UJc	460	4.48
121-14-2	2,4-Dinitrotoluene	240 U		240	4.41
606-20-2	2,6-Dinitrotoluene	240 U		240	38.8
91-58-7	2-Chloronaphthalene	240 U		240	3.22
95-57-8	2-Chlorophenol	240 U		240	2.81
91-57-6	**2-Methylnaphthalene**	**4.0 J**		240	3.84
95-48-7	2-Methylphenol	240 U		240	6.78
88-74-4	2-Nitroaniline	240 U		240	6.44
88-75-5	2-Nitrophenol	240 U		240	2.38
91-94-1	3,3'-Dichlorobenzidine	240 U		240	77.6
99-09-2	3-Nitroaniline	240 U		240	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	240 U		240	6.31
101-55-3	4-Bromophenyl Phenylether	240 U		240	4.73
59-50-7	**4-Chloro-3-Methylphenol**	**15 J**		240	7.29
106-47-8	4-Chloroaniline	240 U		240	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	240 U		240	4.58
106-44-5	4-Methylphenol	240 U		240	8.92
100-01-6	4-Nitroaniline	240 U		240	10.2
100-02-7	4-Nitrophenol	460 U		460	3.96
83-32-9	**Acenaphthene**	**9.0 J**		240	2.41
208-96-8	**Acenaphthylene**	**4.0 J**		240	2.10
98-86-2	Acetophenone	240 U		240	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**26 J**	240	6.47
1912-24-9	Atrazine	240 U	240	9.63
100-52-7	Benzaldehyde	240 U	240	5.67
56-55-3	**Benzo (a) Anthracene**	**89 J**	240	18.6
50-32-8	**Benzo (a) Pyrene**	**72 J**	240	7.99
205-99-2	**Benzo (b) Fluoranthene**	**120 J**	240	13.7
191-24-2	**Benzo (g,h,i,) Perylene**	**34 J**	240	12.2
207-08-9	**Benzo (k) Fluoranthene**	**49 J**	240	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	240 U	240	4.40
111-44-4	Bis (2-Chloroethyl) Ether	240 U	240	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**450**	240	2.90
85-68-7	**Butyl Benzyl Phthalate**	**38 J**	240	6.27
105-60-2	Caprolactam	460 U	460	8.93
86-74-8	Carbazole	240 U	240	8.54
218-01-9	**Chrysene**	**120 J**	240	14.3
53-70-3	Dibenzo (a,h) Anthracene	240 U	240	8.26
132-64-9	**Dibenzofuran**	**6.0 J**	240	4.42
84-66-2	**Diethylphthalate**	**110 J**	240	2.66
131-11-3	**Dimethylphthalate**	**140 J**	240	4.63
84-74-2	**Di-n-Butylphthalate**	**470**	240	5.35
117-84-0	Di-n-Octylphthalate	240 U	240	4.34
206-44-0	**Fluoranthene**	**350**	240	3.29
86-73-7	**Fluorene**	**12 J**	240	2.35
118-74-1	Hexachlorobenzene	240 U	240	3.51
87-68-3	Hexachlorobutadiene	240 U	240	5.42
77-47-4	Hexachlorocyclopentadiene	240 U	240	2.77
67-72-1	Hexachloroethane	240 U	240	3.27
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**32 J**	240	5.49
78-59-1	Isophorone	240 U	240	2.42
91-20-3	Naphthalene	240 U	240	3.85
98-95-3	Nitrobenzene	240 U	240	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	240 U	240	4.61
86-30-6	N-Nitroso-di-Phenylamine	240 U	240	6.65
87-86-5	Pentachlorophenol	460 U	460	6.15
85-01-8	**Phenanthrene**	**170 J**	240	3.22
108-95-2	Phenol	240 U	240	5.54
129-00-0	**Pyrene**	**260**	240	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10A**	QC Batch:	90572 -114
Sample #:	**345893**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	71
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	2400	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	530	E	NJ,+
4,4,6a,6b,8a,11,11,14b-Octamethyl-1,4,4a,5,6,6a,6b	1000194624 1000019-46-24	710	E	NJ,+
Cholesterol	57-88-5	470	E	NJ,+
Erucylamide	112-84-5	400	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~5000~~	~~E~~	~~dh 2/18/04~~
Vitamin E	10191-41-0	600	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U	220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U	220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U	220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U	220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U	220	3.41
120-83-2	2,4-Dichlorophenol	220 U	220	4.58
105-67-9	2,4-Dimethylphenol	220 U	220	10.3
51-28-5	2,4-Dinitrophenol	430 U UJ,c	430	4.16
121-14-2	**2,4-Dinitrotoluene**	**51 J**	220	4.10
606-20-2	2,6-Dinitrotoluene	220 U	220	36.0
91-58-7	2-Chloronaphthalene	220 U	220	2.99
95-57-8	2-Chlorophenol	220 U	220	2.61
91-57-6	**2-Methylnaphthalene**	**4.0 J**	220	3.56
95-48-7	2-Methylphenol	220 U	220	6.29
88-74-4	2-Nitroaniline	220 U	220	5.98
88-75-5	2-Nitrophenol	220 U	220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U	220	72.0
99-09-2	3-Nitroaniline	220 U	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U	220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U	220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U	220	6.77
106-47-8	4-Chloroaniline	220 U	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U	220	4.25
106-44-5	4-Methylphenol	220 U	220	8.28
100-01-6	4-Nitroaniline	220 U	220	9.43
100-02-7	4-Nitrophenol	430 U	430	3.68
83-32-9	**Acenaphthene**	**4.0 J**	220	2.24
208-96-8	**Acenaphthylene**	**6.0 J**	220	1.95
98-86-2	Acetophenone	220 U	220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**16 J**	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	**Benzo (a) Anthracene**	**73 J**	220	17.3
50-32-8	**Benzo (a) Pyrene**	**95 J**	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**150 J**	220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**60 J**	220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**64 J**	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**200 J**	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U	220	5.82
105-60-2	Caprolactam	430 U	430	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	**Chrysene**	**100 J**	220	13.3
53-70-3	**Dibenzo (a,h) Anthracene**	**16 J**	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**240**	220	2.47
131-11-3	Dimethylphthalate	220 U	220	4.30
84-74-2	**Di-n-Butylphthalate**	**470**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**90 J**	220	3.06
86-73-7	**Fluorene**	**4.0 J**	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**54 J**	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	Naphthalene	220 U	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**120 J**	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**43 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**83 J**	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10B**	QC Batch:	90572 -114
Sample #:	**345894**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	47	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	150	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	71	E	NJ,+
Erucylamide	112-84-5	900	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~150~~	~~E~~	

AS 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	450 U	UJ,C	450	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U		230	7.29
106-47-8	4-Chloroaniline	230 U		230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	450 U		450	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	**Acenaphthylene**	**6.0 J**		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**22 J**	230	6.47
1912-24-9	Atrazine	230 U	230	9.63
100-52-7	Benzaldehyde	230 U	230	5.67
56-55-3	**Benzo (a) Anthracene**	**50 J**	230	18.6
50-32-8	**Benzo (a) Pyrene**	**82 J**	230	7.99
205-99-2	**Benzo (b) Fluoranthene**	**140 J**	230	13.7
191-24-2	**Benzo (g,h,i,) Perylene**	**46 J**	230	12.2
207-08-9	**Benzo (k) Fluoranthene**	**48 J**	230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U	230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U	230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**31 J**	230	2.90
85-68-7	**Butyl Benzyl Phthalate**	**9.0 J**	230	6.27
105-60-2	Caprolactam	450 U	450	8.93
86-74-8	Carbazole	230 U	230	8.54
218-01-9	**Chrysene**	**83 J**	230	14.3
53-70-3	**Dibenzo (a,h) Anthracene**	**13 J**	230	8.26
132-64-9	Dibenzofuran	230 U	230	4.42
84-66-2	**Diethylphthalate**	**71 J**	230	2.66
131-11-3	Dimethylphthalate	230 U	230	4.63
84-74-2	**Di-n-Butylphthalate**	**450**	230	5.35
117-84-0	Di-n-Octylphthalate	230 U	230	4.34
206-44-0	**Fluoranthene**	**29 J**	230	3.29
86-73-7	Fluorene	230 U	230	2.35
118-74-1	Hexachlorobenzene	230 U	230	3.51
87-68-3	Hexachlorobutadiene	230 U	230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U	230	2.77
67-72-1	Hexachloroethane	230 U	230	3.27
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**45 J**	230	5.49
78-59-1	Isophorone	230 U	230	2.42
91-20-3	Naphthalene	230 U	230	3.85
98-95-3	Nitrobenzene	230 U	230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	450 U	450	6.15
85-01-8	**Phenanthrene**	**14 J**	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	**Pyrene**	**29 J**	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB10C**	QC Batch:	90572 -114
Sample #:	**345895**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	530	E	NJ,+
Erucylamide	112-84-5	180	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1800~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,C	420	4.16
121-14-2	**2,4-Dinitrotoluene**	**220**		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**25 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	**Acenaphthene**	**10 J**		220	2.24
208-96-8	**Acenaphthylene**	**7.0 J**		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	**Anthracene**	**25 J**	220	6.01
1912-24-9	Atrazine	220 U	220	8.94
100-52-7	Benzaldehyde	220 U	220	5.27
56-55-3	**Benzo (a) Anthracene**	**200 J**	220	17.3
50-32-8	**Benzo (a) Pyrene**	**140 J**	220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**240**	220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**46 J**	220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**93 J**	220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U	220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U	220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**43 J**	220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U	220	5.82
105-60-2	Caprolactam	420 U	420	8.29
86-74-8	Carbazole	220 U	220	7.93
218-01-9	**Chrysene**	**220**	220	13.3
53-70-3	**Dibenzo (a,h) Anthracene**	**13 J**	220	7.67
132-64-9	Dibenzofuran	220 U	220	4.11
84-66-2	**Diethylphthalate**	**230**	220	2.47
131-11-3	**Dimethylphthalate**	**18 J**	220	4.30
84-74-2	**Di-n-Butylphthalate**	**580**	220	4.97
117-84-0	Di-n-Octylphthalate	220 U	220	4.03
206-44-0	**Fluoranthene**	**260**	220	3.06
86-73-7	**Fluorene**	**6.0 J**	220	2.18
118-74-1	Hexachlorobenzene	220 U	220	3.26
87-68-3	Hexachlorobutadiene	220 U	220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	220	2.57
67-72-1	Hexachloroethane	220 U	220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**43 J**	220	5.10
78-59-1	Isophorone	220 U	220	2.25
91-20-3	Naphthalene	220 U	220	3.58
98-95-3	Nitrobenzene	220 U	220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**25 J**	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	**Phenanthrene**	**79 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**230**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9A**	QC Batch:	90572 -114
Sample #:	**345896**	Anal. Batch:	208911
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	160	E	NJ+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	670	E	NJ+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	75	E	NJ+
Erucylamide	112-84-5	570	E	NJ+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~780~~	~~E~~	

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U		210	9.53
51-28-5	2,4-Dinitrophenol	410 U	UJ,C	410	3.84
121-14-2	**2,4-Dinitrotoluene**	**23 J**		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	**4-Chloro-3-Methylphenol**	**8.0 J**		210	6.25
106-47-8	4-Chloroaniline	210 U		210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U		410	3.40
83-32-9	**Acenaphthene**	**7.0 J**		210	2.06
208-96-8	**Acenaphthylene**	**3.0 J**		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**18 J**		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	**Benzo (a) Anthracene**	**140 J**		210	16.0
50-32-8	**Benzo (a) Pyrene**	**120 J**		210	6.85
205-99-2	**Benzo (b) Fluoranthene**	**170 J**		210	11.7
191-24-2	**Benzo (g,h,i,) Perylene**	**58 J**		210	10.5
207-08-9	**Benzo (k) Fluoranthene**	**85 J**		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**33 J**		210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U		410	7.66
86-74-8	**Carbazole**	**37 J**		210	7.32
218-01-9	**Chrysene**	**160 J**		210	12.2
53-70-3	**Dibenzo (a,h) Anthracene**	**18 J**		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**44 J**		210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**430**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**190 J**		210	2.82
86-73-7	**Fluorene**	**4.0 J**		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U	UJ,C	210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**52 J**		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	**N-Nitroso-di-Phenylamine**	**46 J**	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	**Phenanthrene**	**60 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**170 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD9**	QC Batch:	90572 -114
Sample #:	**345897**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	45	E	BX
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~820~~	~~E~~	
Stigmasterol, 22,23-dihydro-	1000214207 100021-42-07	160	E	NJ+
Urea, N,N'-dimethyl-N,N'-diphenyl-	611-92-7	48	E	NJ+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U		230	11.1
51-28-5	2,4-Dinitrophenol	450 U	VJC	450	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U		230	77.6
99-09-2	3-Nitroaniline	230 U		230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U		230	7.29
106-47-8	4-Chloroaniline	230 U		230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U		230	10.2
100-02-7	4-Nitrophenol	450 U		450	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	**Benzo (a) Anthracene**	**22 J**		230	18.6
50-32-8	**Benzo (a) Pyrene**	**22 J**		230	7.99
205-99-2	**Benzo (b) Fluoranthene**	**25 J**		230	13.7
191-24-2	**Benzo (g,h,i,) Perylene**	**15 J**		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**24 J**		230	2.90
85-68-7	Butyl Benzyl Phthalate	230 U		230	6.27
105-60-2	Caprolactam	450 U		450	8.93
86-74-8	Carbazole	230 U		230	8.54
218-01-9	**Chrysene**	**30 J**		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**8.0 J**		230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**270**		230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	**Fluoranthene**	**37 J**		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U	UJ,c	230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**10 J**		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	450 U	450	6.15
85-01-8	**Phenanthrene**	**17 J**	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	**Pyrene**	**33 J**	230	2.07

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9B**	QC Batch:	90572 -114
Sample #:	**345898**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	83	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	420	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	45	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1000~~	~~E~~	~~✓~~ 2/18/04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,c	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**15 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**3.0 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**180 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ,c	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**3.0 J**	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB9C**	QC Batch:	90572 -114
Sample #:	**345899**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	350	E
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~300~~	~~E~~

NJ+

~~AS~~ 2-18-04

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	430 U	UJ,C	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	**2-Methylnaphthalene**	**22 J**		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	**Acenaphthene**	**19 J**		220	2.24
208-96-8	**Acenaphthylene**	**2.0 J**		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**37 J**		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	**Benzo (a) Anthracene**	**100 J**		220	17.3
50-32-8	**Benzo (a) Pyrene**	**120 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**180 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**72 J**		220	11.3
207-08-9	**Benzo (k) Fluoranthene**	**68 J**		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**35 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**140 J**		220	13.3
53-70-3	**Dibenzo (a,h) Anthracene**	**18 J**		220	7.67
132-64-9	**Dibenzofuran**	**13 J**		220	4.11
84-66-2	**Diethylphthalate**	**33 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**62 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**370**		220	3.06
86-73-7	**Fluorene**	**20 J**		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ,c	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**73 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	**Naphthalene**	**10 J**		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	**N-Nitroso-di-Phenylamine**	**21 J**	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	**Phenanthrene**	**130 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**260**	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB8A**	QC Batch:	90572 -114
Sample #:	**345900**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	780	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	120	E	NJ,+
Cholesterol	57-88-5	120	E	NJ,+
Erucylamide	112-84-5	220	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~2600~~	~~E~~	* 2/18/04
Stigmast-4-en-3-one	1058-61-3	240	E	NJ,+
Taraxerol	127-22-0	290	E	NJ,+
Vitamin E	10191-41-0	160	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U		220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,C	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	**4-Chloro-3-Methylphenol**	**24 J**		220	6.77
106-47-8	4-Chloroaniline	220 U		220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	**Benzo (a) Pyrene**	**21 J**		220	7.42
205-99-2	**Benzo (b) Fluoranthene**	**36 J**		220	12.7
191-24-2	**Benzo (g,h,i,) Perylene**	**14 J**		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**190 J**		220	2.69
85-68-7	**Butyl Benzyl Phthalate**	**6.0 J**		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U		220	7.93
218-01-9	**Chrysene**	**25 J**		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**40 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**190 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	**Fluoranthene**	**35 J**		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U	UJ/C	220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**12 J**		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	**Phenanthrene**	**10 J**	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	**Pyrene**	**32 J**	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/02/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SB8B**	QC Batch:	90572 -114
Sample #:	**345901**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
.Gamma.-sitosterol	83-47-6	76	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	320	E	NJ,+
9-Octadecenoic acid, (E)-	112-79-8	74	E	NJ,+
Erucylamide	112-84-5	890	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~990~~	~~E~~	
Tetradecanamide	638-58-4	60	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB2A**	QC Batch:	90834 -115
Sample #:	**345745**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	250 U	250	13.9
120-12-7	Anthracene	25 U	25	0.840
56-55-3	**Benzo (a) Anthracene**	**2.9 J**	25	0.960
50-32-8	Benzo (a) Pyrene	25 U	25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U	25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U	25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U	25	1.20
218-01-9	**Chrysene**	**2.9 J**	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	25	1.68
206-44-0	**Fluoranthene**	**18 J**	25	2.04
86-73-7	Fluorene	25 U	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U	25	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	**Phenanthrene**	**7.2 J**	25	0.720
129-00-0	**Pyrene**	**13 J**	25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**69SB2B**	QC Batch:	90834 -115
Sample #:	**345746**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U VLS	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	Benzo (a) Anthracene	27 U	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	Chrysene	27 U	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	Fluoranthene	27 U	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	27 U	27	0.780
129-00-0	Pyrene	27 U	27	1.17

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**69SB2C**	QC Batch:	90834 -115
Sample #:	**345747**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	75
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U VL,S	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**57SB4B**	QC Batch:	90834 -115
Sample #:	**345748**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	74
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	280 U	280	16.2
120-12-7	Anthracene	28 U	28	0.980
56-55-3	Benzo (a) Anthracene	28 U	28	1.12
50-32-8	Benzo (a) Pyrene	28 U	28	1.40
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.82
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	17.5
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.40
218-01-9	Chrysene	28 U	28	1.68
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.96
206-44-0	Fluoranthene	28 U	28	2.38
86-73-7	Fluorene	28 U	28	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	28 U	28	0.840
129-00-0	Pyrene	28 U	28	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB7A**	QC Batch:	90834 -115
Sample #:	**345883**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	260 U	260	13.9
120-12-7	Anthracene	26 U	26	0.840
56-55-3	**Benzo (a) Anthracene**	**2.1 J**	26	0.960
50-32-8	Benzo (a) Pyrene	26 U	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.20
218-01-9	**Chrysene**	**2.6 J**	26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.68
206-44-0	**Fluoranthene**	**5.0 J**	26	2.04
86-73-7	Fluorene	26 U	26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	**Phenanthrene**	**2.1 J**	26	0.720
129-00-0	**Pyrene**	**3.6 J**	26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/15/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB7B**	QC Batch:	90834 -115
Sample #:	**345884**	Anal. Batch:	209212
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	260 U	260	15.1
120-12-7	**Anthracene**	**1.0 J**	26	0.910
56-55-3	**Benzo (a) Anthracene**	**3.9 J**	26	1.04
50-32-8	Benzo (a) Pyrene	26 U	26	1.30
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.69
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	16.3
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.30
218-01-9	**Chrysene**	**6.5 J**	26	1.56
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.82
206-44-0	**Fluoranthene**	**3.3 J**	26	2.21
86-73-7	Fluorene	26 U	26	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**1.8 J**	26	0.780
129-00-0	**Pyrene**	**3.0 J**	26	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB7C**	QC Batch:	91080 -118
Sample #:	**345885**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	79
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	Benzo (a) Anthracene	27 U	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	Chrysene	27 U	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	Fluoranthene	27 U	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	27 U	27	0.780
129-00-0	Pyrene	27 U	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB12A**	QC Batch:	91080 -118
Sample #:	**345886**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	**Benzo (a) Anthracene**	**3.8 J**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**6.5 J**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**4.9 J**	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	**Chrysene**	**2.4 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**9.2 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**5.9 J**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**2.5 J**	27	0.780
129-00-0	**Pyrene**	**6.4 J**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB12B**	QC Batch:	91080 -118
Sample #:	**345887**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	300 U	300	16.2
120-12-7	Anthracene	30 U	30	0.980
56-55-3	**Benzo (a) Anthracene**	**1.7 J**	30	1.12
50-32-8	Benzo (a) Pyrene	30 U	30	1.40
205-99-2	Benzo (b) Fluoranthene	30 U	30	1.82
191-24-2	Benzo (g,h,i,) Perylene	30 U	30	17.5
207-08-9	Benzo (k) Fluoranthene	30 U	30	1.40
218-01-9	Chrysene	30 U	30	1.68
53-70-3	Dibenzo (a,h) Anthracene	30 U	30	1.96
206-44-0	**Fluoranthene**	**7.4 J**	30	2.38
86-73-7	Fluorene	30 U	30	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	30 U	30	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**2.2 J**	30	0.840
129-00-0	**Pyrene**	**3.9 J**	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD8**	QC Batch:	91080 -118
Sample #:	**345888**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	67
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.1
208-96-8	Acenaphthylene	310 U	310	17.4
120-12-7	Anthracene	31 U	31	1.05
56-55-3	**Benzo (a) Anthracene**	**6.4 J**	31	1.20
50-32-8	**Benzo (a) Pyrene**	**8.0 J**	31	1.50
205-99-2	**Benzo (b) Fluoranthene**	**6.7 J**	31	1.95
191-24-2	**Benzo (g,h,i,) Perylene**	**21 J**	31	18.8
207-08-9	Benzo (k) Fluoranthene	31 U	31	1.50
218-01-9	**Chrysene**	**6.7 J**	31	1.80
53-70-3	Dibenzo (a,h) Anthracene	31 U	31	2.10
206-44-0	**Fluoranthene**	**16 J**	31	2.55
86-73-7	Fluorene	31 U	31	1.95
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**6.8 J**	31	1.05
91-20-3	Naphthalene	150 U	150	11.9
85-01-8	**Phenanthrene**	**2.7 J**	31	0.900
129-00-0	**Pyrene**	**10 J**	31	1.35

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB12C**	QC Batch:	91080 -118
Sample #:	**345889**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	62
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	160 U	160	15.0
208-96-8	Acenaphthylene	340 U	340	18.6
120-12-7	**Anthracene**	**11 J**	34	1.12
56-55-3	**Benzo (a) Anthracene**	**32 J**	34	1.28
50-32-8	Benzo (a) Pyrene	34 U	34	1.60
205-99-2	Benzo (b) Fluoranthene	34 U	34	2.08
191-24-2	**Benzo (g,h,i,) Perylene**	**37**	34	20.0
207-08-9	Benzo (k) Fluoranthene	34 U	34	1.60
218-01-9	Chrysene	34 U	34	1.92
53-70-3	Dibenzo (a,h) Anthracene	34 U	34	2.24
206-44-0	**Fluoranthene**	**130**	34	2.72
86-73-7	Fluorene	34 U	34	2.08
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**17 J**	34	1.12
91-20-3	Naphthalene	160 U	160	12.6
85-01-8	**Phenanthrene**	**80**	34	0.960
129-00-0	**Pyrene**	**99**	34	1.44

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB11A**	QC Batch:	91080 -118
Sample #:	**345890**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**6.6 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**31**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**45**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**32**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**82**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**20 J**	27	1.30
218-01-9	**Chrysene**	**37**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**73**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**37**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**26 J**	27	0.780
129-00-0	**Pyrene**	**59**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB11B**	QC Batch:	91080 -118
Sample #:	**345891**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	88
Unit:	ug/kg dry	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	110 U	UL,S	110	10.3
208-96-8	Acenaphthylene	240 U	↓	240	12.8
120-12-7	**Anthracene**	**8.7 J**	L,S	24	0.770
56-55-3	**Benzo (a) Anthracene**	**24**		24	0.880
50-32-8	**Benzo (a) Pyrene**	**33**		24	1.10
205-99-2	**Benzo (b) Fluoranthene**	**21 J**		24	1.43
191-24-2	**Benzo (g,h,i,) Perylene**	**77**		24	13.8
207-08-9	**Benzo (k) Fluoranthene**	**15 J**		24	1.10
218-01-9	**Chrysene**	**40**		24	1.32
53-70-3	Dibenzo (a,h) Anthracene	24 U	UL,S	24	1.54
206-44-0	Fluoranthene	24 U	↓	24	1.87
86-73-7	**Fluorene**	**12 J**	L,S	24	1.43
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**21 J**	↓	24	0.770
91-20-3	Naphthalene	110 U	UL,S	110	8.69
85-01-8	**Phenanthrene**	**110**	L,S	24	0.660
129-00-0	**Pyrene**	**79**	↓	24	0.990

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB11C**	QC Batch:	91080 -118
Sample #:	**345892**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**1.1 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**4.1 J**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**13 J**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**8.8 J**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**46**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**4.5 J**	27	1.30
218-01-9	**Chrysene**	**7.6 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**6.5 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**16 J**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**3.4 J**	27	0.780
129-00-0	**Pyrene**	**5.6 J**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB10A**	QC Batch:	91080 -118
Sample #:	**345893**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	71
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	**Acenaphthene**	**14 J**	140	13.2
208-96-8	Acenaphthylene	300 U	300	16.2
120-12-7	**Anthracene**	**38**	30	0.980
56-55-3	**Benzo (a) Anthracene**	**140**	30	1.12
50-32-8	**Benzo (a) Pyrene**	**190**	30	1.40
205-99-2	**Benzo (b) Fluoranthene**	**140**	30	1.82
191-24-2	**Benzo (g,h,i,) Perylene**	**260**	30	17.5
207-08-9	**Benzo (k) Fluoranthene**	**80**	30	1.40
218-01-9	**Chrysene**	**150**	30	1.68
53-70-3	**Dibenzo (a,h) Anthracene**	**5.2 J**	30	1.96
206-44-0	**Fluoranthene**	**470**	30	2.38
86-73-7	**Fluorene**	**17 J**	30	1.82
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**130**	30	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**210**	30	0.840
129-00-0	**Pyrene**	**320**	30	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**13SB10B**	QC Batch:	91080 -118
Sample #:	**345894**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**14 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**56**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**130**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**91**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**290**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**52**	27	1.30
218-01-9	**Chrysene**	**80**	27	1.56
53-70-3	**Dibenzo (a,h) Anthracene**	**8.0 J**	27	1.82
206-44-0	**Fluoranthene**	**64**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**110**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**27**	27	0.780
129-00-0	**Pyrene**	**50**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB10C**	QC Batch:	91080 -118
Sample #:	**345895**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	290 U	290	16.2
120-12-7	**Anthracene**	**6.1 J**	29	0.980
56-55-3	**Benzo (a) Anthracene**	**18 J**	29	1.12
50-32-8	**Benzo (a) Pyrene**	**59**	29	1.40
205-99-2	**Benzo (b) Fluoranthene**	**47**	29	1.82
191-24-2	**Benzo (g,h,i,) Perylene**	**140**	29	17.5
207-08-9	**Benzo (k) Fluoranthene**	**20 J**	29	1.40
218-01-9	**Chrysene**	**33**	29	1.68
53-70-3	**Dibenzo (a,h) Anthracene**	**5.3 J**	29	1.96
206-44-0	**Fluoranthene**	**12 J**	29	2.38
86-73-7	Fluorene	29 U	29	1.82
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**58**	29	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**7.0 J**	29	0.840
129-00-0	**Pyrene**	**9.5 J**	29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB9A**	QC Batch:	91080 -118
Sample #:	**345896**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	**Acenaphthene**	**17**	**J**	130	12.2
208-96-8	Acenaphthylene	270	U	270	15.1
120-12-7	**Anthracene**	**38**		27	0.910
56-55-3	**Benzo (a) Anthracene**	**130**		27	1.04
50-32-8	**Benzo (a) Pyrene**	**170**		27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**120**		27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**540**	J,f	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**77**		27	1.30
218-01-9	**Chrysene**	**150**		27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27	U	27	1.82
206-44-0	**Fluoranthene**	**290**	J,f	27	2.21
86-73-7	**Fluorene**	**11**	**J**	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**100**		27	0.910
91-20-3	Naphthalene	130	U	130	10.3
85-01-8	**Phenanthrene**	**130**		27	0.780
129-00-0	**Pyrene**	**240**	J,f	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SBD9**	QC Batch:	91080 -118
Sample #:	**345897**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	130 U		130	12.2
208-96-8	Acenaphthylene	260 U		260	15.1
120-12-7	**Anthracene**	**15 J**		26	0.910
56-55-3	**Benzo (a) Anthracene**	**61**		26	1.04
50-32-8	**Benzo (a) Pyrene**	**73**		26	1.30
205-99-2	**Benzo (b) Fluoranthene**	**56**		26	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**240**	J,f	26	16.3
207-08-9	**Benzo (k) Fluoranthene**	**36**		26	1.30
218-01-9	**Chrysene**	**74**		26	1.56
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.82
206-44-0	**Fluoranthene**	**120**	J,f	26	2.21
86-73-7	Fluorene	26 U		26	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**46**		26	0.910
91-20-3	Naphthalene	130 U		130	10.3
85-01-8	**Phenanthrene**	**50**		26	0.780
129-00-0	**Pyrene**	**110**	J,f	26	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB9B**	QC Batch:	91080 -118
Sample #:	**345898**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	290 U	290	16.2
120-12-7	**Anthracene**	**4.2 J**	29	0.980
56-55-3	**Benzo (a) Anthracene**	**12 J**	29	1.12
50-32-8	**Benzo (a) Pyrene**	**15 J**	29	1.40
205-99-2	**Benzo (b) Fluoranthene**	**10 J**	29	1.82
191-24-2	Benzo (g,h,i,) Perylene	29 U	29	17.5
207-08-9	**Benzo (k) Fluoranthene**	**6.0 J**	29	1.40
218-01-9	**Chrysene**	**15 J**	29	1.68
53-70-3	Dibenzo (a,h) Anthracene	29 U	29	1.96
206-44-0	**Fluoranthene**	**30**	29	2.38
86-73-7	Fluorene	29 U	29	1.82
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**9.4 J**	29	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	**Phenanthrene**	**14 J**	29	0.840
129-00-0	**Pyrene**	**27 J**	29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB9C**	QC Batch:	91080 -118
Sample #:	**345899**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	**Benzo (a) Anthracene**	**1.4 J**	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	**Chrysene**	**1.7 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**3.8 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**1.8 J**	27	0.780
129-00-0	**Pyrene**	**5.1 J**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB8A**	QC Batch:	91080 -118
Sample #:	**345900**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	**Anthracene**	**12 J**	27	0.910
56-55-3	**Benzo (a) Anthracene**	**49**	27	1.04
50-32-8	**Benzo (a) Pyrene**	**71**	27	1.30
205-99-2	**Benzo (b) Fluoranthene**	**54**	27	1.69
191-24-2	**Benzo (g,h,i,) Perylene**	**120**	27	16.3
207-08-9	**Benzo (k) Fluoranthene**	**32**	27	1.30
218-01-9	**Chrysene**	**57**	27	1.56
53-70-3	**Dibenzo (a,h) Anthracene**	**2.3 J**	27	1.82
206-44-0	**Fluoranthene**	**120**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**53**	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**43**	27	0.780
129-00-0	**Pyrene**	**97**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SB8B**	QC Batch:	91080 -118
Sample #:	**345901**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	**Benzo (a) Anthracene**	**3.1 J**	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	**Chrysene**	**3.5 J**	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	**Fluoranthene**	**7.9 J**	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**2.9 J**	27	0.780
129-00-0	**Pyrene**	**8.8 J**	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB2A**	QC Batch:	90508 -116
Sample #:	**345745**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	83
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**69SB2B**	QC Batch:	90508 -116
Sample #:	**345746**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	79
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**69SB2C**	QC Batch:	90508 -116
Sample #:	**345747**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	75
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	VJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**57SB4B**	QC Batch:	90508 -116
Sample #:	**345748**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	74
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB7A**	QC Batch:	90508 -116
Sample #:	**345883**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	82
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB7B**	QC Batch:	90508 -116
Sample #:	**345884**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB7C**	QC Batch:	90908 -121
Sample #:	**345885**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	79
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB12A**	QC Batch:	90908 -121
Sample #:	**345886**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.27 J**		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.39 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB12B**	QC Batch:	90908 -121
Sample #:	**345887**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.55**		0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.19 J**		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	VJ/C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	**Hexahydro-1,3,5-trinitro-1,3,5-triazine**	**0.29 J**	J/C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**SBD8**	QC Batch:	90908 -121
Sample #:	**345888**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	67
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	**1,3-Dinitrobenzene**	**0.32 J**		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.56**		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB12C**	QC Batch:	90908 -121
Sample #:	**345889**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	62
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.54**		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB11A**	QC Batch:	90908 -121
Sample #:	**345890**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	**2,4,6-Trinitrotoluene**	**0.43 J**		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB11B**	QC Batch:	90908 -121
Sample #:	**345891**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	88
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB11C**	QC Batch:	90908 -121
Sample #:	**345892**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB10A**	QC Batch:	90908 -121
Sample #:	**345893**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	71
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/23/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB10B**	QC Batch:	90908 -121
Sample #:	**345894**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB10C**	QC Batch:	90908 -121
Sample #:	**345895**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	73
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB9A**	QC Batch:	90908 -121
Sample #:	**345896**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD9**	QC Batch:	90908 -121
Sample #:	**345897**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB9B**	QC Batch:	90908 -121
Sample #:	**345898**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	73
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,C	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,C	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SB9C**	QC Batch:	90908 -121
Sample #:	**345899**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U		0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U		0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U		0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U		0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U		1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U		0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U		1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	UJ,c	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U		0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U		1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.229
98-95-3	Nitrobenzene	0.50 U		0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	UJ,c	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U		1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB8A**	QC Batch:	90908 -121
Sample #:	**345900**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SB8B**	QC Batch:	90908 -121
Sample #:	**345901**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	78
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**69SB2A**	QC Batch:	90181 -116
Sample #:	**345745**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	24 U	24	0.286
72-55-9	4,4'-DDE	24 U	24	0.210
50-29-3	4,4'-DDT	24 U	24	0.216
309-00-2	**Aldrin**	**0.11 J**	24	0.365
319-84-6	Alpha-BHC	24 U	24	0.364
57-74-9	A-Chlordane	24 U	24	0.521
5103-74-2	G-Chlordane	24 U	24	0.844
319-85-7	Beta-BHC	24 U	24	1.36
319-86-8	**Delta-BHC**	**2.5 J**	24	0.982
60-57-1	Dieldrin	24 U	24	0.371
115-29-7	Endosulfan I	24 U	24	1.09
33213-65-9	Endosulfan II	24 U	24	0.257
1031-07-8	Endosulfan Sulfate	24 U	24	0.604
72-20-8	Endrin	24 U	24	0.358
7421-93-4	Endrin Aldehyde	24 U	24	1.33
53494-70-5	Endrin Ketone	24 U	24	0.330
58-89-9	Lindane	24 U	24	0.233
76-44-8	Heptachlor	24 U	24	0.846
1024-57-3	Heptachlor Epoxide	24 U	24	0.546
72-43-5	Methoxychlor	24 U	24	0.336
8001-35-2	Toxaphene	200 U	200	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**13SB9A**	QC Batch:	90181 -116
Sample #:	**345896**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	26 U	26	0.309
72-55-9	4,4'-DDE	26 U	26	0.228
50-29-3	4,4'-DDT	26 U	26	0.234
309-00-2	Aldrin	26 U	26	0.395
319-84-6	Alpha-BHC	26 U	26	0.394
57-74-9	A-Chlordane	26 U	26	0.564
5103-74-2	G-Chlordane	26 U	26	0.914
319-85-7	Beta-BHC	26 U	26	1.47
319-86-8	Delta-BHC	26 U	26	1.06
60-57-1	Dieldrin	26 U	26	0.402
115-29-7	Endosulfan I	26 U	26	1.18
33213-65-9	Endosulfan II	26 U	26	0.278
1031-07-8	Endosulfan Sulfate	26 U	26	0.654
72-20-8	Endrin	26 U	26	0.387
7421-93-4	Endrin Aldehyde	26 U	26	1.44
53494-70-5	Endrin Ketone	26 U	26	0.358
58-89-9	Lindane	26 U	26	0.252
76-44-8	Heptachlor	26 U	26	0.917
1024-57-3	Heptachlor Epoxide	26 U	26	0.592
72-43-5	Methoxychlor	26 U	26	0.364
8001-35-2	Toxaphene	220 U	220	30.3

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**SBD9**	QC Batch:	90181 -116
Sample #:	**345897**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	24 U	24	0.286
72-55-9	4,4'-DDE	24 U	24	0.210
50-29-3	4,4'-DDT	24 U	24	0.216
309-00-2	Aldrin	24 U	24	0.365
319-84-6	Alpha-BHC	24 U	24	0.364
57-74-9	A-Chlordane	24 U	24	0.521
5103-74-2	G-Chlordane	24 U	24	0.844
319-85-7	Beta-BHC	24 U	24	1.36
319-86-8	Delta-BHC	24 U	24	0.982
60-57-1	Dieldrin	24 U	24	0.371
115-29-7	Endosulfan I	24 U	24	1.09
33213-65-9	Endosulfan II	24 U	24	0.257
1031-07-8	Endosulfan Sulfate	24 U	24	0.604
72-20-8	Endrin	24 U	24	0.358
7421-93-4	Endrin Aldehyde	24 U	24	1.33
53494-70-5	Endrin Ketone	24 U	24	0.330
58-89-9	Lindane	24 U	24	0.233
76-44-8	Heptachlor	24 U	24	0.846
1024-57-3	Heptachlor Epoxide	24 U	24	0.546
72-43-5	Methoxychlor	24 U	24	0.336
8001-35-2	Toxaphene	200 U	200	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/20/03 by JLRM
		Anal. Method:	USEPA-8082
Sample ID:	**69SB2A**	QC Batch:	89881 -116
Sample #:	**345745**	Anal. Batch:	207923
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	80 U	80	19.2
11104-28-2	PCB-1221	40 U	40	2.40
11141-16-5	PCB-1232	40 U	40	6.00
53469-21-9	PCB-1242	40 U	40	3.60
12672-29-6	PCB-1248	40 U	40	6.00
11097-69-1	**PCB-1254**	**220**	40	3.60
11096-82-5	PCB-1260	40 U	40	8.40

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**13SB9A**	QC Batch:	89881 -116
Sample #:	**345896**	Anal. Batch:	207924
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	85 U	85	20.8
11104-28-2	PCB-1221	42 U	42	2.60
11141-16-5	PCB-1232	42 U	42	6.50
53469-21-9	PCB-1242	42 U	42	3.90
12672-29-6	PCB-1248	42 U	42	6.50
11097-69-1	PCB-1254	42 U	42	3.90
11096-82-5	PCB-1260	42 U	42	9.10

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-5**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/17/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**SBD9**	QC Batch:	89881 -116
Sample #:	**345897**	Anal. Batch:	207924
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	82 U	82	19.2
11104-28-2	PCB-1221	41 U	41	2.40
11141-16-5	PCB-1232	41 U	41	6.00
53469-21-9	PCB-1242	41 U	41	3.60
12672-29-6	PCB-1248	41 U	41	6.00
11097-69-1	PCB-1254	41 U	41	3.60
11096-82-5	PCB-1260	41 U	41	8.40

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Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**69SB2A**	QC Batch:	90218 -110
Sample #:	**345745**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	60 U	60	2.40
93-72-1	2,4,5-TP (Silvex)	60 U	60	4.80
94-75-7	2,4-D	240 U	240	19.2
94-82-6	2,4-DB	240 U	240	74.4
75-99-0	Dalapon	300 U	300	68.4
1918-00-9	Dicamba	240 U	240	2.40
120-36-5	Dichlorprop	240 U	240	20.4
~~88-85-7~~	~~* Dinoseb~~	~~240 R~~ R,1	~~240~~	~~25.2~~ AZ, 2/18/04
94-74-6	MCPA	24000 U	24000	1680
93-65-2	MCPP	24000 U	24000	6070

* See attached Statement of Data Qualifications.

See re-extraction, AZ 2/18/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

VALUE CHANGES

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/09/03 @ 08:40
		Prepared:	10/17/03 ~~10/10/03~~ by DJM ~~RS~~ 2/18/04
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**69SB2A**	QC Batch:	90218 -110
Sample #:	**345745DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	60 U	60	~~2.40~~
93-72-1	2,4,5-TP (Silvex)	60 U	60	4.80
94-75-7	2,4-D	~~240~~ U	240	19.2
94-82-6	2,4-DB	240 U	240	74.4
75-99-0	Dalapon	300 U	300	68.4
1918-00-9	Dicamba	240 U	240	2.40
~~120-36-5~~	Dichlorprop	240 U	240	20.4
88-85-7	Dinoseb	240 U	240	25.2
94-74-6	MCPA	24000 U	24000	~~1680~~
~~93-65-2~~	MCPP	24000 U	24000	6070

Use only Dinoseb, RS 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**13SB9A**	QC Batch:	90218 -110
Sample #:	**345896**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	64 U	64	2.60
93-72-1	2,4,5-TP (Silvex)	64 U	64	5.20
94-75-7	2,4-D	260 U	260	20.8
94-82-6	2,4-DB	260 U	260	80.6
75-99-0	Dalapon	320 U	320	74.1
1918-00-9	Dicamba	260 U	260	2.60
120-36-5	Dichlorprop	260 U	260	22.1
~~88-85-7~~	~~* Dinoseb~~	~~260 R~~ R,1	~~260~~	~~27.3~~ * 2/18/04
94-74-6	MCPA	26000 U	26000	1810
93-65-2	MCPP	26000 U	26000	6570

* See attached Statement of Data Qualifications.

See re-extraction for Dinoseb * 2/18/04

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ANALYTICAL REPORT

VALUE CHANGES

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
		Prepared:	10/17/03 ~~10/10/03~~ by DJM ✱ 2/18/03
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**13SB9A**	QC Batch:	90218 -110
Sample #:	**345896DL**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	64 U	64	~~2.60~~
93-72-1	2,4,5-TP (Silvex)	64 U	~~64~~	5.20
94-75-7	2,4-D	~~260 U~~	260	20.8
94-82-6	2,4-DB	260 U	260	80.6
75-99-0	Dalapon	320 U	320	74.1
1918-00-9	Dicamba	260 U	260	2.60
~~120-36-5~~	Dichlorprop	~~260 U~~	260	22.1
88-85-7	Dinoseb	260 U	260	27.3
94-74-6	MCPA	~~26000 U~~	~~26000~~	~~1810~~
~~93-65-2~~	MCPP	26000 U	26000	6570

Use only Dinoseb, ✱ 2/18/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
		Prepared:	10/10/03 by DJM
Submittal #:	**36440-5**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/14/03 by MSN
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**SBD9**	QC Batch:	90218 -110
Sample #:	**345897**	Anal. Batch:	208309
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	62	2.40
93-72-1	2,4,5-TP (Silvex)	62 U	62	4.80
94-75-7	2,4-D	250 U	250	19.2
94-82-6	2,4-DB	250 U	250	74.4
75-99-0	Dalapon	310 U	310	68.4
1918-00-9	Dicamba	250 U	250	2.40
120-36-5	Dichlorprop	250 U	250	20.4
~~88-85-7~~	~~*Dinoseb~~	~~250 R~~ R,1	~~250~~	~~25.2~~ AS 2/18/04
94-74-6	MCPA	25000 U	25000	1680
93-65-2	MCPP	25000 U	25000	6070

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

VALUE CHANGES

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**	Prepared:	10/17/03 ~~10/10/03~~ by DJM AS 2/18/04
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8151A
		Analyzed:	10/27/03 by JLRM
Sample ID:	**SBD9**	Anal. Method:	USEPA-8151A
Sample #:	**345897DL**	QC Batch:	90218 -110
Matrix:	Soil	Anal. Batch:	208365
Unit:	ug/kg dry	Percent Solids:	80
		Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	62	~~2.40~~
93-72-1	2,4,5-TP (Silvex)	62 U	62	4.80
94-75-7	2,4-D	~~250~~ U	250	19.2
94-82-6	2,4-DB	250 U	250	74.4
75-99-0	Dalapon	310 U	310	68.4
1918-00-9	Dicamba	250 U	250	2.40
~~120-36-5~~	Dichlorprop	250 U	250	20.4
88-85-7	Dinoseb	250 U	250	25.2
94-74-6	MCPA	~~25000~~ U	~~25000~~	~~1680~~
~~93-65-2~~	MCPP	25000 U	25000	6070

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 15:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB2A**
Sample #: **345745**
Matrix: Soil

Percent Solids: 83

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	24600	250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	9.5	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.64	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	65	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.62 J	1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.57 J	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	840 J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	50 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	17 J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	32700	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	1.0 U	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2270 J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	894	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.091 J	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	0.50 U	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1580	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	1.0 U	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.085 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	114	100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.33 J B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	54	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	51	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 15:15
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB2B**
Sample #: **345746**
Matrix: Soil

Percent Solids: 79

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	34800		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	8.8		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	6.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	70		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.91 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	568	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	50	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	23	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	42400		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	14		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	6020	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	303		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.070 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	30		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	3680		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.47 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	353		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.37 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	71		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	54		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 15:30
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **69SB2C**
Sample #: **345747**
Matrix: Soil

Percent Solids: 75

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	31400		250	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	7.2		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	9.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	63		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.90 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	483	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	41	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	24	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	41200		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	15		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	8790	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	585		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.077 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	25		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	4720		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.45 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	434		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.39 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	57		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/08/03 @ 16:00
Sampler: B.F. & J.S.
Received: 10/09/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **57SB4B**
Sample #: **345748**
Matrix: Soil

Percent Solids: 74

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	33300		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	9.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.0		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	51		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.45 J		1.0	0.0333	mg/kg dry	10/29/03	DSC	USEPA-6010B
Cadmium, Total	1.6		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	372	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	45	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	18	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	59000		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	18		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	971	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	273		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.041 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1080		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.40 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.063 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	497		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.18 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	66		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	88		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 09:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB7A**
Sample #: **345883**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14000		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	170		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.3		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2290	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	28	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.0	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	13	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	31000		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	141		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3370	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1040		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.027 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1670		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.57 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.084 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	58 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.52	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	471		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB7B**
Sample #: **345884**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	13900		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.12 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	199		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.98 J		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2650	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	30	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	16	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	41600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	235		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3140	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1650		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.038 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1320		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.70 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.096 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	46 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.69	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	24		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	688		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB7C**
Sample #: **345885**
Matrix: Soil

Percent Solids: 79

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	21400		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.085 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	208		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.3		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.3		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
* Calcium, Total	2310	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
* Chromium, Total	37	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	19	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	41900		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	239		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
* Magnesium, Total	3940	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1380		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.034 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	19		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1890		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.84 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	53 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.86	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	36		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	847		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12A**
Sample #: **345886**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	6630		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.1		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	78		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.1		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	12400	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	18	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	5.1	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	45	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	14800		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	176		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	5330	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	301		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.016 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	8.3		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1050		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.32 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.059 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	102		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.13 J	B,X	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	14		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	214		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 11:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12B**
Sample #: **345887**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	9910		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.1		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	106		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.4		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4820	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	27	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	6.4	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	37	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	15000		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	325		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3270	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	280		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.041 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	11		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1420		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.39 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.027 J	B,P	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	252		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J	B,X	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	17		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	377		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD8**
Sample #: **345888**
Matrix: Soil

Percent Solids: 67

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	8930		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.3		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	102		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.6		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4640	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	26	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	6.3	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	36	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	14700		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	318		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3050	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	291		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.035 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	9.6		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1290		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.41 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.030 J	B,P	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	88 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.15 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	17		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	426		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 11:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12C**
Sample #: **345889**
Matrix: Soil

Percent Solids: 62

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	15000		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.5		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	161		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	2.3		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	3840	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	34	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.9	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	94	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	18700		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	1140		200	4.36	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3980	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	272		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.13		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	2150		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.063 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	95 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.29 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	26		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	476		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11A**
Sample #: **345890**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	19800		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.27 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.2		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	171		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.2		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4020	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	38	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	26	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	32600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	111		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	4650	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1140		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.052 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	2680		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.86 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.10 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	51 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.42 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	34		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	294		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11B**
Sample #: **345891**
Matrix: Soil

Percent Solids: 88

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	10800		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	4.7		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.8		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	143		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.65 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.2		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2120	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	29	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.4	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	98	J,S	5.0	1.84	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Iron, Total	33800		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	26500		5000	109	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	2520	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	942		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.045 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1280		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.53 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.26 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	63 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.45 J	B,X	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	18		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	502		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11C**
Sample #: **345892**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20900		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.62		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.7		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	211		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.2		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	2.7		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2970	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	39	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	16	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	33	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	48600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	295		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3940	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1700		125	6.60	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.071 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	21		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1720		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	1.5		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.15 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	64 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.68	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	34		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	1070		100	12.9	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10A**
Sample #: **345893**
Matrix: Soil

Percent Solids: 71

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	10900		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.19 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	111		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.85 J		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.1		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	4570	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	27	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	11	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	16	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	25700		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	111		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3850	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	853		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.040 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1540		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.67 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.085 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	36 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.32 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	22		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	287		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10B**
Sample #: **345894**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	14100		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	3.0		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	160		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.97 J		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.5		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2240	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	35	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	12	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	44	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	37500		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	320		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	2890	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1310		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.089 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1200		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.77 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.18 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	52 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.45 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	25		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	578		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10C**
Sample #: **345895**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	17500		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.78		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.6		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	142		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.89 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.0		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1820	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	35	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	14	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	34	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	39600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	204		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3230	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1150		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.083 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	16		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1410		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.96 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	48 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.50	B,Y	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	30		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	540		40	5.17	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9A**
Sample #: **345896**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	20400	50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.095 J B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.7	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	175	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.2	1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	2.2	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1890 J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	36 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	25 J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	36500	200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	434	50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3690 J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1240	25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.043 J	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	19	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1980	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.93 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	44 J	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.78 B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	37	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	1010	100	12.9	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD9**
Sample #: **345897**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	18600		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.10 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	178		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.1		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	2.4		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2070	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	34	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	26	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	35900		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	396		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3690	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1390		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.043 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1910		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.84 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	45 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.95	B,P	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	35		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	969		100	12.9	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9B**
Sample #: **345898**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	16200	50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.1	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	121	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.2	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1490 J,m	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	31 J,m	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.8 J,s	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	13 J,s	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	20400	200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	113	25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	2970 J,m	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	689	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.027 J	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	17	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1490	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.72 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.060 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	54 J	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.25 J B,x	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	30	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	194	20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9C**
Sample #: **345899**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	4250	50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.12 J	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	29	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U	1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	1.1	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1300 J,m	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	11 B,x	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	3.9 J,s	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	2.5 J,s	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	5330	20	4.24	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	12	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1210 J,m	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	59	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.10 U	0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	3.8	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	548	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.23 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.023 J B,p	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	69 J	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.047 J B,x	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	11	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	46	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 15:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB8A**
Sample #: **345900**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	12600		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.069 J	B,P	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	124		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.66 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.91 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	3290	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	28	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	10	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	18	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	29200		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	8620		1000	21.8	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3240	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1160		25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.033 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	14		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1480		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.66 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.14 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	40 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.36 J	B,P	0.50	0.0270	mg/kg dry	10/30/03	DWJ	USEPA-6020
Vanadium, Total	23		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	363		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 15:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB8B**
Sample #: **345901**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	7650		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	0.65		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	66		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.0 U		1.0	0.0391	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cadmium, Total	0.72 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1750	J,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	19	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	6.0	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	8.3	J,S	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	12400		100	21.2	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	46		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2160	J,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	270		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.0087 J		0.10	0.0077	mg/kg dry	10/16/03	MSS	USEPA-7471A
Nickel, Total	7.8		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	939		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.35 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.45 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	63 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.14 J	B,J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	15		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	154		20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**69SB2A**		
Sample #:	**345745**		
Matrix:	Soil	Percent Solids:	83

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	83	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.14 J	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**69SB2B**		
Sample #:	**345746**		
Matrix:	Soil	Percent Solids:	79

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	79	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**69SB2C**		
Sample #:	**345747**		
Matrix:	Soil	Percent Solids:	75

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	75	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.05 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/08/03 @ 16:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/09/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**57SB4B**		
Sample #:	**345748**		
Matrix:	Soil	Percent Solids:	74

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	74	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB7A**		
Sample #:	**345883**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.07 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB7B**		
Sample #:	**345884**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.18 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**13SB7C**		
Sample #:	**345885**		
Matrix:	Soil	Percent Solids:	79

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	79	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 10:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB12A**
Sample #: **345886**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.18 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB12B**		
Sample #:	**345887**		
Matrix:	Soil	Percent Solids:	71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.39 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD8**		
Sample #:	**345888**		
Matrix:	Soil	Percent Solids:	67

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	67	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.23 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB12C**		
Sample #:	**345889**		
Matrix:	Soil	Percent Solids:	62

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	62	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB11A**		
Sample #:	**345890**		
Matrix:	Soil	Percent Solids:	77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.22 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11B**
Sample #: **345891**
Matrix: Soil

Percent Solids: 88

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	88	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.35 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 12:45
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB11C**
Sample #: **345892**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.25 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB10A**		
Sample #:	**345893**		
Matrix:	Soil	Percent Solids:	71

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	71	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.17 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 13:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB10B**
Sample #: **345894**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.22 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 13:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB10C**		
Sample #:	**345895**		
Matrix:	Soil	Percent Solids:	73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.11 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB9A**		
Sample #:	**345896**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.35 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD9**		
Sample #:	**345897**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.26 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9B**
Sample #: **345898**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.12 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 14:30
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB9C**
Sample #: **345899**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/09/03 @ 15:15
Sampler: B.F. & J.S.
Received: 10/10/03 @ 08:40

Submittal #: **36440-5**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SB8A**
Sample #: **345900**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.25 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/09/03 @ 15:30
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/10/03 @ 08:40
Submittal #:	**36440-5**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SB8B**		
Sample #:	**345901**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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Individual sample results relate only to the sample tested.
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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: *The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.*

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?	x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.			x
	1 or more <10% / 1 high/low / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / J / L / K Non-detects: R / UJ / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).		x	
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes: *13SB12C*

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 23			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{O}C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentrationof the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration

		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ±50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes: ***1,2,4,5-tetrachlorobenzene was not in the ICV for the 10/31/03 calibration. It is found in the LCS, MS, and MSD from a second source.***

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?	x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			x
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			x
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		x	

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".	x		

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 23			
	Number of target compounds in each analysis:66			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: February-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
_____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		x	

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	23			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	23			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
___ CLP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: PEST/PCB
Method No.: 8081A/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Preservation/ Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			x

	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
	1 out	high/low	No action	No action
	2 out	2 high same column	K	No action
		2 low same column	L, UL	No action
		mixed same column	J, UJ	No action
		2 high diff columns	J	Not applicable
		2 low diff columns	J, UJ	Not applicable
		mixed diff columns	Professional judgement	Not applicable
	3 out	All high	K	Not applicable
		All low	L, UL	Not applicable
		2 high, 1 low	K (2 high)	J (1 low 2nd column)
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
		other mixed	J, UJ	Not applicable
	4 out	All high	K	Not applicable
		All low	L, UL	Not applicable
		Mixed	J, UJ	Not applicable
	If any recovery is >0% and <10% then L(+)/R(-).			
	If any recovery is 0% then R(+/-).			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).	x		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	3	3			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: February-04
DV Level: II III IV
Review Document:
__X__ Region III Modified for National Functional Guidelines
_____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-5
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD see SDG 36440-1

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	3			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-5
Project No.: 15291974.30000

Project Name: Radford SSP
Reviewer: AS
Date: February-04

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C $\pm$ 2 ^{o}C)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: *four coolers @ 2.3C, 0.4C, 0.9C, & 0.8C*

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x			x			x	

Note:

3.0 Instrument Calibration

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			6 + BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (labelled LCS by TriMatrix) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	x					x	x			x		
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%			passed within 80-120%		

Note: ***A high point added to Al, Ba, Ca, Fe, Mg, Mn, & K curves and the RLs were elevated by 5.***

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes: < -IDL L(+)/UL(-); > IDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note:

7.0 Laboratory Duplicates (MSD)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note:

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?												
	%R > 125% 30%< %R < 74% < 30%	x				x		x			x		
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x			x					x

Note: ***13SB7C Ca 129%/133% (121%), Cr 114%/119% (112%), Mg 127%/142% (111%)***

9.0 Instrument Detection Limits (IDL)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: ***Serial Dilution: 13SB7C - Co 53.8% and Cu 21.1%; post digestion spike recovery passes for Co and Cu***

11.0 Field Duplicate Samples

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	x				x		x			x		

Note: _____

12.0 Result Verification/ Internal Standards/ Tune

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: ***6010B: Several samples displayed yttrium out high. The samples were reanalyzed at DF5 elevating Be MDL but not RL as MDLx3 is still <RL.***

6020: high lead interfered with internal used to quantitate Th concentrations in samples 13SB11B and 13SB8A. Lab used a different internal.

New MDL could not be inserted into EDD.

13.0 Completeness Calculation

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: 23												
13.1.2	Number of target compounds in each analysis: various												
13.1.3	Number of results rejected and not reported: 0												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%	**100%**			**100%**			**100%**			**100%**		

Note: _____

TM0301 Cart, 5 Volatile Soil

№ 1149

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Fenne (804)965-9060

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No: 0000063

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330[redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) (ILM)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] HERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
675B2A	10/8/03 1500	5		X	5	F	/	7	X	X	X	X	X	X		X						X	
675B2B	10/8/03 1515	5		X	5	F	/	5	X	X	X			X		X							
675B2C	10/8/03 1530	5		X	5	F	/	5	X	X	X			X		X							
SF [redacted]5784B	10/8/03 1600	5		X	5	F	/	5	X	X	X			X		X							

2 2 2

TM0360 Cart 2 Volatile Soil

№ 1144

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Rowe (804) 765 9100

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

00000967

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /cN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	NETB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135B7A	10/9/03 945	5		X	5	F	/	5	X	X	X			X		X							
135B7B	10/9/03 1000	5		X	5	F	/	5	X	X	X			X		X							
135B7C	10/9/03 1015	5		X	5	F	/	5	X	X	X			X		X							
135B7CMS	10/9/03 1015	5		X	5	F	/	5	X	X	X			X		X							—
135B7CMSD	10/9/03 1015	5		X	5	F	/	5	X	X	X			X		X							—
135B12A	10/9/03 1045	5		X	5	F	/	5	X	X	X			X		X							
135B12B	10/9/03 1100	5		X	5	F	/	5	X	X	X			X		X							
DBDP	10/9/03	5		X	5	F	/	5	X	X	X			X		X							
135B12C	10/9/03 1115	5		X	5	F	/	5	X	X	X			X		X							
135B11A	10/9/03 1215	5		X	5	F	/	5	X	X	X			X		X							
135B11B	10/9/03 1230	5		X	5	F	/	5	X	X	X			X		X							
135B11C	10/9/03 1245	5		X	5	F	/	5	X	X	X			X		X							

TC 21-2 21-1

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/9/03 1800				
Relinquished by:	Date/time	Received by: (for lab) John Parker	Date/Time 10/10/03 8:40	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-5

21-4

Volatile Cart 4
Soil TM0341
№ 1147

Radford Army Ammunition Plant
Chain Of Custody Record

Project Number	Project Name
09604317	RFAAP

Project Contact (Name and Phone Number): Darren Rayne (804) 965 7000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No: 000068

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330 [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] NERB	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135B10A	10/9/03 1300	5		X	5	F	/	5	X	X	X			X		X							TC
135B10B	10/9/03 1315	5		X	5	F	/	5	X	X	X			X		X							2
135B10C	10/9/03 1330	5		X	5	F	/	5	X	X	X			X		X							↓
135B9A	10/9/03 1400	5		X	5	F	/	7	X	X	X	X	X	X		X						X	2
[redacted]5BD9	10/9/03 —	5		X	5	F	/	7	X	X	X	X	X	X		X						X	2
135B9B	10/9/03 1415	5		X	5	F	/	5	X	X	X			X		X							2
135B9C	10/9/03 1430	5		X	5	F	/	5	X	X	X			X		X							↓
135B8A	10/9/03 1515	5		X	5	F	/	5	X	X	X			X		X							2
135B8B	10/9/03 1530	5		X	5	F	/	5	X	X	X			X		X							N/C for 135B8
~~135B8C~~	~~10/9/03 1545~~	~~5~~		X	5	F	/	6	X	X	X			X		X	BT						

Box #1			Box #2			Box #3	Box #4	
1. Surface Water	6. Trip Blank		A. HCl + Ice	F. Ice Only		F. Filtered	R. Rush - 3 Day	
2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other _____		U. Unfiltered	S. Standard 28 Day	
3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice			T. Timely 14 Day	
4. Rinsate	9. Other _____		D. H2SO4 + Ice	I. ZnAc + NaOH + Ice			O. Other _____	
5. Soil Sediment/Sludge			E. Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/9/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/10/03 8:40	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

21-4

36440-5

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-6 **Fraction:** VOCs, SVOCs, PAHs, Explosives, Pesticides, PCBs, Herbicides, Metals, & Cyanide

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** January_20,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: For the VOC analyses, the method blank for batch 89888-115 contained acetone at 13.0 ug/L and methylene chloride at 0.410 ug/L. The method blank for batch 89888-122 contained methylene chloride at 0.540 ug/L. The method blank for batch 90257-121 contained acetone at 10 ug/Kg. The method blank for batch 90601-122 contained acetone at 9.7 ug/Kg. The method blank for batch 90601-123 contained acetone at 14 ug/Kg and methylene chloride at 3.9 ug/Kg. Positive results less than ten times the blank concentrations were flagged "B,z" in the associated samples.

The equipment blank EQB5 displayed positive detections for acetone at 1.6 ug/L and methylene chloride at 0.60 ug/L. The associated trip blank displayed positive detections for methylene chloride at 1.2 ug/L and toluene at 0.24 ug/L. The equipment blank EQB6 displayed positive detections for acetone at 1.4 ug/L and methylene chloride at 0.68 ug/L. The associated trip blank displayed a positive detection for methylene chloride at 1.1 ug/L. The trip blank associated with the investigative field samples contained methylene chloride at 0.96 ug/L. The field blank detections for methylene chloride were previously qualified due to method blank detections. Since EQB5 was non-detect for toluene, no data qualifying action was required based on the associated trip blank detection for toluene. Positive associated soil boring sample results for acetone were previously flagged for method blank detections. No further data qualifying action was taken.

The continuing calibration analyzed on 10/15/03 at 0919 displayed a percent difference greater than the control limit (i.e., 20%) with a negative bias for carbon disulfide at 27.5%. All associated field sample results were non-detect and were flagged "UJ,c".

The continuing calibration analyzed on 10/22/03 at 1151 displayed percent differences greater than the control limit with a negative bias for acetone at 28.4%, 4-methyl-2-pentanone at 26.8%, and 2-hexanone at 27.7% and with a positive bias for carbon disulfide at 22.5%. Positive associated field sample results for acetone, 4-methyl-2-pentanone, and 2-hexanone were flagged "J,c" while non-detects were flagged "UJ,c". All associated field sample results for carbon disulfide were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The continuing calibration analyzed on 10/21/03 at 0901 displayed percent differences greater than the control limit with a negative bias for chloroethane at 24.1% and with a positive bias for trans-1,3-dichloropropene at 23.1%, dibromochloromethane at 24.8%, bromoform at 20.7%, and 1,2-dibromo-3-chloropropane at 31.6%. The associated field sample results for chloroethane were non-detect and were flagged "UJ,c". All associated field sample results for trans-1,3-dichloropropene, dibromochloromethane, bromoform, and 1,2-dibromo-3-chloropropane were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The continuing calibration analyzed on 10/22/03 at 1203 displayed percent differences greater than the control limit with a negative bias for chloroethane at 25.3% and acetone at 21.8% and with a positive bias for dibromochloromethane at 22.9%. The associated field sample results for chloroethane were non-detect and were flagged "UJ,c". All associated field sample results for acetone were positive and were previously flagged for a method blank detection; thus, no further data qualifying action was taken. All associated field sample results for dibromochloro-methane were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The continuing calibration analyzed on 10/23/03 at 1121 displayed percent differences greater than the control limit with a negative bias for carbon disulfide at 20.8% and methyl acetate at 20.7% and with a positive bias for methyl-tert-butyl ether at 27.3%, bromochloromethane at 25.8%, and trans-1,3-dichloropropene at 24.5%. The associated field sample results for carbon disulfide and methyl acetate were non-detect and were flagged "UJ,c". All associated field sample results for methyl-tert-butyl ether, bromochloromethane, and trans-1,3-dichloropropene were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The laboratory control spike analyzed for batch 90257-121 displayed percent recoveries greater than the laboratory generated upper control limits for 1,2-dibromo3-chloropropane at 132% and methyl acetate at 131%. Since the associated field sample results were non-detect while the laboratory control spike displayed a positive bias, no data qualifying action was required.

The matrix spike pair for sample 13SD2 displayed several percent recoveries less than the laboratory generated lower control limits or relative percent differences greater than the laboratory generated control limits. Positive associated parent sample results were flagged "J,m" while non-detect parent sample results were flagged "UJ,m", except for the result for chloroethane that was previously flagged for a low continuing calibration percent difference. The matrix spike pair for sample 13SW2 displayed acceptable recoveries. The matrix spike for sample ASB2C displayed percent recoveries less than the lower control limits for 1,1,2-trichloro-1,2,2-trifluoroethane at 69% and trans-1,3-dichloroethene at 73%. The matrix spike duplicate displayed a percent recovery less than the laboratory generated lower control limit (i.e., 49%) for acetone at 49%. This matrix spike pair displayed relative percent differences greater than the laboratory generated control limits for carbon tetrachloride at 20%, methyl-cyclohexane at 22%, and vinyl chloride at 26%. Since one of the matrix spikes displayed an acceptable recovery and the parent sample was non-detect for the compounds that displayed imprecision anomalies, no data qualifying action was taken.

For the SVOC analyses, the method blank for extraction batch 90165-116 displayed positive detections for bis(2-ethylhexyl)phthalate at 0.700 ug/L, butyl benzyl phthalate at 0.350 ug/L,

and diethylphthalate at 0.080 ug/L. Positive associated field sample results less than ten times the blank concentrations were flagged "B,z".

The equipment blank EQB5 contained bis(2-ethylhexyl)phthalate at 0.35 ug/L, butyl benzyl phthalate at 0.060 ug/L, and several tentatively identified compounds (TICs). The equipment blank EQB6 contained bis(2-ethylhexyl)phthalate at 0.29 ug/L, butyl benzyl phthalate at 0.050 ug/L, and several TICs. The equipment blank detections for these phthalates were previously flagged due to method blank detections and no further data qualifying action was taken. Positive results less than five times the blank concentration of the TICs were flagged "B,x" in the associated soil boring field samples.

The continuing calibration analyzed on 11/02/03 at 1249 displayed percent differences greater than the control limit (i.e., 20%) with a negative bias for hexachlorocyclopentadiene at 28.0% and 2,4-dinitrophenol at 22.4%. The continuing calibration analyzed on 11/03/03 at 1053 displayed percent differences greater than the control limit with a negative bias for carbazole at 31.6% and 2,4-dinitrophenol at 20.1%. The continuing calibration analyzed on 11/04/03 at 0845 displayed percent differences greater than the control limit with a negative bias for 4-chloroaniline at 32.1%, caprolactam at 26.4%, 3-nitroaniline at 54.6%, 4-nitrophenol at 37.9%, carbazole at 43.9%, and 2,4-dinitrophenol at 32.9%. The continuing calibration analyzed on 11/05/03 at 1252 displayed a percent difference greater than the control limit with a negative bias for caprolactam at 22.5%. The associated field sample results were non-detect for these anomalous compounds and were flagged "UJ,c".

The laboratory control spike for batch 89985-118 displayed recoveries less than the laboratory generated lower control limits but greater than the QAPP lower control limit (i.e., 10%) for 2,4-dimethylphenol (17%) and 4-chloroaniline (11%). The laboratory control spike for batch 90165-116 displayed recoveries less than the laboratory generated lower control limits but greater than the QAPP lower control limit for 2,4-dinitrophenol (23%), caprolactam (20%), and hexachlorocyclopentadiene (18%). The associated field sample results were non-detect and were flagged "UJ,l", unless previously flagged for a negative bias in the continuing calibration.

The laboratory control spike for batch 89985-118 displayed recoveries greater than the laboratory generated upper control limits for benzo(b)fluoranthene at 119% and benzo(k) fluoranthene at 129%. The laboratory control spike for batch 90165-116 displayed recoveries greater than the laboratory generated upper control limits for benzo(a)pyrene at 129%, benzo(k)fluoranthene at 136%, dibenzo(a,h)anthracene at 132%, and indeno(1,2,3-cd)pyrene at 131%. The laboratory control spike for batch 90572-114 displayed a recovery greater than the laboratory generated upper control limit for 3,3'-dichlorobenzidine at 120%. Sample ASB1A displayed a positive detection for benzo(b)fluoranthene that was flagged "J,l". All other associated field sample results were non-detect while the laboratory control spike displayed a positive bias. No further data qualifying action was taken.

The matrix spike pair for sample 13SD2 displayed percent recoveries outside the laboratory generated control limits for 4-chloroaniline (13%/11%), anthracene (60%/64%), atrazine (118%/120%), bis(2-ethylhexyl)phthalate (125%/125%), fluoranthene (133%/136%), and hexachlorocyclopentadiene (20%/21%). The positive associated parent sample results for bis(2-ethylhexyl)phthalate and fluoranthene were flagged "J,m". The non-detect parent sample results for 4-chloroaniline, anthracene, and hexachlorocyclopentadiene were flagged "UJ,m". The parent sample result for atrazine was non-detect while the matrix spike recoveries displayed a positive bias; thus, no data qualifying action was required. This matrix spike pair

also displayed relative percent differences greater than the laboratory generated control limits for 4-methylphenol at 12%, diethylphthalate at 18%, and isophorone at 15%. The positive parent sample result for diethylphthalate was flagged "J,d". The parent sample results for 4-methylphenol and isophorone were non-detect while the matrix spikes displayed imprecision; thus, no data qualifying action was required.

The matrix spike pair for sample 13SW2 displayed percent recoveries less than the laboratory generated lower control limits for 2,4-dimethylphenol (42%), 2,4-dinitrophenol (20%/23%), 4,6-dinitro-2-methylphenol (24%/16%), 4-nitrophenol (19%/14%), caprolactam (18%/18%), hexachlorocyclopentadiene (14%/21%), and pentachlorophenol (16%). The associated parent sample results were non-detect and were flagged "UJ,m", unless previously flagged for low bias anomalies for the continuing calibration or laboratory control spike. This matrix spike pair displayed percent recoveries greater than the laboratory generated upper control limits for benzo(a)pyrene at 124%, benzo(k)fluoranthene at 130%, and n-nitroso-diphenylamine at 96%. This matrix spike pair also displayed relative percent differences greater than the laboratory generated control limits for 2-nitrophenol at 25%, 4,6-dinitro-2-methylphenol at 40%, and hexachlorocyclopentadiene at 35%. The parent sample result was non-detect while the matrix spikes displayed a high bias or imprecision; thus, no data qualifying action was required.

The matrix spike pair for sample ASB2C displayed percent recoveries less than the laboratory generated lower control limits for 2,4-dimethylphenol (21%/29%), 2,4-dinitrophenol (26%/25%), 3,3'-dichlorobenzidine (24%), 4-chloroaniline (10%/10%), 4-nitroaniline (53%), and hexachlorocyclopentadiene (43%). The associated parent sample results were non-detect and were flagged "UJ,m", unless previously flagged for low bias anomalies for the continuing calibration or laboratory control spike. This matrix spike pair displayed a percent recovery greater than the laboratory generated upper control limit for benzo(k)fluoranthene at 129%. The parent sample results were non-detect while the matrix spikes displayed a high bias; thus, no data qualifying action was required.

Sample ASB3A displayed an internal standard area count marginally less than the lower control limit (i.e., -50%) for perylene-d_{10} at -57.8%. Positive associated field sample results were flagged "J,i" while non-detects were flagged "UJ,i".

The acid fraction surrogate 2,4,6-tribromophenol displayed percent recoveries less than the laboratory generated lower control limit (i.e., 26%) for samples 13SW2 at 22% and SBD10 at 18%. Since these samples only displayed one acid fraction surrogate recovery less than the lower control limits, no data qualifying action was required.

Sample ASB1A displayed positive concentrations that exceeded the linear range of the instrument initial calibration. These detections were flagged "J,q". This sample was re-analyzed at a dilution factor of five with acceptable results that should be used for data interpretation. Sample ASB3A displayed positive concentrations that exceeded the linear range of the instrument initial calibration. These detections were flagged "J,q". This sample was re-analyzed at a dilution factor of two hundred and fifty with acceptable results for 2,4-dinitrotoluene, di-n-butylphthalate, and n-nitroso-diphenylamine that should be used for data interpretation. Sample ASB2A displayed a positive concentration for di-n-butylphthalate that exceeded the linear range of the instrument initial calibration. This detection was flagged "J,q". This sample was re-analyzed at a dilution factor of five with an acceptable result that should be used for data interpretation.

The field duplicate pair (13SD3/SDD1) displayed a difference greater than the control limit (i.e., 1080 ug/Kg) for dimethylphthalate at 1130 ug/Kg. The positive dimethylphthalate result for sample 13SD3 was flagged "J,f" while the non-detect dimethylphthalate result for sample SDD1 was flagged "UJ,f".

For the PAH analyses, the opening continuing calibration analyzed on 11/25/2003 at 1207 displayed percent differences greater than the control limit (i.e., 15%) with a negative bias for benzo(a)pyrene at 21.03% and with a positive bias for indeno(1,2,3-cd)pyrene at 17.02%. The closing continuing calibration analyzed on 11/25/2003 at 1531 displayed percent differences greater than the control limit with a negative bias for benzo(a)pyrene at 17.92% and with a positive bias for fluoranthene at 17.10%, benzo(k)fluoranthene at 16.82%, and indeno(1,2,3-cd)pyrene at 19.10%. The associated field sample ASB1A was non-detect for benzo(a)pyrene and was flagged "UJ,c". The associated field sample result for fluoranthene was positive and was flagged "J,c". This associated field sample was non-detect for benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

Sample ASB3B displayed a surrogate percent recovery less than the laboratory lower control limit (i.e., 49%) for 2-fluorobiphenyl at 46%. All associated field sample results were non-detect and were flagged "UL,s".

The matrix spike pair for sample 13SW2 displayed several percent recoveries greater than the laboratory generated upper control limits. The parent sample was non-detect for all target compounds. Based on professional judgement, no data qualifying action was taken based on these matrix spike anomalies.

For the explosive analyses, the opening continuing calibration analyzed on 10/24/03 at 0146 displayed a percent difference greater than the control limit (i.e., 15%) with a positive bias for 2,6-dinitrotoluene at 16.0%. The closing continuing calibration analyzed on 10/24/03 at 0646 displayed a percent difference greater than the control limit with a positive bias for 2,6-dinitrotoluene at 15.2%. The associated field sample results for 2,6-dinitrotoluene were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required. The closing continuing calibration analyzed on 10/28/03 at 1126 displayed a percent difference greater than the control limit with a positive bias for HMX at 16.7%. The associated field sample results for HMX were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

The matrix spike pair for sample 13SD2 displayed relative percent differences greater than the laboratory generated control limits (i.e., 40%) for 1,3,5-trinitrobenzene at 44% and 4-amino-2,6-dinitrotoluene at 41%. The matrix spike pair for sample ASB2C displayed relative percent differences greater than the laboratory generated control limits for 2,4-dinitrotoluene at 41%, 4-nitrotoluene at 45%, nitrobenzene at 45%, and RDX at 56%. The parent sample results were non-detect while the matrix spike results displayed imprecision; thus, no data qualifying action was taken. The matrix spike pair for sample 13SW2 displayed percent recoveries less than the laboratory generated lower control limit (i.e., 50%) for tetryl (42%/40%). The parent sample result for tetryl was non-detect and was flagged "UJ,m".

Sample ASB3A displayed a positive concentration for 2,4-dinitrotoluene that exceeded the linear range of the instrument initial calibration. This detection was flagged "J,q". This sample was re-analyzed at a dilution factor of five with an acceptable result that should be used for data interpretation.

For the pesticide analyses, closing continuing calibration analyzed on 10/18/03 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for delta BHC at 16.89%, 4,4'-DDD at 33.20%, 4,4'-DDT at 18.77%, methoxychlor at 28.37%, and endosulfan sulfate at 15.85%. This closing continuing calibration displayed percent differences greater than the control limit with a positive bias on column two for 4,4'-DDD at 17.38% and methoxychlor at 20.16%. The associated field sample results were non-detect on one or both columns while the continuing calibration displayed a positive bias. No data qualifying action was taken based on these anomalies.

The opening continuing calibration analyzed on 10/31/03 at 0958 displayed percent differences greater than the control limit with a positive bias on column one for endrin at 25.43% and 4,4'-DDD at 19.19%. This opening continuing calibration displayed percent differences greater than the control limit with a negative bias on column two for heptachlor at 15.75% and endosulfan II at 15.25%. The closing continuing calibration analyzed on 10/31/03 at 1342 displayed percent differences greater than the control limit with a positive bias on column one for endrin at 26.81% and 4,4'-DDD at 23.02%. This closing continuing calibration displayed a percent difference greater than the control limit with a negative bias on column two for endosulfan II at 21.50%. Only one column is required to pass to report valid non-detects. Since the associated field sample results were non-detects, no data qualifying action was taken based on these anomalies.

For the PCB analyses, the closing continuing calibration displayed a percent difference greater than the control limit (i.e., 15%) with a positive bias for arochlor 1016 at 16.70%. The associated field sample results were non-detect while the continuing calibration displayed a positive bias; thus, no data qualifying action was required.

For the herbicide analyses, the opening continuing calibration analyzed on 10/27/03 at 2225 displayed percent differences greater than the control limit (i.e., 15%) with a positive bias on column one for 2,4-D at 49.0% and with a negative bias for 2,4,5-T at 17.17% and silvex at 22.6%. This opening continuing calibration displayed percent differences greater than the control limit with a negative bias on column two for dicamba at 21.0% and 2,4-D at 19.9%. The closing continuing calibration analyzed on 10/28/03 at 0339 displayed acceptable percent differences on column one. This closing continuing calibration displayed a percent difference greater than the control limit with a negative bias on column two for 2,4-D at 16.8% and with a positive bias for dalapon at 15.1%. Only one column is required to pass to report valid non-detects. Since the associated field sample results were non-detects, no data qualifying action was taken based on these anomalies.

The laboratory control spikes displayed several recoveries greater than the laboratory generated upper control limits. The associated field samples were non-detect while the laboratory control spike displayed a positive bias. No data qualifying action was taken.

All samples displayed surrogate percent recoveries greater than the laboratory generated upper control limits. Since the associated field samples results were non-detect, no data qualifying action was required.

For the metal analyses by 6020, the method blank for batch 89969-115 contained total chromium at 0.69 ug/L and total lead at 0.43 ug/L. The associated positive field sample results less than five times the blank concentration were flagged "B,p". The method blank for batch 89970-113 contained lead at 0.098 mg/Kg. The associated field sample results for lead were

greater than five times the blank concentration and no data qualifying action was required. The equipment blank EQB5 contained chromium at 4.5 ug/L and thallium at 0.5 ug/L. The equipment blank EQB6 contained chromium at 0.9 ug/L and thallium at 0.4 ug/L. The chromium detection in EQB6 was previously flagged due to a method blank detection and no further data qualifying action was required. The associated positive field sample results less than five times the equipment blank concentrations were flagged "B,x".

The field duplicate pair (ASB2B and SBD10) displayed relative percent differences greater than the control limit (i.e., 35%) for lead at 38.5% and nickel at 52.6%. The results for lead and nickel were positive in these two field samples and were flagged "J,f".

For the metal analyses by 6010B, the method blank for batch 89968-115 contained total beryllium at 0.31 ug/L, total iron at 6.2 ug/L, and total sodium at 200 ug/L. Positive results less than five times the blank concentrations were flagged "B,p" in the associated field samples. The method blank for batch 90177-120 contained total cobalt at 0.374 mg/Kg. The associated field sample results were greater than five times the blank concentration and no data qualifying action was required. The equipment blank EQB5 contained beryllium at 0.3 ug/L, iron at 7.6 ug/L, and sodium at 280 ug/L. The equipment blank EQB6 contained iron at 4.8 ug/L, sodium at 180 ug/L, and zinc at 4.6 ug/L. The equipment blank results for beryllium, iron, and sodium were previously qualified due to method blank detections. The associated field sample results were greater than five times the blank concentration for zinc. No data qualifying action was required.

The serial dilution performed on sample 13SW2 displayed a percent difference greater than the control limit (i.e., 10%) for total sodium at 15.7%. All associated field surface water sample results were positive and were flagged "J,s".

The matrix spike performed on sample 13SD2 displayed percent recoveries greater than the laboratory generated upper control limits for calcium at 134% and magnesium at 121%. All associated positive field sediment sample results were flagged "K,m". The serial dilution performed on sample 13SD2 displayed a percent difference greater than the control limit for calcium at 12.6%. All associated field sediment sample results were previously qualified for matrix spike recovery anomalies and no further data qualifying action was taken.

The matrix spike pair performed on sample ASB2C displayed percent recoveries outside the laboratory generated control limits for chromium (61%/114%) and a recovery less than the lower control limit (i.e., 64%) for vanadium at 60%. All associated field soil boring sample results were positive for chromium and were flagged "J,m". All associated field sample results were positive for vanadium and were flagged "L,m". The serial dilution performed on sample ASB2C displayed a percent difference greater than the control limit for cobalt at 30.0%. All associated field soil boring sample results were positive and were flagged "J,s".

The field duplicate pair (ASB2B and SBD10) displayed relative percent differences greater than the control limit (i.e., 35%) for cobalt at 44.4%, magnesium at 60.3%, and potassium at 55.2%. The associated field sample results for cobalt were previously flagged for a matrix spike anomaly and no further data qualifying action was taken. The results for magnesium and potassium were positive in these two field samples and were flagged "J,f".

Several samples displayed internal standard recoveries greater than the laboratory upper control limit (i.e., 120%) for yttrium. This internal standard is used to quantitate beryllium. The affected samples were reanalyzed at a dilution factor of five and displayed acceptable

internal standard responses. The affected sample results were reported from the diluted analyses and the method detection limits were elevated by a factor of five. The reporting limit was not raised because the project specified reporting limit was still greater than three times the elevated method detection limit.

Correctable Anomalies: For the sample receipt at the laboratory on 10/14/2003, two unlabelled jars were assigned to ASB1C and two unlabelled 250ml jars were assigned to ASB3A based on a logical deduction of required number of sample container types.

Comments: All samples from Area A were collected on a Saturday and could not be shipped until the following Monday. Samples were received at laboratory that Tuesday. The encore aliquots could not be used since the holding time to preservation had expired. All sample aliquots for VOC analyses were taken from bulk. Cooler TM0436 was received at the laboratory with internal temperatures greater than the upper control limit (i.e., 6°C) at 9.8 °C. This cooler contained the sample aliquots for field sample EQB5. Based on professional judgement no data qualifying action was required since this temperature did not exceed 10°C.

It should be noted that TIC results were flagged "NJ,t" in the associated samples. TIC results that were identified as unknown were manually lined out by the reviewer. Due to the abundance of target compounds, most of the samples were analyzed at dilutions for the metals analyses. Therefore, the reporting limits for these constituents were elevated.

No anomalies were encountered if a given fraction was not mentioned. Except for data flagged "R", all data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SSP

Submittal No.	Lab Sample ID	Field Sample ID	Matrix (Code)	Sample Date
36440-6	346012	37SB1B	SO	10/10/03
36440-6	346013	EQB5	WQ	10/10/03
36440-6	346014	Trip Blank	WQ	10/10/03
36440-6	346015	EQB6	WQ	10/10/03
36440-6	346016	Trip Blank	WQ	10/10/03
36440-6	346017	13SD3	SO	10/10/03
36440-6	346018	SDD1	SO	10/10/03
36440-6	346019	13SD2	SO	10/10/03
36440-6	346020	13SW3	WS	10/10/03
36440-6	346021	SWD1	WS	10/10/03
36440-6	346022	13SW2	WS	10/10/03
36440-6	346082	Trip Blank	WQ	10/10/03
36440-6	346248	ASB1A	SO	10/11/03
36440-6	346249	ASB1B	SO	10/11/03
36440-6	346250	ASB1C	SO	10/11/03
36440-6	346251	ASB3A	SO	10/11/03
36440-6	346252	ASB3B	SO	10/11/03
36440-6	346253	ASB3C	SO	10/11/03
36440-6	346254	ASB2A	SO	10/11/03
36440-6	346255	ASB2B	SO	10/11/03
36440-6	346256	SBD-10	SO	10/11/03
36440-6	346257	ASB2C	SO	10/11/03

Radford SSP
Duplicate Statistics
ASB2B and SBD10

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
acetone	ug/Kg	26	130	23	B	24	B	4.3%	1	104	N/A
methylene chloride	ug/Kg	26	130	7.7	J	7.0	J	9.5%	0.7	104	N/A
Semi-Volatiles											
bis(2-ethylhexyl)phthalate	ug/Kg	220	1100	22	J	16	J	31.6%	6	880	N/A
diethylphthalate	ug/Kg	220	1100	10	J	220	U	182.6%	210	880	N/A
di-n-butylphthalate	ug/Kg	220	1100	590		640		8.1%	50	880	Pass
Polyaromatic Hydrocarbons											
BDL											
Explosives											
BDL											
Metals											
aluminum	mg/Kg	250	1250	32300		34800		7.5%	2500	1000	Pass
antimony	mg/Kg	0.5	2.5	0.50	U	0.068	J	152.1%	0.432	2	N/A
arsenic	mg/Kg	0.40	2.0	3.4		4.7		32.1%	1.3	1.6	Pass
barium	mg/Kg	5.0	25	77		98		24.0%	21	20	Pass
beryllium	mg/Kg	1.0	5.0	1.3		0.86	J	40.7%	0.44	4	N/A
cadmium	mg/Kg	1.0	5.0	0.36	J	1.0	U	94.1%	0.64	4	N/A
calcium	mg/Kg	250	1250	867		380		78.1%	487	1000	Pass
chromium	mg/Kg	5.0	25	39		41		5.0%	2	20	Pass
cobalt	mg/Kg	1.0	5.0	14		22		**44.4%**	8	4	**Fail**
copper	mg/Kg	2.0	10	19		23		19.0%	4	8	Pass
iron	mg/Kg	1000	5000	40300		38000		5.9%	2300	4000	Pass
lead	mg/Kg	1.0	5.0	8.8		13		**38.5%**	4.2	4	**Fail**
magnesium	mg/Kg	250	1250	5220		2800		**60.3%**	2420	1000	**Fail**
manganese	mg/Kg	5.0	25	648		859		28.0%	211	20	Pass
mercury	mg/Kg	0.10	0.50	0.014	J	0.022	J	44.4%	0.008	0.4	N/A
nickel	mg/Kg	0.50	2.5	36		21		**52.6%**	15	2	**Fail**
potassium	mg/Kg	100	500	2750		1560		**55.2%**	1190	400	**Fail**
selenium	mg/Kg	1.0	5.0	0.60	J	0.50	J	18.2%	0.1	4	N/A
silver	mg/Kg	3.0	15	0.093	J	0.094	J	1.1%	0.001	12	N/A
sodium	mg/Kg	100	500	77	J	50	J	42.5%	27	400	N/A
thallium	mg/Kg	0.50	2.5	0.23	J	0.22	J	4.4%	0.01	2	N/A
vanadium	mg/Kg	1.0	5.0	55		49		11.5%	6	4	Pass
zinc	mg/Kg	4.0	20	45		37		19.5%	8	16	Pass
Cyanide											
zinc	mg/Kg	0.50	2.5	0.18	J	0.14	J	25.0%	0.04	2.0	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

Radford SSP
Duplicate Statistics

13SD3 and SDD1

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
cis-1,2-dichloroethene	ug/Kg	7.4	37	11		8		31.6%	3	30	Pass
methyl ethyl ketone	ug/Kg	29	145	31		30		3.3%	1	116	Pass
acetone	ug/Kg	29	145	80	B	59	B	30.2%	21	116	Pass
methylene chloride	ug/Kg	29	145	29		6.6	J	125.8%	22.4	116	N/A
tetrachloroethene	ug/Kg	7.4	37	5	J	2.1	J	81.7%	2.9	30	N/A
toluene	ug/Kg	7.4	37	1.8	J	1	J	57.1%	0.8	30	N/A
trichloroethene	ug/Kg	7.4	37	64		38		51.0%	26	30	Pass
Semi-Volatiles											
2-methylnaphalene	ug/Kg	270	1350	7.0	J	270	U	189.9%	263	1080	N/A
acenaphthylene	ug/Kg	270	1350	9.0	J	3.0	J	100.0%	6	1080	N/A
anthracene	ug/Kg	270	1350	44	J	12	J	114.3%	32	1080	N/A
benzo(a)anthracene	ug/Kg	270	1350	86	J	30	J	96.6%	56	1080	N/A
benzo(a)pyrene	ug/Kg	270	1350	140	J	53	J	90.2%	87	1080	N/A
benzo(b)fluoranthene	ug/Kg	270	1350	190	J	86	J	75.4%	104	1080	N/A
benzo(g,h,i)perylene	ug/Kg	270	1350	110	J	27	J	121.2%	83	1080	N/A
benzo(k)fluoranthene	ug/Kg	270	1350	92	J	36	J	87.5%	56	1080	N/A
bis(2-ethylhexyl)phthalate	ug/Kg	270	1350	41	J	35	J	15.8%	6	1080	N/A
chrysene	ug/Kg	270	1350	220	J	64	J	109.9%	156	1080	N/A
dibenzo(a,h)anthracene	ug/Kg	270	1350	42.0	J	270	U	146.2%	228	1080	N/A
diethylphthalate	ug/Kg	270	1350	18	J	22	J	20.0%	4	1080	N/A
dimethylphthalate	ug/Kg	270	1350	1400		270	U	135.3%	1130	1080	Fail
di-n-butylphthalate	ug/Kg	270	1350	130	J	110	J	16.7%	20	1080	N/A
fluoranthene	ug/Kg	270	1350	34	J	26	J	26.7%	8	1080	N/A
fluorene	ug/Kg	270	1350	4.0	J	270	U	194.2%	266	1080	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	270	1350	100	J	30	J	107.7%	70	1080	N/A
naphthalene	ug/Kg	270	1350	5.0	J	270	U	192.7%	265	1080	N/A
phenanthrene	ug/Kg	270	1350	29	J	14	J	69.8%	15	1080	N/A
pyrene	ug/Kg	270	1350	37	J	23	J	46.7%	14	1080	N/A
Polyaromatic Hydrocarbons											
anthracene	ug/Kg	33	165	9	J	33	U	111.3%	23.6	132	N/A
benzo(a)anthracene	ug/Kg	33	165	30	J	33	U	9.5%	3	132	N/A
benzo(a)pyrene	ug/Kg	33	165	49		33	U	39.0%	16	132	N/A
benzo(b)fluoranthene	ug/Kg	33	165	36		33	U	8.7%	3	132	N/A
benzo(g,h,i)perylene	ug/Kg	33	165	88		33	U	90.9%	55	132	N/A
benzo(k)fluoranthene	ug/Kg	33	165	24	J	33	U	31.6%	9	132	N/A
chrysene	ug/Kg	33	165	84		2.6	J	188.0%	81.4	132	N/A
dibenzo(a,h)anthracene	ug/Kg	33	165	6.2	J	33	U	136.7%	26.8	132	N/A
fluoranthene	ug/Kg	33	165	19	J	33	U	53.8%	14	132	N/A
indeno(1,2,3-cd)pyrene	ug/Kg	33	165	45		33	U	30.8%	12	132	N/A
phenanthrene	ug/Kg	33	165	5	J	33	U	145.5%	27.8	132	N/A
pyrene	ug/Kg	33	165	14	J	33	U	80.9%	19	132	N/A
Explosives											
BDL											
Metals											
aluminum	mg/Kg	500	2500	23400		19600		17.7%	3800	2000	Pass
antimony	mg/Kg	0.5	2.5	3.5		1.9		59.3%	1.6	2.0	Pass
arsenic	mg/Kg	0.4	2.0	3.4		3.7		8.5%	0.3	1.6	Pass
barium	mg/Kg	5	25	169		131		25.3%	38	20	Pass
beryllium	mg/Kg	1	5	1.3		1.3		0.0%	0.0	4.0	Pass
cadmium	mg/Kg	1	5	1.0		0.94	J	6.2%	0.06	4.0	N/A
calcium	mg/Kg	250	1250	2080		1620		24.9%	460	1000	Pass
chromium	mg/Kg	5	25	40		31		25.4%	9.0	20	Pass
cobalt	mg/Kg	1	5	13		12		8.0%	1.0	4.0	Pass
copper	mg/Kg	2	10	36		31		14.9%	5.0	8.0	Pass
iron	mg/Kg	1000	5000	37100		32000		14.8%	5100	4000	Pass
lead	mg/Kg	50	250	247		271		9.3%	24	200	Pass
magnesium	mg/Kg	250	1250	3870		3030		24.3%	840	1000	Pass
manganese	mg/Kg	5	25	544		644		16.8%	100	20	Pass
mercury	mg/Kg	0.1	0.50	0.13		0.11		16.7%	0.02	0.40	Pass
nickel	mg/Kg	0.5	2.5	19		18		5.4%	1.0	2.0	Pass
potassium	mg/Kg	100	500	1950		1520		24.8%	430	400	Pass
selenium	mg/Kg	1	5	1.2		1.2		0.0%	0.0	4.0	Pass
silver	mg/Kg	3	15	0.12	J	0.14	J	15.4%	0.02	12	N/A
sodium	mg/Kg	100	500	52	J	38	J	31.1%	14	400	N/A
thallium	mg/Kg	0.5	2.5	0.52		0.49	J	5.9%	0.03	2.0	N/A
vanadium	mg/Kg	1	5	44		32		31.6%	12	4.0	Pass
zinc	mg/Kg	40	200	541		541		0.0%	0.0	160	Pass
Cyanide											
total cyanide	mg/Kg	0.10	0.50	0.20	J	0.39	J	64.4%	0.19	0.40	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

URS
Measurement Systems DV Service

Radford SSP
Duplicate Statistics
13SW3 and SWD1

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	4xRL	Pass/ Fail
Volatiles											
BDL											
Semi-Volatiles											
bis(2-ethylhexyl)phthalate	ug/L	5.0	25	0.31	J	0.33	J	6.3%	0.02	20	N/A
butyl benzyl phthalate	ug/L	5.0	25	0.11	J	0.11	J	0.0%	0.0	20	N/A
Polyaromatic Hydrocarbons											
BDL											
Explosives											
BDL											
Metals											
total aluminum	ug/L	100	500	66	J	53	J	21.8%	13	400	N/A
total antimony	ug/L	1.0	5	0.7	J	1.0	U	35.3%	0.3	4.0	N/A
dissolved antimony	ug/L	2.0	10	0.8	J	2.0	U	85.7%	1.2	8.0	N/A
total barium	ug/L	10	50	21		21		0.0%	0.0	40.0	Pass
dissolved barium	ug/L	10	50	18		17		5.7%	1.0	40	Pass
total calcium	ug/L	2500	12500	13000		13000		0.0%	0.0	10000	Pass
dissolved calcium	ug/L	2500	12500	13000		13000		0.0%	0.0	10000	Pass
total chromium	ug/L	1.0	5	0.8	J	0.6	J	28.6%	0.2	4	N/A
dissolved chromium	ug/L	2.0	10	0.6	J	0.8	J	28.6%	0.2	8	N/A
total iron	ug/L	100	500	180		170		5.7%	10.0	400.0	Pass
dissolved iron	ug/L	100	500	38	J	36	J	5.4%	2.0	400.0	N/A
total lead	ug/L	1.0	5	0.9	J	0.9	J	0.0%	0	4	N/A
total magnesium	ug/L	500	2500	5400		5300		1.9%	100	2000	Pass
dissloved magnesium	ug/L	500	2500	5500		5400		1.8%	100	2000	Pass
total manganese	ug/L	10	50	30		24		22.2%	6	40	Pass
dissolved manganese	ug/L	10	50	7.9	J	4.3	J	59.0%	3.6	40.00	N/A
total nickel	ug/L	1.0	5.0	0.8	J	0.8	J	0.0%	0.0	4.0	N/A
dissolved nickel	ug/L	2.0	10	1.0	J	0.8	J	22.2%	0.2	8	N/A
total potassium	ug/L	200	1000	1900		1800		5.4%	100.0	800.0	Pass
dissolved potassium	ug/L	200	1000	1600		1700		6.1%	100	800	Pass
total sodium	ug/L	500	2500	5100		5000		2.0%	100	2000	Pass
dissolved sodium	ug/L	500	2500	5100		5000		2.0%	100	2000.0	Pass
total thallium	ug/L	1.0	5	0.30	J	0.24	J	22.2%	0.06	4.0	N/A
Cyanide											
BDL											

Aqueous Control Limits

[sample] > 5 x RL, use 25%
[sample] < 5 x RL, use 2 x RL

URS
Measurement Systems DV Service

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1B**	QC Batch:	90257 -121
Sample #:	**346012**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	83
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	0.511
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.911
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	0.784
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	0.712
75-34-3	1,1-Dichloroethane	6.0 U		6.0	0.869
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	0.880
106-93-4	1,2-Dibromoethane	6.0 U		6.0	0.822
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	2.50
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	0.581
107-06-2	1,2-Dichloroethane	6.0 U		6.0	0.517
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	0.852
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	0.844
78-87-5	1,2-Dichloropropane	6.0 U		6.0	0.703
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	0.653
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	0.492
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	0.322
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.852
78-93-3	**Methyl Ethyl Ketone**	**24**		24	6.00
591-78-6	2-Hexanone	12 U		12	2.71
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.75
67-64-1	**Acetone**	**48**	B,Z	24	6.00
71-43-2	Benzene	6.0 U		6.0	0.632
74-97-5	Bromochloromethane	6.0 U		6.0	0.913
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.601
75-25-2	Bromoform	6.0 U		6.0	0.694
74-83-9	Bromomethane	6.0 U		6.0	1.80
75-15-0	Carbon Disulfide	6.0 U		6.0	1.74
56-23-5	Carbon Tetrachloride	6.0 U		6.0	0.559
108-90-7	Chlorobenzene	6.0 U		6.0	0.793
75-00-3	Chloroethane	6.0 U	UJ,C	6.0	1.62
67-66-3	Chloroform	6.0 U		6.0	0.535

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**37SB1B**
Sample #:	**346012**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/10/03 @ 09:15
Sampler:	B.F. & J.S.
Received:	10/11/03 @ 08:45
Prepared:	n/a
Prep. Method:	n/a
Analyzed:	10/21/03 by JDM
Anal. Method:	USEPA-8260B
QC Batch:	90257 -121
Anal. Batch:	208351
Percent Solids:	83
Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U	6.0	1.00
110-82-7	Cyclohexane	12 U	12	0.379
10061-01-5	cis-1,3-Dichloropropene	6.0 U	6.0	0.589
10061-02-6	trans-1,3-Dichloropropene	6.0 U	6.0	0.625
75-71-8	Dichlorodifluoromethane	6.0 U	6.0	0.802
124-48-1	Chlorodibromomethane	6.0 U	6.0	0.620
100-41-4	Ethylbenzene	6.0 U	6.0	0.508
98-82-8	Isopropylbenzene	6.0 U	6.0	0.655
79-20-9	Methyl Acetate	24 U	24	4.16
108-87-2	Methylcyclohexane	12 U	12	1.01
1634-04-4	Methyl(tert)butyl Ether	6.0 U	6.0	0.769
75-09-2	**Methylene Chloride**	**4.6 J**	24	3.37
100-42-5	Styrene	6.0 U	6.0	0.530
127-18-4	Tetrachloroethene	6.0 U	6.0	0.736
108-88-3	Toluene	6.0 U	6.0	0.557
79-01-6	Trichloroethene	6.0 U	6.0	0.812
75-69-4	Trichlorofluoromethane	6.0 U	6.0	0.892
75-01-4	Vinyl Chloride	6.0 U	6.0	0.444
1330-20-7	Xylene (Total)	6.0 U	6.0	0.505

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**37SB1B**	QC Batch:	90257 -121
Sample #:	**346012**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	83
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB5**	QC Batch:	89888 -122
Sample #:	**346013**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U	UJ,c	20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U	UJ,c	20	0.364
67-64-1	**Acetone**	**1.6 J**	J,c	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U		5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB5**	QC Batch:	89888 -122
Sample #:	**346013**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.60 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB5**	QC Batch:	89888 -122
Sample #:	**346013**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -122
Sample #:	**346014**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U	UJ,C	20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U	UJ,C	20	0.364
67-64-1	Acetone	20 U	UJ,C	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U		5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -122
Sample #:	**346014**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**1.2 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	**Toluene**	**0.24 J**		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**	Prepared:	n/a
Submittal:	Delivery Order 0046	Prep. Method:	n/a
	RAAP	Analyzed:	10/22/03 DLVV
Sample ID:	**Trip Blank**	Anal. Method:	USEPA-8260B
Sample #:	**346014**	QC Batch:	89888 -122
Matrix:	QC Water	Anal. Batch:	208078
		Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**EQB6**	QC Batch:	89888 -122
Sample #:	**346015**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U	UJ,C	20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U	UJ,C	20	0.364
67-64-1	**Acetone**	**1.4 J**	J,C	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U		5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB6**	QC Batch:	89888 -122
Sample #:	**346015**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.68 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**EQB6**	QC Batch:	89888 -122
Sample #:	**346015**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -122
Sample #:	**346016**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U	UJ,C	20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U	UJ,C	20	0.364
67-64-1	Acetone	20 U	UJ,C	20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U		5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -122
Sample #:	**346016**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**1.1 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -122
Sample #:	**346016**	Anal. Batch:	208078
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**13SD3**	QC Batch:	90257 -121
Sample #:	**346017**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.4 U		7.4	0.639
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.4 U		7.4	1.14
79-34-5	1,1,2,2-Tetrachloroethane	7.4 U		7.4	0.980
79-00-5	1,1,2-Trichloroethane	7.4 U		7.4	0.890
75-34-3	1,1-Dichloroethane	7.4 U		7.4	1.09
75-35-4	1,1-Dichloroethylene	7.4 U		7.4	1.10
106-93-4	1,2-Dibromoethane	7.4 U		7.4	1.03
96-12-8	1,2-Dibromo-3-chloropropane	15 U		15	3.12
95-50-1	1,2-Dichlorobenzene	7.4 U		7.4	0.726
107-06-2	1,2-Dichloroethane	7.4 U		7.4	0.647
156-59-2	**cis-1,2-Dichloroethene**	**11**		7.4	1.07
156-60-5	trans-1,2-Dichloroethene	7.4 U		7.4	1.05
78-87-5	1,2-Dichloropropane	7.4 U		7.4	0.879
87-61-6	1,2,3-Trichlorobenzene	7.4 U		7.4	0.816
120-82-1	1,2,4-Trichlorobenzene	7.4 U		7.4	0.615
541-73-1	1,3-Dichlorobenzene	7.4 U		7.4	0.402
106-46-7	1,4-Dichlorobenzene	7.4 U		7.4	1.07
78-93-3	**Methyl Ethyl Ketone**	**31**		29	7.50
591-78-6	2-Hexanone	15 U		15	3.39
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.19
67-64-1	**Acetone**	**80**	B,Z	29	7.50
71-43-2	Benzene	7.4 U		7.4	0.791
74-97-5	Bromochloromethane	7.4 U		7.4	1.14
75-27-4	Dichlorobromomethane	7.4 U		7.4	0.752
75-25-2	Bromoform	7.4 U		7.4	0.867
74-83-9	Bromomethane	7.4 U		7.4	2.25
75-15-0	Carbon Disulfide	7.4 U		7.4	2.18
56-23-5	Carbon Tetrachloride	7.4 U		7.4	0.699
108-90-7	Chlorobenzene	7.4 U		7.4	0.992
75-00-3	Chloroethane	7.4 U	UJ,C	7.4	2.03
67-66-3	Chloroform	7.4 U		7.4	0.669

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SD3**	QC Batch:	90257 -121
Sample #:	**346017**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	7.4 U	7.4	1.25
110-82-7	Cyclohexane	15 U	15	0.474
10061-01-5	cis-1,3-Dichloropropene	7.4 U	7.4	0.737
10061-02-6	trans-1,3-Dichloropropene	7.4 U	7.4	0.782
75-71-8	Dichlorodifluoromethane	7.4 U	7.4	1.00
124-48-1	Chlorodibromomethane	7.4 U	7.4	0.776
100-41-4	Ethylbenzene	7.4 U	7.4	0.635
98-82-8	Isopropylbenzene	7.4 U	7.4	0.819
79-20-9	Methyl Acetate	29 U	29	5.21
108-87-2	Methylcyclohexane	15 U	15	1.27
1634-04-4	Methyl(tert)butyl Ether	7.4 U	7.4	0.962
75-09-2	Methylene Chloride	29 U	29	4.22
100-42-5	Styrene	7.4 U	7.4	0.663
127-18-4	**Tetrachloroethene**	**5.0 J**	7.4	0.920
108-88-3	**Toluene**	**1.8 J**	7.4	0.696
79-01-6	**Trichloroethene**	**64**	7.4	1.02
75-69-4	Trichlorofluoromethane	7.4 U	7.4	1.11
75-01-4	Vinyl Chloride	7.4 U	7.4	0.555
1330-20-7	Xylene (Total)	7.4 U	7.4	0.632

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**13SD3**
Sample #:	**346017**
Matrix:	Soil

Sampled:	10/10/03 @ 13:00
Sampler:	B.F. & J.S.
Received:	10/11/03 @ 08:45
Prepared:	n/a
Prep. Method:	n/a
Analyzed:	10/21/03 JDM
Anal. Method:	USEPA-8260B
QC Batch:	90257 -121
Anal. Batch:	208351
Percent Solids:	68
Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/21/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**SDD1**	QC Batch:	90257 -121
Sample #:	**346018**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	7.9 U		7.9	0.682
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	7.9 U		7.9	1.21
79-34-5	1,1,2,2-Tetrachloroethane	7.9 U		7.9	1.04
79-00-5	1,1,2-Trichloroethane	7.9 U		7.9	0.949
75-34-3	1,1-Dichloroethane	7.9 U		7.9	1.16
75-35-4	1,1-Dichloroethylene	7.9 U		7.9	1.17
106-93-4	1,2-Dibromoethane	7.9 U		7.9	1.10
96-12-8	1,2-Dibromo-3-chloropropane	16 U		16	3.33
95-50-1	1,2-Dichlorobenzene	7.9 U		7.9	0.774
107-06-2	1,2-Dichloroethane	7.9 U		7.9	0.690
156-59-2	**cis-1,2-Dichloroethene**	**8.0**		7.9	1.14
156-60-5	trans-1,2-Dichloroethene	7.9 U		7.9	1.12
78-87-5	1,2-Dichloropropane	7.9 U		7.9	0.938
87-61-6	1,2,3-Trichlorobenzene	7.9 U		7.9	0.870
120-82-1	1,2,4-Trichlorobenzene	7.9 U		7.9	0.656
541-73-1	1,3-Dichlorobenzene	7.9 U		7.9	0.429
106-46-7	1,4-Dichlorobenzene	7.9 U		7.9	1.14
78-93-3	**Methyl Ethyl Ketone**	**30 J**		32	8.00
591-78-6	2-Hexanone	16 U		16	3.62
108-10-1	4-Methyl-2-Pentanone	16 U		16	2.34
67-64-1	**Acetone**	**59**	B,Z	32	8.00
71-43-2	Benzene	7.9 U		7.9	0.843
74-97-5	Bromochloromethane	7.9 U		7.9	1.22
75-27-4	Dichlorobromomethane	7.9 U		7.9	0.802
75-25-2	Bromoform	7.9 U		7.9	0.925
74-83-9	Bromomethane	7.9 U		7.9	2.40
75-15-0	Carbon Disulfide	7.9 U		7.9	2.32
56-23-5	Carbon Tetrachloride	7.9 U		7.9	0.746
108-90-7	Chlorobenzene	7.9 U		7.9	1.06
75-00-3	Chloroethane	7.9 U	UJ,C	7.9	2.16
67-66-3	Chloroform	7.9 U		7.9	0.714

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SDD1**	QC Batch:	90257 -121
Sample #:	**346018**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	7.9 U	7.9	1.33
110-82-7	Cyclohexane	16 U	16	0.506
10061-01-5	cis-1,3-Dichloropropene	7.9 U	7.9	0.786
10061-02-6	trans-1,3-Dichloropropene	7.9 U	7.9	0.834
75-71-8	Dichlorodifluoromethane	7.9 U	7.9	1.07
124-48-1	Chlorodibromomethane	7.9 U	7.9	0.827
100-41-4	Ethylbenzene	7.9 U	7.9	0.677
98-82-8	Isopropylbenzene	7.9 U	7.9	0.874
79-20-9	Methyl Acetate	32 U	32	5.55
108-87-2	Methylcyclohexane	16 U	16	1.35
1634-04-4	Methyl(tert)butyl Ether	7.9 U	7.9	1.03
75-09-2	**Methylene Chloride**	**6.6 J**	32	4.50
100-42-5	Styrene	7.9 U	7.9	0.707
127-18-4	**Tetrachloroethene**	**2.1 J**	7.9	0.981
108-88-3	**Toluene**	**1.0 J**	7.9	0.742
79-01-6	**Trichloroethene**	**38**	7.9	1.08
75-69-4	Trichlorofluoromethane	7.9 U	7.9	1.19
75-01-4	Vinyl Chloride	7.9 U	7.9	0.592
1330-20-7	Xylene (Total)	7.9 U	7.9	0.674

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SDD1**	QC Batch:	90257 -121
Sample #:	**346018**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SD2**	QC Batch:	90257 -121
Sample #:	**346019**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	*1,1,1-Trichloroethane	7.7 U	UJ,M	7.7	0.639
76-13-1	*1,1,2-Trichloro-1,2,2-trifluoroethane	7.7 U	↓	7.7	1.14
79-34-5	1,1,2,2-Tetrachloroethane	7.7 U		7.7	0.980
79-00-5	*1,1,2-Trichloroethane	7.7 U	UJ,M	7.7	0.890
75-34-3	*1,1-Dichloroethane	7.7 U		7.7	1.09
75-35-4	*1,1-Dichloroethylene	7.7 U		7.7	1.10
106-93-4	*1,2-Dibromoethane	7.7 U		7.7	1.03
96-12-8	*1,2-Dibromo-3-chloropropane	15 U		15	3.12
95-50-1	*1,2-Dichlorobenzene	7.7 U		7.7	0.726
107-06-2	*1,2-Dichloroethane	7.7 U		7.7	0.647
156-59-2	*cis-1,2-Dichloroethene	7.7 U		7.7	1.07
156-60-5	*trans-1,2-Dichloroethene	7.7 U		7.7	1.05
78-87-5	*1,2-Dichloropropane	7.7 U		7.7	0.879
87-61-6	*1,2,3-Trichlorobenzene	7.7 U		7.7	0.816
120-82-1	*1,2,4-Trichlorobenzene	7.7 U		7.7	0.615
541-73-1	*1,3-Dichlorobenzene	7.7 U		7.7	0.402
106-46-7	*1,4-Dichlorobenzene	7.7 U	↓	7.7	1.07
78-93-3	**Methyl Ethyl Ketone**	**42**		31	7.50
591-78-6	2-Hexanone	15 U		15	3.39
108-10-1	4-Methyl-2-Pentanone	15 U		15	2.19
67-64-1	***Acetone**	**180**	J,M	31	7.50
71-43-2	*Benzene	7.7 U	UJ,M	7.7	0.791
74-97-5	*Bromochloromethane	7.7 U		7.7	1.14
75-27-4	*Dichlorobromomethane	7.7 U		7.7	0.752
75-25-2	*Bromoform	7.7 U		7.7	0.867
74-83-9	Bromomethane	7.7 U		7.7	2.25
75-15-0	*Carbon Disulfide	7.7 U		7.7	2.18
56-23-5	*Carbon Tetrachloride	7.7 U		7.7	0.699
108-90-7	*Chlorobenzene	7.7 U		7.7	0.992
75-00-3	*Chloroethane	7.7 U	UJ,C	7.7	2.03
67-66-3	*Chloroform	7.7 U	UJ,M	7.7	0.669

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SD2**	QC Batch:	90257 -121
Sample #:	**346019**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	*Chloromethane	7.7 U	UJ,M	7.7	1.25
110-82-7	*Cyclohexane	15 U		15	0.474
10061-01-5	*cis-1,3-Dichloropropene	7.7 U		7.7	0.737
10061-02-6	*trans-1,3-Dichloropropene	7.7 U		7.7	0.782
75-71-8	*Dichlorodifluoromethane	7.7 U		7.7	1.00
124-48-1	*Chlorodibromomethane	7.7 U		7.7	0.776
100-41-4	*Ethylbenzene	7.7 U		7.7	0.635
98-82-8	*Isopropylbenzene	7.7 U		7.7	0.819
79-20-9	Methyl Acetate	31 U		31	5.21
108-87-2	Methylcyclohexane	15 U		15	1.27
1634-04-4	*Methyl(tert)butyl Ether	7.7 U	UJ,M	7.7	0.962
75-09-2	*Methylene Chloride	31 U		31	4.22
100-42-5	*Styrene	7.7 U		7.7	0.663
127-18-4	*Tetrachloroethene	7.7 U		7.7	0.920
108-88-3	***Toluene**	**1.1 J**	J,M	7.7	0.696
79-01-6	*Trichloroethene	7.7 U	UJ,M	7.7	1.02
75-69-4	*Trichlorofluoromethane	7.7 U		7.7	1.11
75-01-4	*Vinyl Chloride	7.7 U		7.7	0.555
1330-20-7	*Xylene (Total)	7.7 U		7.7	0.632

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/21/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SD2**	QC Batch:	90257 -121
Sample #:	**346019**	Anal. Batch:	208351
Matrix:	Soil	Percent Solids:	65
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**13SW3**	QC Batch:	89888 -115
Sample #:	**346020**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SW3**	QC Batch:	89888 -115
Sample #:	**346020**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U	1.0	0.103
110-82-7	Cyclohexane	5.0 U	5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U	1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U	1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U	1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U	1.0	0.108
100-41-4	Ethylbenzene	1.0 U	1.0	0.195
98-82-8	Isopropylbenzene	1.0 U	1.0	0.090
79-20-9	Methyl Acetate	10 U	10	0.231
108-87-2	Methylcyclohexane	5.0 U	5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U	1.0	0.077
75-09-2	Methylene Chloride	4.0 U	4.0	0.117
100-42-5	Styrene	1.0 U	1.0	0.137
127-18-4	Tetrachloroethene	1.0 U	1.0	0.193
108-88-3	Toluene	1.0 U	1.0	0.214
79-01-6	Trichloroethene	1.0 U	1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U	1.0	0.051
75-01-4	Vinyl Chloride	1.0 U	1.0	0.119
1330-20-7	Xylene (Total)	3.0 U	3.0	0.160

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SW3**	QC Batch:	89888 -115
Sample #:	**346020**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**SWD1**	QC Batch:	89888 -115
Sample #:	**346021**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**SWD1**	QC Batch:	89888 -115
Sample #:	**346021**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U	1.0	0.103
110-82-7	Cyclohexane	5.0 U	5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U	1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U	1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U	1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U	1.0	0.108
100-41-4	Ethylbenzene	1.0 U	1.0	0.195
98-82-8	Isopropylbenzene	1.0 U	1.0	0.090
79-20-9	Methyl Acetate	10 U	10	0.231
108-87-2	Methylcyclohexane	5.0 U	5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U	1.0	0.077
75-09-2	Methylene Chloride	4.0 U	4.0	0.117
100-42-5	Styrene	1.0 U	1.0	0.137
127-18-4	Tetrachloroethene	1.0 U	1.0	0.193
108-88-3	Toluene	1.0 U	1.0	0.214
79-01-6	Trichloroethene	1.0 U	1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U	1.0	0.051
75-01-4	Vinyl Chloride	1.0 U	1.0	0.119
1330-20-7	Xylene (Total)	3.0 U	3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SWD1**	QC Batch:	89888 -115
Sample #:	**346021**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**13SW2**	QC Batch:	89888 -115
Sample #:	**346022**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	VJ,c	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 by DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SW2**	QC Batch:	89888 -115
Sample #:	**346022**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U	1.0	0.103
110-82-7	Cyclohexane	5.0 U	5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U	1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U	1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U	1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U	1.0	0.108
100-41-4	Ethylbenzene	1.0 U	1.0	0.195
98-82-8	Isopropylbenzene	1.0 U	1.0	0.090
79-20-9	Methyl Acetate	10 U	10	0.231
108-87-2	Methylcyclohexane	5.0 U	5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U	1.0	0.077
75-09-2	Methylene Chloride	4.0 U	4.0	0.117
100-42-5	Styrene	1.0 U	1.0	0.137
127-18-4	Tetrachloroethene	1.0 U	1.0	0.193
108-88-3	Toluene	1.0 U	1.0	0.214
79-01-6	Trichloroethene	1.0 U	1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U	1.0	0.051
75-01-4	Vinyl Chloride	1.0 U	1.0	0.119
1330-20-7	Xylene (Total)	3.0 U	3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**13SW2**	QC Batch:	89888 -115
Sample #:	**346022**	Anal. Batch:	207752
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**346082**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	1.0 U		1.0	0.142
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U		1.0	0.179
79-34-5	1,1,2,2-Tetrachloroethane	1.0 U		1.0	0.148
79-00-5	1,1,2-Trichloroethane	1.0 U		1.0	0.142
75-34-3	1,1-Dichloroethane	1.0 U		1.0	0.057
75-35-4	1,1-Dichloroethylene	1.0 U		1.0	0.133
106-93-4	1,2-Dibromoethane	1.0 U		1.0	0.171
96-12-8	1,2-Dibromo-3-chloropropane	5.0 U		5.0	0.270
95-50-1	1,2-Dichlorobenzene	1.0 U		1.0	0.164
107-06-2	1,2-Dichloroethane	1.0 U		1.0	0.111
156-59-2	cis-1,2-Dichloroethene	1.0 U		1.0	0.139
156-60-5	trans-1,2-Dichloroethene	1.0 U		1.0	0.143
78-87-5	1,2-Dichloropropane	1.0 U		1.0	0.255
87-61-6	1,2,3-Trichlorobenzene	1.0 U		1.0	0.228
120-82-1	1,2,4-Trichlorobenzene	1.0 U		1.0	0.189
541-73-1	1,3-Dichlorobenzene	1.0 U		1.0	0.160
106-46-7	1,4-Dichlorobenzene	1.0 U		1.0	0.124
78-93-3	Methyl Ethyl Ketone	20 U		20	0.417
591-78-6	2-Hexanone	20 U		20	0.455
108-10-1	4-Methyl-2-Pentanone	20 U		20	0.364
67-64-1	Acetone	20 U		20	1.07
71-43-2	Benzene	1.0 U		1.0	0.022
74-97-5	Bromochloromethane	1.0 U		1.0	0.076
75-27-4	Dichlorobromomethane	2.0 U		2.0	0.431
75-25-2	Bromoform	1.0 U		1.0	0.110
74-83-9	Bromomethane	1.0 U		1.0	0.267
75-15-0	Carbon Disulfide	5.0 U	UJ,C	5.0	0.059
56-23-5	Carbon Tetrachloride	1.0 U		1.0	0.115
108-90-7	Chlorobenzene	1.0 U		1.0	0.157
75-00-3	Chloroethane	1.0 U		1.0	0.180
67-66-3	Chloroform	1.0 U		1.0	0.101

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/15/03 by DLVV
		Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**346082**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Volatile Organics OLM4.2+ TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	1.0 U		1.0	0.103
110-82-7	Cyclohexane	5.0 U		5.0	0.215
10061-01-5	cis-1,3-Dichloropropene	1.0 U		1.0	0.189
10061-02-6	trans-1,3-Dichloropropene	1.0 U		1.0	0.117
75-71-8	Dichlorodifluoromethane	1.0 U		1.0	0.120
124-48-1	Chlorodibromomethane	1.0 U		1.0	0.108
100-41-4	Ethylbenzene	1.0 U		1.0	0.195
98-82-8	Isopropylbenzene	1.0 U		1.0	0.090
79-20-9	Methyl Acetate	10 U		10	0.231
108-87-2	Methylcyclohexane	5.0 U		5.0	0.168
1634-04-4	Methyl(tert)butyl Ether	1.0 U		1.0	0.077
75-09-2	**Methylene Chloride**	**0.96 J**	B,Z	4.0	0.117
100-42-5	Styrene	1.0 U		1.0	0.137
127-18-4	Tetrachloroethene	1.0 U		1.0	0.193
108-88-3	Toluene	1.0 U		1.0	0.214
79-01-6	Trichloroethene	1.0 U		1.0	0.211
75-69-4	Trichlorofluoromethane	1.0 U		1.0	0.051
75-01-4	Vinyl Chloride	1.0 U		1.0	0.119
1330-20-7	Xylene (Total)	3.0 U		3.0	0.160

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/15/03 DLVV
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**Trip Blank**	QC Batch:	89888 -115
Sample #:	**346082**	Anal. Batch:	207752
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/L)**	**Qualifier**

No compound was detected.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB1A**	QC Batch:	90601 -122
Sample #:	**346248**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.1 U		6.1	1.93
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.1 U		6.1	0.775
79-34-5	1,1,2,2-Tetrachloroethane	6.1 U		6.1	1.80
79-00-5	1,1,2-Trichloroethane	6.1 U		6.1	1.54
75-34-3	1,1-Dichloroethane	6.1 U		6.1	1.62
75-35-4	1,1-Dichloroethylene	6.1 U		6.1	3.47
106-93-4	1,2-Dibromoethane	6.1 U		6.1	2.24
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	3.28
95-50-1	1,2-Dichlorobenzene	6.1 U		6.1	1.72
107-06-2	1,2-Dichloroethane	6.1 U		6.1	1.56
156-59-2	cis-1,2-Dichloroethene	6.1 U		6.1	2.05
156-60-5	trans-1,2-Dichloroethene	6.1 U		6.1	2.12
78-87-5	1,2-Dichloropropane	6.1 U		6.1	1.90
87-61-6	1,2,3-Trichlorobenzene	6.1 U		6.1	1.13
120-82-1	1,2,4-Trichlorobenzene	6.1 U		6.1	2.11
541-73-1	1,3-Dichlorobenzene	6.1 U		6.1	2.16
106-46-7	1,4-Dichlorobenzene	6.1 U		6.1	0.833
78-93-3	Methyl Ethyl Ketone	24 U		24	5.40
591-78-6	2-Hexanone	12 U		12	2.27
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.22
67-64-1	**Acetone**	**15 J**	B,Z	24	11.2
71-43-2	Benzene	6.1 U		6.1	0.805
74-97-5	Bromochloromethane	6.1 U		6.1	1.48
75-27-4	Dichlorobromomethane	6.1 U		6.1	0.569
75-25-2	Bromoform	6.1 U		6.1	1.63
74-83-9	Bromomethane	6.1 U		6.1	5.50
75-15-0	Carbon Disulfide	6.1 U		6.1	1.84
56-23-5	Carbon Tetrachloride	6.1 U		6.1	1.70
108-90-7	Chlorobenzene	6.1 U		6.1	0.545
75-00-3	Chloroethane	6.1 U	UJ,C	6.1	2.92
67-66-3	Chloroform	6.1 U		6.1	0.869

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1A**	QC Batch:	90601 -122
Sample #:	**346248**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.1 U	6.1	0.679
110-82-7	Cyclohexane	12 U	12	1.58
10061-01-5	cis-1,3-Dichloropropene	6.1 U	6.1	1.30
10061-02-6	trans-1,3-Dichloropropene	6.1 U	6.1	1.94
75-71-8	Dichlorodifluoromethane	6.1 U	6.1	0.840
124-48-1	Chlorodibromomethane	6.1 U	6.1	0.673
100-41-4	Ethylbenzene	6.1 U	6.1	1.92
98-82-8	Isopropylbenzene	6.1 U	6.1	1.44
79-20-9	Methyl Acetate	24 U	24	4.50
108-87-2	Methylcyclohexane	12 U	12	1.94
1634-04-4	Methyl(tert)butyl Ether	6.1 U	6.1	1.55
75-09-2	**Methylene Chloride**	**4.9 J**	24	1.44
100-42-5	Styrene	6.1 U	6.1	1.49
127-18-4	Tetrachloroethene	6.1 U	6.1	1.54
108-88-3	Toluene	6.1 U	6.1	1.38
79-01-6	Trichloroethene	6.1 U	6.1	2.23
75-69-4	Trichlorofluoromethane	6.1 U	6.1	0.841
75-01-4	Vinyl Chloride	6.1 U	6.1	1.49
1330-20-7	Xylene (Total)	6.1 U	6.1	1.82

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1A**	QC Batch:	90601 -122
Sample #:	**346248**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1B**	QC Batch:	90601 -122
Sample #:	**346249**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.4 U		6.4	2.09
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.4 U		6.4	0.840
79-34-5	1,1,2,2-Tetrachloroethane	6.4 U		6.4	1.95
79-00-5	1,1,2-Trichloroethane	6.4 U		6.4	1.66
75-34-3	1,1-Dichloroethane	6.4 U		6.4	1.76
75-35-4	1,1-Dichloroethylene	6.4 U		6.4	3.76
106-93-4	1,2-Dibromoethane	6.4 U		6.4	2.43
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	3.55
95-50-1	1,2-Dichlorobenzene	6.4 U		6.4	1.86
107-06-2	1,2-Dichloroethane	6.4 U		6.4	1.69
156-59-2	cis-1,2-Dichloroethene	6.4 U		6.4	2.22
156-60-5	trans-1,2-Dichloroethene	6.4 U		6.4	2.30
78-87-5	1,2-Dichloropropane	6.4 U		6.4	2.05
87-61-6	1,2,3-Trichlorobenzene	6.4 U		6.4	1.23
120-82-1	1,2,4-Trichlorobenzene	6.4 U		6.4	2.29
541-73-1	1,3-Dichlorobenzene	6.4 U		6.4	2.34
106-46-7	1,4-Dichlorobenzene	6.4 U		6.4	0.902
78-93-3	Methyl Ethyl Ketone	26 U		26	5.85
591-78-6	2-Hexanone	13 U		13	2.46
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.33
67-64-1	**Acetone**	**19 J**	B,Z	26	12.1
71-43-2	Benzene	6.4 U		6.4	0.872
74-97-5	Bromochloromethane	6.4 U		6.4	1.60
75-27-4	Dichlorobromomethane	6.4 U		6.4	0.616
75-25-2	Bromoform	6.4 U		6.4	1.77
74-83-9	Bromomethane	6.4 U		6.4	5.95
75-15-0	Carbon Disulfide	6.4 U		6.4	1.99
56-23-5	Carbon Tetrachloride	6.4 U		6.4	1.85
108-90-7	Chlorobenzene	6.4 U		6.4	0.590
75-00-3	Chloroethane	6.4 U	UJ,C	6.4	3.16
67-66-3	Chloroform	6.4 U		6.4	0.941

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1B**	QC Batch:	90601 -122
Sample #:	**346249**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.4 U	6.4	0.736
110-82-7	Cyclohexane	13 U	13	1.72
10061-01-5	cis-1,3-Dichloropropene	6.4 U	6.4	1.40
10061-02-6	trans-1,3-Dichloropropene	6.4 U	6.4	2.11
75-71-8	Dichlorodifluoromethane	6.4 U	6.4	0.910
124-48-1	Chlorodibromomethane	6.4 U	6.4	0.729
100-41-4	Ethylbenzene	6.4 U	6.4	2.08
98-82-8	Isopropylbenzene	6.4 U	6.4	1.56
79-20-9	Methyl Acetate	26 U	26	4.88
108-87-2	Methylcyclohexane	13 U	13	2.11
1634-04-4	Methyl(tert)butyl Ether	6.4 U	6.4	1.68
75-09-2	**Methylene Chloride**	**5.9 J**	26	1.56
100-42-5	Styrene	6.4 U	6.4	1.61
127-18-4	Tetrachloroethene	6.4 U	6.4	1.66
108-88-3	Toluene	6.4 U	6.4	1.50
79-01-6	Trichloroethene	6.4 U	6.4	2.42
75-69-4	Trichlorofluoromethane	6.4 U	6.4	0.911
75-01-4	Vinyl Chloride	6.4 U	6.4	1.61
1330-20-7	Xylene (Total)	6.4 U	6.4	1.98

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1B**	QC Batch:	90601 -122
Sample #:	**346249**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB1C**	QC Batch:	90601 -122
Sample #:	**346250**	Anal. Batch:	208508
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.5 U		6.5	2.09
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.5 U		6.5	0.840
79-34-5	1,1,2,2-Tetrachloroethane	6.5 U		6.5	1.95
79-00-5	1,1,2-Trichloroethane	6.5 U		6.5	1.66
75-34-3	1,1-Dichloroethane	6.5 U		6.5	1.76
75-35-4	1,1-Dichloroethylene	6.5 U		6.5	3.76
106-93-4	1,2-Dibromoethane	6.5 U		6.5	2.43
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	3.55
95-50-1	1,2-Dichlorobenzene	6.5 U		6.5	1.86
107-06-2	1,2-Dichloroethane	6.5 U		6.5	1.69
156-59-2	cis-1,2-Dichloroethene	6.5 U		6.5	2.22
156-60-5	trans-1,2-Dichloroethene	6.5 U		6.5	2.30
78-87-5	1,2-Dichloropropane	6.5 U		6.5	2.05
87-61-6	1,2,3-Trichlorobenzene	6.5 U		6.5	1.23
120-82-1	1,2,4-Trichlorobenzene	6.5 U		6.5	2.29
541-73-1	1,3-Dichlorobenzene	6.5 U		6.5	2.34
106-46-7	1,4-Dichlorobenzene	6.5 U		6.5	0.902
78-93-3	Methyl Ethyl Ketone	26 U		26	5.85
591-78-6	2-Hexanone	13 U		13	2.46
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.33
67-64-1	**Acetone**	**29**	B,Z	26	12.1
71-43-2	Benzene	6.5 U		6.5	0.872
74-97-5	Bromochloromethane	6.5 U		6.5	1.60
75-27-4	Dichlorobromomethane	6.5 U		6.5	0.616
75-25-2	Bromoform	6.5 U		6.5	1.77
74-83-9	Bromomethane	6.5 U		6.5	5.95
75-15-0	Carbon Disulfide	6.5 U	UJ,C	6.5	1.99
56-23-5	Carbon Tetrachloride	6.5 U		6.5	1.85
108-90-7	Chlorobenzene	6.5 U		6.5	0.590
75-00-3	Chloroethane	6.5 U		6.5	3.16
67-66-3	Chloroform	6.5 U		6.5	0.941

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB1C**	QC Batch:	90601 -122
Sample #:	**346250**	Anal. Batch:	208508
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
74-87-3	Chloromethane	6.5 U		6.5	0.736
110-82-7	Cyclohexane	13 U		13	1.72
10061-01-5	cis-1,3-Dichloropropene	6.5 U		6.5	1.40
10061-02-6	trans-1,3-Dichloropropene	6.5 U		6.5	2.11
75-71-8	Dichlorodifluoromethane	6.5 U		6.5	0.910
124-48-1	Chlorodibromomethane	6.5 U		6.5	0.729
100-41-4	Ethylbenzene	6.5 U		6.5	2.08
98-82-8	Isopropylbenzene	6.5 U		6.5	1.56
79-20-9	Methyl Acetate	26 U	UJ,c	26	4.88
108-87-2	Methylcyclohexane	13 U		13	2.11
1634-04-4	Methyl(tert)butyl Ether	6.5 U		6.5	1.68
75-09-2	**Methylene Chloride**	**6.6 J**	B,2	26	1.56
100-42-5	Styrene	6.5 U		6.5	1.61
127-18-4	Tetrachloroethene	6.5 U		6.5	1.66
108-88-3	Toluene	6.5 U		6.5	1.50
79-01-6	Trichloroethene	6.5 U		6.5	2.42
75-69-4	Trichlorofluoromethane	6.5 U		6.5	0.911
75-01-4	Vinyl Chloride	6.5 U		6.5	1.61
1330-20-7	Xylene (Total)	6.5 U		6.5	1.98

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**ASB1C**
Sample #:	**346250**
Matrix:	Soil

Sampled:	10/11/03 @ 09:15
Sampler:	B.F.& J.S.
Received:	10/14/03 @ 09:30
Prepared:	n/a
Prep. Method:	n/a
Analyzed:	10/22/03 JDM
Anal. Method:	USEPA-8260B
QC Batch:	90601 -122
Anal. Batch:	208854
Percent Solids:	77
Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**

No compound was detected.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB3A**	QC Batch:	90601 -122
Sample #:	**346251**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	1.93
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.775
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	1.80
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	1.54
75-34-3	1,1-Dichloroethane	6.2 U		6.2	1.62
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	3.47
106-93-4	1,2-Dibromoethane	6.2 U		6.2	2.24
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	3.28
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	1.72
107-06-2	1,2-Dichloroethane	6.2 U		6.2	1.56
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	2.05
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	2.12
78-87-5	1,2-Dichloropropane	6.2 U		6.2	1.90
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	1.13
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	2.11
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	2.16
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.833
78-93-3	Methyl Ethyl Ketone	25 U		25	5.40
591-78-6	2-Hexanone	12 U		12	2.27
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.22
67-64-1	**Acetone**	**12 J**	B,Z	25	11.2
71-43-2	Benzene	6.2 U		6.2	0.805
74-97-5	Bromochloromethane	6.2 U		6.2	1.48
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.569
75-25-2	Bromoform	6.2 U		6.2	1.63
74-83-9	Bromomethane	6.2 U		6.2	5.50
75-15-0	Carbon Disulfide	6.2 U		6.2	1.84
56-23-5	Carbon Tetrachloride	6.2 U		6.2	1.70
108-90-7	Chlorobenzene	6.2 U		6.2	0.545
75-00-3	Chloroethane	6.2 U	UJ,C	6.2	2.92
67-66-3	Chloroform	6.2 U		6.2	0.869

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB3A**	QC Batch:	90601 -122
Sample #:	**346251**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U	6.2	0.679
110-82-7	Cyclohexane	12 U	12	1.58
10061-01-5	cis-1,3-Dichloropropene	6.2 U	6.2	1.30
10061-02-6	trans-1,3-Dichloropropene	6.2 U	6.2	1.94
75-71-8	Dichlorodifluoromethane	6.2 U	6.2	0.840
124-48-1	Chlorodibromomethane	6.2 U	6.2	0.673
100-41-4	Ethylbenzene	6.2 U	6.2	1.92
98-82-8	Isopropylbenzene	6.2 U	6.2	1.44
79-20-9	Methyl Acetate	25 U	25	4.50
108-87-2	Methylcyclohexane	12 U	12	1.94
1634-04-4	Methyl(tert)butyl Ether	6.2 U	6.2	1.55
75-09-2	**Methylene Chloride**	**5.3 J**	25	1.44
100-42-5	Styrene	6.2 U	6.2	1.49
127-18-4	Tetrachloroethene	6.2 U	6.2	1.54
108-88-3	Toluene	6.2 U	6.2	1.38
79-01-6	Trichloroethene	6.2 U	6.2	2.23
75-69-4	Trichlorofluoromethane	6.2 U	6.2	0.841
75-01-4	Vinyl Chloride	6.2 U	6.2	1.49
1330-20-7	Xylene (Total)	6.2 U	6.2	1.82

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB3A**	QC Batch:	90601 -122
Sample #:	**346251**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB3B**	QC Batch:	90601 -122
Sample #:	**346252**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	1.93
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.775
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	1.80
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	1.54
75-34-3	1,1-Dichloroethane	6.2 U		6.2	1.62
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	3.47
106-93-4	1,2-Dibromoethane	6.2 U		6.2	2.24
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	3.28
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	1.72
107-06-2	1,2-Dichloroethane	6.2 U		6.2	1.56
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	2.05
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	2.12
78-87-5	1,2-Dichloropropane	6.2 U		6.2	1.90
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	1.13
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	2.11
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	2.16
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.833
78-93-3	Methyl Ethyl Ketone	25 U		25	5.40
591-78-6	2-Hexanone	12 U		12	2.27
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.22
67-64-1	**Acetone**	**19 J**	B,z	25	11.2
71-43-2	Benzene	6.2 U		6.2	0.805
74-97-5	Bromochloromethane	6.2 U		6.2	1.48
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.569
75-25-2	Bromoform	6.2 U		6.2	1.63
74-83-9	Bromomethane	6.2 U		6.2	5.50
75-15-0	Carbon Disulfide	6.2 U		6.2	1.84
56-23-5	Carbon Tetrachloride	6.2 U		6.2	1.70
108-90-7	Chlorobenzene	6.2 U		6.2	0.545
75-00-3	Chloroethane	6.2 U	UJ,c	6.2	2.92
67-66-3	Chloroform	6.2 U		6.2	0.869

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB3B**	QC Batch:	90601 -122
Sample #:	**346252**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U	6.2	0.679
110-82-7	Cyclohexane	12 U	12	1.58
10061-01-5	cis-1,3-Dichloropropene	6.2 U	6.2	1.30
10061-02-6	trans-1,3-Dichloropropene	6.2 U	6.2	1.94
75-71-8	Dichlorodifluoromethane	6.2 U	6.2	0.840
124-48-1	Chlorodibromomethane	6.2 U	6.2	0.673
100-41-4	Ethylbenzene	6.2 U	6.2	1.92
98-82-8	Isopropylbenzene	6.2 U	6.2	1.44
79-20-9	Methyl Acetate	25 U	25	4.50
108-87-2	Methylcyclohexane	12 U	12	1.94
1634-04-4	Methyl(tert)butyl Ether	6.2 U	6.2	1.55
75-09-2	**Methylene Chloride**	**6.6 J**	25	1.44
100-42-5	Styrene	6.2 U	6.2	1.49
127-18-4	Tetrachloroethene	6.2 U	6.2	1.54
108-88-3	Toluene	6.2 U	6.2	1.38
79-01-6	Trichloroethene	6.2 U	6.2	2.23
75-69-4	Trichlorofluoromethane	6.2 U	6.2	0.841
75-01-4	Vinyl Chloride	6.2 U	6.2	1.49
1330-20-7	Xylene (Total)	6.2 U	6.2	1.82

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB3B**	QC Batch:	90601 -122
Sample #:	**346252**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB3C**	QC Batch:	90601 -122
Sample #:	**346253**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.0 U		6.0	1.93
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.0 U		6.0	0.775
79-34-5	1,1,2,2-Tetrachloroethane	6.0 U		6.0	1.80
79-00-5	1,1,2-Trichloroethane	6.0 U		6.0	1.54
75-34-3	1,1-Dichloroethane	6.0 U		6.0	1.62
75-35-4	1,1-Dichloroethylene	6.0 U		6.0	3.47
106-93-4	1,2-Dibromoethane	6.0 U		6.0	2.24
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	3.28
95-50-1	1,2-Dichlorobenzene	6.0 U		6.0	1.72
107-06-2	1,2-Dichloroethane	6.0 U		6.0	1.56
156-59-2	cis-1,2-Dichloroethene	6.0 U		6.0	2.05
156-60-5	trans-1,2-Dichloroethene	6.0 U		6.0	2.12
78-87-5	1,2-Dichloropropane	6.0 U		6.0	1.90
87-61-6	1,2,3-Trichlorobenzene	6.0 U		6.0	1.13
120-82-1	1,2,4-Trichlorobenzene	6.0 U		6.0	2.11
541-73-1	1,3-Dichlorobenzene	6.0 U		6.0	2.16
106-46-7	1,4-Dichlorobenzene	6.0 U		6.0	0.833
78-93-3	Methyl Ethyl Ketone	24 U		24	5.40
591-78-6	2-Hexanone	12 U		12	2.27
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.22
67-64-1	**Acetone**	**18 J**	B,Z	24	11.2
71-43-2	Benzene	6.0 U		6.0	0.805
74-97-5	Bromochloromethane	6.0 U		6.0	1.48
75-27-4	Dichlorobromomethane	6.0 U		6.0	0.569
75-25-2	Bromoform	6.0 U		6.0	1.63
74-83-9	Bromomethane	6.0 U		6.0	5.50
75-15-0	Carbon Disulfide	6.0 U		6.0	1.84
56-23-5	Carbon Tetrachloride	6.0 U		6.0	1.70
108-90-7	Chlorobenzene	6.0 U		6.0	0.545
75-00-3	Chloroethane	6.0 U	UJ,C	6.0	2.92
67-66-3	Chloroform	6.0 U		6.0	0.869

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB3C**	QC Batch:	90601 -122
Sample #:	**346253**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.0 U	6.0	0.679
110-82-7	Cyclohexane	12 U	12	1.58
10061-01-5	cis-1,3-Dichloropropene	6.0 U	6.0	1.30
10061-02-6	trans-1,3-Dichloropropene	6.0 U	6.0	1.94
75-71-8	Dichlorodifluoromethane	6.0 U	6.0	0.840
124-48-1	Chlorodibromomethane	6.0 U	6.0	0.673
100-41-4	Ethylbenzene	6.0 U	6.0	1.92
98-82-8	Isopropylbenzene	6.0 U	6.0	1.44
79-20-9	Methyl Acetate	24 U	24	4.50
108-87-2	Methylcyclohexane	12 U	12	1.94
1634-04-4	Methyl(tert)butyl Ether	6.0 U	6.0	1.55
75-09-2	**Methylene Chloride**	**3.7 J**	24	1.44
100-42-5	Styrene	6.0 U	6.0	1.49
127-18-4	Tetrachloroethene	6.0 U	6.0	1.54
108-88-3	Toluene	6.0 U	6.0	1.38
79-01-6	Trichloroethene	6.0 U	6.0	2.23
75-69-4	Trichlorofluoromethane	6.0 U	6.0	0.841
75-01-4	Vinyl Chloride	6.0 U	6.0	1.49
1330-20-7	Xylene (Total)	6.0 U	6.0	1.82

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB3C**	QC Batch:	90601 -122
Sample #:	**346253**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB2A**	QC Batch:	90601 -122
Sample #:	**346254**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.2 U		6.2	1.93
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.2 U		6.2	0.775
79-34-5	1,1,2,2-Tetrachloroethane	6.2 U		6.2	1.80
79-00-5	1,1,2-Trichloroethane	6.2 U		6.2	1.54
75-34-3	1,1-Dichloroethane	6.2 U		6.2	1.62
75-35-4	1,1-Dichloroethylene	6.2 U		6.2	3.47
106-93-4	1,2-Dibromoethane	6.2 U		6.2	2.24
96-12-8	1,2-Dibromo-3-chloropropane	12 U		12	3.28
95-50-1	1,2-Dichlorobenzene	6.2 U		6.2	1.72
107-06-2	1,2-Dichloroethane	6.2 U		6.2	1.56
156-59-2	cis-1,2-Dichloroethene	6.2 U		6.2	2.05
156-60-5	trans-1,2-Dichloroethene	6.2 U		6.2	2.12
78-87-5	1,2-Dichloropropane	6.2 U		6.2	1.90
87-61-6	1,2,3-Trichlorobenzene	6.2 U		6.2	1.13
120-82-1	1,2,4-Trichlorobenzene	6.2 U		6.2	2.11
541-73-1	1,3-Dichlorobenzene	6.2 U		6.2	2.16
106-46-7	1,4-Dichlorobenzene	6.2 U		6.2	0.833
78-93-3	Methyl Ethyl Ketone	25 U		25	5.40
591-78-6	2-Hexanone	12 U		12	2.27
108-10-1	4-Methyl-2-Pentanone	12 U		12	1.22
67-64-1	**Acetone**	**16 J**	B,Z	25	11.2
71-43-2	Benzene	6.2 U		6.2	0.805
74-97-5	Bromochloromethane	6.2 U		6.2	1.48
75-27-4	Dichlorobromomethane	6.2 U		6.2	0.569
75-25-2	Bromoform	6.2 U		6.2	1.63
74-83-9	Bromomethane	6.2 U		6.2	5.50
75-15-0	Carbon Disulfide	6.2 U		6.2	1.84
56-23-5	Carbon Tetrachloride	6.2 U		6.2	1.70
108-90-7	Chlorobenzene	6.2 U		6.2	0.545
75-00-3	Chloroethane	6.2 U	VJ,C	6.2	2.92
67-66-3	Chloroform	6.2 U		6.2	0.869

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**ASB2A**	QC Batch:	90601 -122
Sample #:	**346254**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.2 U	6.2	0.679
110-82-7	Cyclohexane	12 U	12	1.58
10061-01-5	cis-1,3-Dichloropropene	6.2 U	6.2	1.30
10061-02-6	trans-1,3-Dichloropropene	6.2 U	6.2	1.94
75-71-8	Dichlorodifluoromethane	6.2 U	6.2	0.840
124-48-1	Chlorodibromomethane	6.2 U	6.2	0.673
100-41-4	Ethylbenzene	6.2 U	6.2	1.92
98-82-8	Isopropylbenzene	6.2 U	6.2	1.44
79-20-9	Methyl Acetate	25 U	25	4.50
108-87-2	Methylcyclohexane	12 U	12	1.94
1634-04-4	Methyl(tert)butyl Ether	6.2 U	6.2	1.55
75-09-2	**Methylene Chloride**	**4.5 J**	25	1.44
100-42-5	Styrene	6.2 U	6.2	1.49
127-18-4	Tetrachloroethene	6.2 U	6.2	1.54
108-88-3	Toluene	6.2 U	6.2	1.38
79-01-6	Trichloroethene	6.2 U	6.2	2.23
75-69-4	Trichlorofluoromethane	6.2 U	6.2	0.841
75-01-4	Vinyl Chloride	6.2 U	6.2	1.49
1330-20-7	Xylene (Total)	6.2 U	6.2	1.82

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2A**	QC Batch:	90601 -122
Sample #:	**346254**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	n/a
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	n/a
		Analyzed:	10/22/03 by JDM
Sample ID:	**ASB2B**	Anal. Method:	USEPA-8260B
Sample #:	**346255**	QC Batch:	90601 -122
Matrix:	Soil	Anal. Batch:	208854
Unit:	ug/kg dry	Percent Solids:	76
		Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.6 U		6.6	2.09
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.6 U		6.6	0.840
79-34-5	1,1,2,2-Tetrachloroethane	6.6 U		6.6	1.95
79-00-5	1,1,2-Trichloroethane	6.6 U		6.6	1.66
75-34-3	1,1-Dichloroethane	6.6 U		6.6	1.76
75-35-4	1,1-Dichloroethylene	6.6 U		6.6	3.76
106-93-4	1,2-Dibromoethane	6.6 U		6.6	2.43
96-12-8	1,2-Dibromo-3-chloropropane	13 U		13	3.55
95-50-1	1,2-Dichlorobenzene	6.6 U		6.6	1.86
107-06-2	1,2-Dichloroethane	6.6 U		6.6	1.69
156-59-2	cis-1,2-Dichloroethene	6.6 U		6.6	2.22
156-60-5	trans-1,2-Dichloroethene	6.6 U		6.6	2.30
78-87-5	1,2-Dichloropropane	6.6 U		6.6	2.05
87-61-6	1,2,3-Trichlorobenzene	6.6 U		6.6	1.23
120-82-1	1,2,4-Trichlorobenzene	6.6 U		6.6	2.29
541-73-1	1,3-Dichlorobenzene	6.6 U		6.6	2.34
106-46-7	1,4-Dichlorobenzene	6.6 U		6.6	0.902
78-93-3	Methyl Ethyl Ketone	26 U		26	5.85
591-78-6	2-Hexanone	13 U		13	2.46
108-10-1	4-Methyl-2-Pentanone	13 U		13	1.33
67-64-1	**Acetone**	**23 J**	B,Z	26	12.1
71-43-2	Benzene	6.6 U		6.6	0.872
74-97-5	Bromochloromethane	6.6 U		6.6	1.60
75-27-4	Dichlorobromomethane	6.6 U		6.6	0.616
75-25-2	Bromoform	6.6 U		6.6	1.77
74-83-9	Bromomethane	6.6 U		6.6	5.95
75-15-0	Carbon Disulfide	6.6 U		6.6	1.99
56-23-5	Carbon Tetrachloride	6.6 U		6.6	1.85
108-90-7	Chlorobenzene	6.6 U		6.6	0.590
75-00-3	Chloroethane	6.6 U	UJ,C	6.6	3.16
67-66-3	Chloroform	6.6 U		6.6	0.941

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2B**	QC Batch:	90601 -122
Sample #:	**346255**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.6 U	6.6	0.736
110-82-7	Cyclohexane	13 U	13	1.72
10061-01-5	cis-1,3-Dichloropropene	6.6 U	6.6	1.40
10061-02-6	trans-1,3-Dichloropropene	6.6 U	6.6	2.11
75-71-8	Dichlorodifluoromethane	6.6 U	6.6	0.910
124-48-1	Chlorodibromomethane	6.6 U	6.6	0.729
100-41-4	Ethylbenzene	6.6 U	6.6	2.08
98-82-8	Isopropylbenzene	6.6 U	6.6	1.56
79-20-9	Methyl Acetate	26 U	26	4.88
108-87-2	Methylcyclohexane	13 U	13	2.11
1634-04-4	Methyl(tert)butyl Ether	6.6 U	6.6	1.68
75-09-2	**Methylene Chloride**	**7.7 J**	26	1.56
100-42-5	Styrene	6.6 U	6.6	1.61
127-18-4	Tetrachloroethene	6.6 U	6.6	1.66
108-88-3	Toluene	6.6 U	6.6	1.50
79-01-6	Trichloroethene	6.6 U	6.6	2.42
75-69-4	Trichlorofluoromethane	6.6 U	6.6	0.911
75-01-4	Vinyl Chloride	6.6 U	6.6	1.61
1330-20-7	Xylene (Total)	6.6 U	6.6	1.98

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2B**	QC Batch:	90601 -122
Sample #:	**346255**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**SBD-10**	QC Batch:	90601 -122
Sample #:	**346256**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.9 U		6.9	2.25
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	6.9 U		6.9	0.904
79-34-5	1,1,2,2-Tetrachloroethane	6.9 U		6.9	2.10
79-00-5	1,1,2-Trichloroethane	6.9 U		6.9	1.79
75-34-3	1,1-Dichloroethane	6.9 U		6.9	1.89
75-35-4	1,1-Dichloroethylene	6.9 U		6.9	4.05
106-93-4	1,2-Dibromoethane	6.9 U		6.9	2.62
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	3.82
95-50-1	1,2-Dichlorobenzene	6.9 U		6.9	2.00
107-06-2	1,2-Dichloroethane	6.9 U		6.9	1.82
156-59-2	cis-1,2-Dichloroethene	6.9 U		6.9	2.39
156-60-5	trans-1,2-Dichloroethene	6.9 U		6.9	2.48
78-87-5	1,2-Dichloropropane	6.9 U		6.9	2.21
87-61-6	1,2,3-Trichlorobenzene	6.9 U		6.9	1.32
120-82-1	1,2,4-Trichlorobenzene	6.9 U		6.9	2.46
541-73-1	1,3-Dichlorobenzene	6.9 U		6.9	2.52
106-46-7	1,4-Dichlorobenzene	6.9 U		6.9	0.972
78-93-3	Methyl Ethyl Ketone	28 U		28	6.30
591-78-6	2-Hexanone	14 U		14	2.65
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.43
67-64-1	**Acetone**	**24 J**	B,Z	28	13.1
71-43-2	Benzene	6.9 U		6.9	0.939
74-97-5	Bromochloromethane	6.9 U		6.9	1.72
75-27-4	Dichlorobromomethane	6.9 U		6.9	0.664
75-25-2	Bromoform	6.9 U		6.9	1.90
74-83-9	Bromomethane	6.9 U		6.9	6.41
75-15-0	Carbon Disulfide	6.9 U		6.9	2.14
56-23-5	Carbon Tetrachloride	6.9 U		6.9	1.99
108-90-7	Chlorobenzene	6.9 U		6.9	0.636
75-00-3	Chloroethane	6.9 U	UJ,C	6.9	3.40
67-66-3	Chloroform	6.9 U		6.9	1.01

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/22/03 by JDM
		Anal. Method:	USEPA-8260B
Sample ID:	**SBD-10**	QC Batch:	90601 -122
Sample #:	**346256**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.9 U	6.9	0.792
110-82-7	Cyclohexane	14 U	14	1.85
10061-01-5	cis-1,3-Dichloropropene	6.9 U	6.9	1.51
10061-02-6	trans-1,3-Dichloropropene	6.9 U	6.9	2.27
75-71-8	Dichlorodifluoromethane	6.9 U	6.9	0.980
124-48-1	Chlorodibromomethane	6.9 U	6.9	0.785
100-41-4	Ethylbenzene	6.9 U	6.9	2.24
98-82-8	Isopropylbenzene	6.9 U	6.9	1.68
79-20-9	Methyl Acetate	28 U	28	5.25
108-87-2	Methylcyclohexane	14 U	14	2.27
1634-04-4	Methyl(tert)butyl Ether	6.9 U	6.9	1.81
75-09-2	**Methylene Chloride**	**7.0 J**	28	1.68
100-42-5	Styrene	6.9 U	6.9	1.74
127-18-4	Tetrachloroethene	6.9 U	6.9	1.79
108-88-3	Toluene	6.9 U	6.9	1.61
79-01-6	Trichloroethene	6.9 U	6.9	2.60
75-69-4	Trichlorofluoromethane	6.9 U	6.9	0.981
75-01-4	Vinyl Chloride	6.9 U	6.9	1.74
1330-20-7	Xylene (Total)	6.9 U	6.9	2.13

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**SBD-10**	QC Batch:	90601 -122
Sample #:	**346256**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	72
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2C**	QC Batch:	90601 -122
Sample #:	**346257**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
71-55-6	1,1,1-Trichloroethane	6.8 U		6.8	2.25
76-13-1	*1,1,2-Trichloro-1,2,2-trifluoroethane	6.8 U		6.8	0.904
79-34-5	1,1,2,2-Tetrachloroethane	6.8 U		6.8	2.10
79-00-5	1,1,2-Trichloroethane	6.8 U		6.8	1.79
75-34-3	1,1-Dichloroethane	6.8 U		6.8	1.89
75-35-4	1,1-Dichloroethylene	6.8 U		6.8	4.05
106-93-4	1,2-Dibromoethane	6.8 U		6.8	2.62
96-12-8	1,2-Dibromo-3-chloropropane	14 U		14	3.82
95-50-1	1,2-Dichlorobenzene	6.8 U		6.8	2.00
107-06-2	1,2-Dichloroethane	6.8 U		6.8	1.82
156-59-2	cis-1,2-Dichloroethene	6.8 U		6.8	2.39
156-60-5	*trans-1,2-Dichloroethene	6.8 U		6.8	2.48
78-87-5	1,2-Dichloropropane	6.8 U		6.8	2.21
87-61-6	1,2,3-Trichlorobenzene	6.8 U		6.8	1.32
120-82-1	1,2,4-Trichlorobenzene	6.8 U		6.8	2.46
541-73-1	1,3-Dichlorobenzene	6.8 U		6.8	2.52
106-46-7	1,4-Dichlorobenzene	6.8 U		6.8	0.972
78-93-3	Methyl Ethyl Ketone	27 U		27	6.30
591-78-6	2-Hexanone	14 U		14	2.65
108-10-1	4-Methyl-2-Pentanone	14 U		14	1.43
67-64-1	***Acetone**	**23 J**	B,Z	27	13.1
71-43-2	Benzene	6.8 U		6.8	0.939
74-97-5	Bromochloromethane	6.8 U		6.8	1.72
75-27-4	Dichlorobromomethane	6.8 U		6.8	0.664
75-25-2	Bromoform	6.8 U		6.8	1.90
74-83-9	Bromomethane	6.8 U		6.8	6.41
75-15-0	Carbon Disulfide	6.8 U		6.8	2.14
56-23-5	*Carbon Tetrachloride	6.8 U		6.8	1.99
108-90-7	Chlorobenzene	6.8 U		6.8	0.636
75-00-3	Chloroethane	6.8 U	UJ,C	6.8	3.40
67-66-3	Chloroform	6.8 U		6.8	1.01

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 by JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2C**	QC Batch:	90601 -122
Sample #:	**346257**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Volatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
74-87-3	Chloromethane	6.8 U	6.8	0.792
110-82-7	Cyclohexane	14 U	14	1.85
10061-01-5	cis-1,3-Dichloropropene	6.8 U	6.8	1.51
10061-02-6	trans-1,3-Dichloropropene	6.8 U	6.8	2.27
75-71-8	Dichlorodifluoromethane	6.8 U	6.8	0.980
124-48-1	Chlorodibromomethane	6.8 U	6.8	0.785
100-41-4	Ethylbenzene	6.8 U	6.8	2.24
98-82-8	Isopropylbenzene	6.8 U	6.8	1.68
79-20-9	Methyl Acetate	27 U	27	5.25
108-87-2	*Methylcyclohexane	14 U	14	2.27
1634-04-4	Methyl(tert)butyl Ether	6.8 U	6.8	1.81
75-09-2	**Methylene Chloride**	**11 J**	27	1.68
100-42-5	Styrene	6.8 U	6.8	1.74
127-18-4	Tetrachloroethene	6.8 U	6.8	1.79
108-88-3	Toluene	6.8 U	6.8	1.61
79-01-6	Trichloroethene	6.8 U	6.8	2.60
75-69-4	Trichlorofluoromethane	6.8 U	6.8	0.981
75-01-4	*Vinyl Chloride	6.8 U	6.8	1.74
1330-20-7	Xylene (Total)	6.8 U	6.8	2.13

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	n/a
Submittal #:	**36440-6**	Prep. Method:	n/a
Submittal:	Delivery Order 0046	Analyzed:	10/22/03 JDM
	RAAP	Anal. Method:	USEPA-8260B
Sample ID:	**ASB2C**	QC Batch:	90601 -122
Sample #:	**346257**	Anal. Batch:	208854
Matrix:	Soil	Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8260B	**CAS Number**	**Result (ug/kg dr**	**Qualifier**
No compound was detected.			

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**EQB5**	QC Batch:	90165 -116
Sample #:	**346013**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U		5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U		5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U		5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U		5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U		5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U		5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U		5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	VJ,C	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U		5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U		5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U		5.0	0.005
95-57-8	2-Chlorophenol	5.0 U		5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U		5.0	0.084
95-48-7	2-Methylphenol	5.0 U		5.0	0.007
88-74-4	2-Nitroaniline	5.0 U		5.0	0.010
88-75-5	2-Nitrophenol	5.0 U		5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U		5.0	0.058
99-09-2	3-Nitroaniline	5.0 U		5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U		5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U		5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U		5.0	0.018
106-47-8	4-Chloroaniline	5.0 U		5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U		5.0	0.015
106-44-5	4-Methylphenol	5.0 U		5.0	0.014
100-01-6	4-Nitroaniline	5.0 U		5.0	0.070
100-02-7	4-Nitrophenol	10 U		10	0.134
83-32-9	Acenaphthene	5.0 U		5.0	0.008
208-96-8	Acenaphthylene	5.0 U		5.0	0.007
98-86-2	Acetophenone	5.0 U		5.0	0.011

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB5**	QC Batch:	90165 -116
Sample #:	**346013**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U		5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**0.35 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.060 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U	UJ,C	5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	Diethylphthalate	5.0 U		5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U	UJ,I	5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB5**	QC Batch:	90165 -116
Sample #:	**346013**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**EQB5**	QC Batch:	90165 -116
Sample #:	**346013**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.57	E	NJ,+
1-HEXACOSANOL	506-52-5	0.64	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	1.22	E	NJ,+
Erucylamide	112-84-5	9.63	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB6**	QC Batch:	90165 -116
Sample #:	**346015**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U		5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U		5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U		5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U		5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U		5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U		5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U		5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	UJ,C	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U		5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U		5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U		5.0	0.005
95-57-8	2-Chlorophenol	5.0 U		5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U		5.0	0.084
95-48-7	2-Methylphenol	5.0 U		5.0	0.007
88-74-4	2-Nitroaniline	5.0 U		5.0	0.010
88-75-5	2-Nitrophenol	5.0 U		5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U		5.0	0.058
99-09-2	3-Nitroaniline	5.0 U		5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U		5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U		5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U		5.0	0.018
106-47-8	4-Chloroaniline	5.0 U		5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U		5.0	0.015
106-44-5	4-Methylphenol	5.0 U		5.0	0.014
100-01-6	4-Nitroaniline	5.0 U		5.0	0.070
100-02-7	4-Nitrophenol	10 U		10	0.134
83-32-9	Acenaphthene	5.0 U		5.0	0.008
208-96-8	Acenaphthylene	5.0 U		5.0	0.007
98-86-2	Acetophenone	5.0 U		5.0	0.011

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**EQB6**	QC Batch:	90165 -116
Sample #:	**346015**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U		5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**0.29 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.050 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U	UJ,C	5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	Diethylphthalate	5.0 U		5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U	UJ,I	5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB6**	QC Batch:	90165 -116
Sample #:	**346015**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**EQB6**	QC Batch:	90165 -116
Sample #:	**346015**	Anal. Batch:	209010
Matrix:	QC Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
1-HEXACOSANOL	506-52-5	0.65	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	0.75	E	NJ,+
Erucylamide	112-84-5	6.94	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD3**	QC Batch:	90572 -114
Sample #:	**346017**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	250 U		250	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	250 U		250	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	250 U		250	1.98
95-95-4	2,4,5-Trichlorophenol	250 U		250	5.01
88-06-2	2,4,6-Trichlorophenol	250 U		250	3.93
120-83-2	2,4-Dichlorophenol	250 U		250	5.28
105-67-9	2,4-Dimethylphenol	250 U		250	11.9
51-28-5	2,4-Dinitrophenol	480 U	UJ,C	480	4.80
121-14-2	2,4-Dinitrotoluene	250 U		250	4.73
606-20-2	2,6-Dinitrotoluene	250 U		250	41.6
91-58-7	2-Chloronaphthalene	250 U		250	3.45
95-57-8	2-Chlorophenol	250 U		250	3.02
91-57-6	**2-Methylnaphthalene**	**7.0 J**		250	4.11
95-48-7	2-Methylphenol	250 U		250	7.26
88-74-4	2-Nitroaniline	250 U		250	6.90
88-75-5	2-Nitrophenol	250 U		250	2.55
91-94-1	3,3'-Dichlorobenzidine	250 U		250	83.1
99-09-2	3-Nitroaniline	250 U		250	27.5
534-52-1	4,6-Dinitro-2-Methylphenol	250 U		250	6.77
101-55-3	4-Bromophenyl Phenylether	250 U		250	5.07
59-50-7	4-Chloro-3-Methylphenol	250 U		250	7.82
106-47-8	4-Chloroaniline	250 U		250	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	250 U		250	4.91
106-44-5	4-Methylphenol	250 U		250	9.56
100-01-6	4-Nitroaniline	250 U		250	10.9
100-02-7	4-Nitrophenol	480 U		480	4.25
83-32-9	Acenaphthene	250 U		250	2.58
208-96-8	**Acenaphthylene**	**9.0 J**		250	2.25
98-86-2	Acetophenone	250 U		250	2.85

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD3**	QC Batch:	90572 -114
Sample #:	**346017**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**44 J**		250	6.93
1912-24-9	Atrazine	250 U		250	10.3
100-52-7	Benzaldehyde	250 U		250	6.08
56-55-3	**Benzo (a) Anthracene**	**86 J**		250	20.0
50-32-8	**Benzo (a) Pyrene**	**140 J**		250	8.57
205-99-2	**Benzo (b) Fluoranthene**	**190 J**		250	14.6
191-24-2	**Benzo (g,h,i,) Perylene**	**110 J**		250	13.1
207-08-9	**Benzo (k) Fluoranthene**	**92 J**		250	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	250 U		250	4.71
111-44-4	Bis (2-Chloroethyl) Ether	250 U		250	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**41 J**		250	3.11
85-68-7	Butyl Benzyl Phthalate	250 U		250	6.72
105-60-2	Caprolactam	480 U		480	9.57
86-74-8	Carbazole	250 U		250	9.15
218-01-9	**Chrysene**	**220 J**		250	15.3
53-70-3	**Dibenzo (a,h) Anthracene**	**42 J**		250	8.85
132-64-9	Dibenzofuran	250 U		250	4.74
84-66-2	**Diethylphthalate**	**18 J**		250	2.85
131-11-3	**Dimethylphthalate**	**1400**	J,f	250	4.97
84-74-2	**Di-n-Butylphthalate**	**130 J**		250	5.73
117-84-0	Di-n-Octylphthalate	250 U		250	4.65
206-44-0	**Fluoranthene**	**34 J**		250	3.53
86-73-7	**Fluorene**	**4.0 J**		250	2.52
118-74-1	Hexachlorobenzene	250 U		250	3.77
87-68-3	Hexachlorobutadiene	250 U		250	5.81
77-47-4	Hexachlorocyclopentadiene	250 U	UJ,c	250	2.97
67-72-1	Hexachloroethane	250 U		250	3.50
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**100 J**		250	5.88
78-59-1	Isophorone	250 U		250	2.60
91-20-3	**Naphthalene**	**5.0 J**		250	4.13
98-95-3	Nitrobenzene	250 U		250	4.80

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD3**	QC Batch:	90572 -114
Sample #:	**346017**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	250 U	250	4.94
86-30-6	N-Nitroso-di-Phenylamine	250 U	250	7.13
87-86-5	Pentachlorophenol	480 U	480	6.59
85-01-8	**Phenanthrene**	**29 J**	250	3.45
108-95-2	Phenol	250 U	250	5.94
129-00-0	**Pyrene**	**37 J**	250	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD3**	QC Batch:	90572 -114
Sample #:	**346017**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	68
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	300	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	350	E	NJ,+
Erucylamide	112-84-5	400	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~150~~	~~E~~	
Perylene	198-55-0	170	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SDD1**	QC Batch:	90572 -114
Sample #:	**346018**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	270 U		270	3.94
95-94-3	1,2,4,5-Tetrachloro-benzene	270 U		270	45.9
108-60-1	Bis (2-Chloroisopropyl)-Ether	270 U		270	2.11
95-95-4	2,4,5-Trichlorophenol	270 U		270	5.34
88-06-2	2,4,6-Trichlorophenol	270 U		270	4.19
120-83-2	2,4-Dichlorophenol	270 U		270	5.63
105-67-9	2,4-Dimethylphenol	270 U		270	12.7
51-28-5	2,4-Dinitrophenol	520 U	UJ,C	520	5.12
121-14-2	2,4-Dinitrotoluene	270 U		270	5.04
606-20-2	2,6-Dinitrotoluene	270 U		270	44.3
91-58-7	2-Chloronaphthalene	270 U		270	3.68
95-57-8	2-Chlorophenol	270 U		270	3.22
91-57-6	2-Methylnaphthalene	270 U		270	4.38
95-48-7	2-Methylphenol	270 U		270	7.74
88-74-4	2-Nitroaniline	270 U		270	7.36
88-75-5	2-Nitrophenol	270 U		270	2.72
91-94-1	3,3'-Dichlorobenzidine	270 U		270	88.6
99-09-2	3-Nitroaniline	270 U		270	29.3
534-52-1	4,6-Dinitro-2-Methylphenol	270 U		270	7.22
101-55-3	4-Bromophenyl Phenylether	270 U		270	5.41
59-50-7	4-Chloro-3-Methylphenol	270 U		270	8.34
106-47-8	4-Chloroaniline	270 U		270	2.02
7005-72-3	4-Chlorophenylphenyl-Ether	270 U		270	5.23
106-44-5	4-Methylphenol	270 U		270	10.2
100-01-6	4-Nitroaniline	270 U		270	11.6
100-02-7	4-Nitrophenol	520 U		520	4.53
83-32-9	Acenaphthene	270 U		270	2.75
208-96-8	**Acenaphthylene**	**3.0 J**		270	2.40
98-86-2	Acetophenone	270 U		270	3.04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SDD1**	QC Batch:	90572 -114
Sample #:	**346018**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	**Anthracene**	**12 J**		270	7.39
1912-24-9	Atrazine	270 U		270	11.0
100-52-7	Benzaldehyde	270 U		270	6.48
56-55-3	**Benzo (a) Anthracene**	**30 J**		270	21.3
50-32-8	**Benzo (a) Pyrene**	**53 J**		270	9.14
205-99-2	**Benzo (b) Fluoranthene**	**86 J**		270	15.6
191-24-2	**Benzo (g,h,i,) Perylene**	**27 J**		270	14.0
207-08-9	**Benzo (k) Fluoranthene**	**36 J**		270	21.4
111-91-1	Bis (2-Chloroethoxy)-Methane	270 U		270	5.02
111-44-4	Bis (2-Chloroethyl) Ether	270 U		270	2.77
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**35 J**		270	3.31
85-68-7	Butyl Benzyl Phthalate	270 U		270	7.17
105-60-2	Caprolactam	520 U		520	10.2
86-74-8	Carbazole	270 U		270	9.76
218-01-9	**Chrysene**	**64 J**		270	16.3
53-70-3	Dibenzo (a,h) Anthracene	270 U		270	9.44
132-64-9	Dibenzofuran	270 U		270	5.06
84-66-2	**Diethylphthalate**	**22 J**		270	3.04
131-11-3	Dimethylphthalate	270 U	UJ,f	270	5.30
84-74-2	**Di-n-Butylphthalate**	**110 J**		270	6.11
117-84-0	Di-n-Octylphthalate	270 U		270	4.96
206-44-0	**Fluoranthene**	**26 J**		270	3.76
86-73-7	Fluorene	270 U		270	2.69
118-74-1	Hexachlorobenzene	270 U		270	4.02
87-68-3	Hexachlorobutadiene	270 U		270	6.19
77-47-4	Hexachlorocyclopentadiene	270 U	UJ,c	270	3.17
67-72-1	Hexachloroethane	270 U		270	3.73
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**30 J**		270	6.27
78-59-1	Isophorone	270 U		270	2.77
91-20-3	Naphthalene	270 U		270	4.40
98-95-3	Nitrobenzene	270 U		270	5.12

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SDD1**	QC Batch:	90572 -114
Sample #:	**346018**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	270 U	270	5.26
86-30-6	N-Nitroso-di-Phenylamine	270 U	270	7.60
87-86-5	Pentachlorophenol	520 U	520	7.02
85-01-8	**Phenanthrene**	**14 J**	270	3.68
108-95-2	Phenol	270 U	270	6.34
129-00-0	**Pyrene**	**23 J**	270	2.37

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/02/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SDD1**	QC Batch:	90572 -114
Sample #:	**346018**	Anal. Batch:	208711
Matrix:	Soil	Percent Solids:	63
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	170	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	60	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~680~~	~~E~~	~~4~~ 1/20/2004
Perylene	198-55-0	57	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SD2**	QC Batch:	90572 -114
Sample #:	**346019**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	260 U		260	3.69
95-94-3	1,2,4,5-Tetrachloro-benzene	260 U		260	43.1
108-60-1	Bis (2-Chloroisopropyl)-Ether	260 U		260	1.98
95-95-4	2,4,5-Trichlorophenol	260 U		260	5.01
88-06-2	2,4,6-Trichlorophenol	260 U		260	3.93
120-83-2	2,4-Dichlorophenol	260 U		260	5.28
105-67-9	2,4-Dimethylphenol	260 U		260	11.9
51-28-5	2,4-Dinitrophenol	510 U	UJ,C	510	4.80
121-14-2	2,4-Dinitrotoluene	260 U		260	4.73
606-20-2	2,6-Dinitrotoluene	260 U		260	41.6
91-58-7	2-Chloronaphthalene	260 U		260	3.45
95-57-8	2-Chlorophenol	260 U		260	3.02
91-57-6	**2-Methylnaphthalene**	**12 J**		260	4.11
95-48-7	2-Methylphenol	260 U		260	7.26
88-74-4	2-Nitroaniline	260 U		260	6.90
88-75-5	2-Nitrophenol	260 U		260	2.55
91-94-1	3,3'-Dichlorobenzidine	260 U		260	83.1
99-09-2	3-Nitroaniline	260 U		260	27.5
534-52-1	4,6-Dinitro-2-Methylphenol	260 U		260	6.77
101-55-3	4-Bromophenyl Phenylether	260 U		260	5.07
59-50-7	4-Chloro-3-Methylphenol	260 U		260	7.82
106-47-8	4-Chloroaniline	260 U	UJ,M	260	1.89
7005-72-3	4-Chlorophenylphenyl-Ether	260 U		260	4.91
106-44-5	4-Methylphenol	260 U		260	9.56
100-01-6	4-Nitroaniline	260 U		260	10.9
100-02-7	4-Nitrophenol	510 U		510	4.25
83-32-9	**Acenaphthene**	**5.0 J**		260	2.58
208-96-8	Acenaphthylene	260 U		260	2.25
98-86-2	Acetophenone	260 U		260	2.85

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD2**	QC Batch:	90572 -114
Sample #:	**346019**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	260 U	UJ,M	260	6.93
1912-24-9	Atrazine	260 U		260	10.3
100-52-7	Benzaldehyde	260 U		260	6.08
56-55-3	**Benzo (a) Anthracene**	**33 J**		260	20.0
50-32-8	**Benzo (a) Pyrene**	**42 J**		260	8.57
205-99-2	**Benzo (b) Fluoranthene**	**64 J**		260	14.6
191-24-2	**Benzo (g,h,i,) Perylene**	**35 J**		260	13.1
207-08-9	**Benzo (k) Fluoranthene**	**27 J**		260	20.1
111-91-1	Bis (2-Chloroethoxy)-Methane	260 U		260	4.71
111-44-4	Bis (2-Chloroethyl) Ether	260 U		260	2.60
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**28 J**	J,M	260	3.11
85-68-7	Butyl Benzyl Phthalate	260 U		260	6.72
105-60-2	Caprolactam	510 U		510	9.57
86-74-8	Carbazole	260 U	UJ,C	260	9.15
218-01-9	**Chrysene**	**37 J**		260	15.3
53-70-3	**Dibenzo (a,h) Anthracene**	**15 J**		260	8.85
132-64-9	Dibenzofuran	260 U		260	4.74
84-66-2	**Diethylphthalate**	**14 J**	J,d	260	2.85
131-11-3	Dimethylphthalate	260 U		260	4.97
84-74-2	**Di-n-Butylphthalate**	**69 J**		260	5.73
117-84-0	Di-n-Octylphthalate	260 U		260	4.65
206-44-0	**Fluoranthene**	**56 J**	J,M	260	3.53
86-73-7	**Fluorene**	**5.0 J**		260	2.52
118-74-1	Hexachlorobenzene	260 U		260	3.77
87-68-3	Hexachlorobutadiene	260 U		260	5.81
77-47-4	Hexachlorocyclopentadiene	260 U	UJ,M	260	2.97
67-72-1	Hexachloroethane	260 U		260	3.50
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**31 J**		260	5.88
78-59-1	Isophorone	260 U		260	2.60
91-20-3	Naphthalene	260 U		260	4.13
98-95-3	Nitrobenzene	260 U		260	4.80

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD2**	QC Batch:	90572 -114
Sample #:	**346019**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	260 U	260	4.94
86-30-6	N-Nitroso-di-Phenylamine	260 U	260	7.13
87-86-5	Pentachlorophenol	510 U	510	6.59
85-01-8	**Phenanthrene**	**34 J**	260	3.45
108-95-2	Phenol	260 U	260	5.94
129-00-0	**Pyrene**	**51 J**	260	2.22

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SD2**	QC Batch:	90572 -114
Sample #:	**346019**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	65
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	66	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	91	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~430~~	~~E~~	~~AS~~ 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW3**	QC Batch:	90165 -116
Sample #:	**346020**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U		5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U		5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U		5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U		5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U		5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U		5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U		5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	UJ,C	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U		5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U		5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U		5.0	0.005
95-57-8	2-Chlorophenol	5.0 U		5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U		5.0	0.084
95-48-7	2-Methylphenol	5.0 U		5.0	0.007
88-74-4	2-Nitroaniline	5.0 U		5.0	0.010
88-75-5	2-Nitrophenol	5.0 U		5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U		5.0	0.058
99-09-2	3-Nitroaniline	5.0 U		5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U		5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U		5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U		5.0	0.018
106-47-8	4-Chloroaniline	5.0 U		5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U		5.0	0.015
106-44-5	4-Methylphenol	5.0 U		5.0	0.014
100-01-6	4-Nitroaniline	5.0 U		5.0	0.070
100-02-7	4-Nitrophenol	10 U		10	0.134
83-32-9	Acenaphthene	5.0 U		5.0	0.008
208-96-8	Acenaphthylene	5.0 U		5.0	0.007
98-86-2	Acetophenone	5.0 U		5.0	0.011

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW3**	QC Batch:	90165 -116
Sample #:	**346020**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U		5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**0.31 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.11 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U	UJ,C	5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	Diethylphthalate	5.0 U		5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U	UJ,I	5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW3**	QC Batch:	90165 -116
Sample #:	**346020**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW3**	QC Batch:	90165 -116
Sample #:	**346020**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	0.89	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	0.51	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	1.20	E	NJ,+
Docosane, 11-butyl-	13475-76-8	0.49	E	NJ,+
Erucylamide	112-84-5	9.63	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SWD1**	QC Batch:	90165 -116
Sample #:	**346021**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U	5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U	5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U	5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U	5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U	5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U	5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U	5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	UJ,c 10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U	5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U	5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U	5.0	0.005
95-57-8	2-Chlorophenol	5.0 U	5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U	5.0	0.084
95-48-7	2-Methylphenol	5.0 U	5.0	0.007
88-74-4	2-Nitroaniline	5.0 U	5.0	0.010
88-75-5	2-Nitrophenol	5.0 U	5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U	5.0	0.058
99-09-2	3-Nitroaniline	5.0 U	5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U	5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U	5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U	5.0	0.018
106-47-8	4-Chloroaniline	5.0 U	5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U	5.0	0.015
106-44-5	4-Methylphenol	5.0 U	5.0	0.014
100-01-6	4-Nitroaniline	5.0 U	5.0	0.070
100-02-7	4-Nitrophenol	10 U	10	0.134
83-32-9	Acenaphthene	5.0 U	5.0	0.008
208-96-8	Acenaphthylene	5.0 U	5.0	0.007
98-86-2	Acetophenone	5.0 U	5.0	0.011

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SWD1**	QC Batch:	90165 -116
Sample #:	**346021**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U		5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**0.33 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.11 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U	UJ,C	5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	Diethylphthalate	5.0 U		5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U	UJ,I	5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SWD1**	QC Batch:	90165 -116
Sample #:	**346021**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U	5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U	5.0	0.019
87-86-5	Pentachlorophenol	10 U	10	0.075
85-01-8	Phenanthrene	5.0 U	5.0	0.016
108-95-2	Phenol	5.0 U	5.0	0.006
129-00-0	Pyrene	5.0 U	5.0	0.033

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SWD1**	QC Batch:	90165 -116
Sample #:	**346021**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	0.78	E	NJ,+
(Z)-9-Octadecenamide	301-02-0	10.37	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.52	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SW2**	QC Batch:	90165 -116
Sample #:	**346022**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	5.0 U		5.0	0.013
95-94-3	1,2,4,5-Tetrachloro-benzene	5.0 U		5.0	0.775
108-60-1	Bis (2-Chloroisopropyl)-Ether	5.0 U		5.0	0.014
95-95-4	2,4,5-Trichlorophenol	5.0 U		5.0	0.014
88-06-2	2,4,6-Trichlorophenol	5.0 U		5.0	0.015
120-83-2	2,4-Dichlorophenol	5.0 U		5.0	0.018
105-67-9	2,4-Dimethylphenol	5.0 U	UJ,M	5.0	0.198
51-28-5	2,4-Dinitrophenol	10 U	UJ,C	10	1.24
121-14-2	2,4-Dinitrotoluene	5.0 U		5.0	0.007
606-20-2	2,6-Dinitrotoluene	5.0 U		5.0	0.052
91-58-7	2-Chloronaphthalene	5.0 U		5.0	0.005
95-57-8	2-Chlorophenol	5.0 U		5.0	0.011
91-57-6	2-Methylnaphthalene	5.0 U		5.0	0.084
95-48-7	2-Methylphenol	5.0 U		5.0	0.007
88-74-4	2-Nitroaniline	5.0 U		5.0	0.010
88-75-5	2-Nitrophenol	5.0 U		5.0	0.011
91-94-1	3,3'-Dichlorobenzidine	5.0 U		5.0	0.058
99-09-2	3-Nitroaniline	5.0 U		5.0	0.032
534-52-1	4,6-Dinitro-2-Methylphenol	5.0 U	UJ,M	5.0	0.054
101-55-3	4-Bromophenyl Phenylether	5.0 U		5.0	0.019
59-50-7	4-Chloro-3-Methylphenol	5.0 U		5.0	0.018
106-47-8	4-Chloroaniline	5.0 U		5.0	0.011
7005-72-3	4-Chlorophenylphenyl-Ether	5.0 U		5.0	0.015
106-44-5	4-Methylphenol	5.0 U		5.0	0.014
100-01-6	4-Nitroaniline	5.0 U		5.0	0.070
100-02-7	4-Nitrophenol	10 U	UJ,M	10	0.134
83-32-9	Acenaphthene	5.0 U		5.0	0.008
208-96-8	Acenaphthylene	5.0 U		5.0	0.007
98-86-2	Acetophenone	5.0 U		5.0	0.011

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**13SW2**	QC Batch:	90165 -116
Sample #:	**346022**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	5.0 U		5.0	0.014
1912-24-9	Atrazine	5.0 U		5.0	0.018
100-52-7	Benzaldehyde	5.0 U		5.0	0.616
56-55-3	Benzo (a) Anthracene	5.0 U		5.0	0.022
50-32-8	Benzo (a) Pyrene	5.0 U		5.0	0.025
205-99-2	Benzo (b) Fluoranthene	5.0 U		5.0	0.019
191-24-2	Benzo (g,h,i,) Perylene	5.0 U		5.0	0.046
207-08-9	Benzo (k) Fluoranthene	5.0 U		5.0	0.064
111-91-1	Bis (2-Chloroethoxy)-Methane	5.0 U		5.0	0.013
111-44-4	Bis (2-Chloroethyl) Ether	5.0 U		5.0	0.012
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**0.34 J**	B,Z	5.0	0.149
85-68-7	**Butyl Benzyl Phthalate**	**0.11 J**	B,Z	5.0	0.015
105-60-2	Caprolactam	5.0 U	UJ,I	5.0	0.024
86-74-8	Carbazole	5.0 U	UJ,C	5.0	0.015
218-01-9	Chrysene	5.0 U		5.0	0.025
53-70-3	Dibenzo (a,h) Anthracene	5.0 U		5.0	0.025
132-64-9	Dibenzofuran	5.0 U		5.0	0.014
84-66-2	**Diethylphthalate**	**0.11 J**	B,Z	5.0	0.074
131-11-3	Dimethylphthalate	5.0 U		5.0	0.013
84-74-2	Di-n-Butylphthalate	5.0 U		5.0	1.60
117-84-0	Di-n-Octylphthalate	5.0 U		5.0	0.162
206-44-0	Fluoranthene	5.0 U		5.0	0.024
86-73-7	Fluorene	5.0 U		5.0	0.012
118-74-1	Hexachlorobenzene	5.0 U		5.0	0.011
87-68-3	Hexachlorobutadiene	5.0 U		5.0	0.019
77-47-4	Hexachlorocyclopentadiene	5.0 U	UJ,I	5.0	0.016
67-72-1	Hexachloroethane	5.0 U		5.0	0.023
193-39-5	Indeno (1,2,3-cd) Pyrene	5.0 U		5.0	0.033
78-59-1	Isophorone	5.0 U		5.0	0.017
91-20-3	Naphthalene	5.0 U		5.0	0.006
98-95-3	Nitrobenzene	5.0 U		5.0	0.012

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW2**	QC Batch:	90165 -116
Sample #:	**346022**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	5.0 U		5.0	0.017
86-30-6	N-Nitroso-di-Phenylamine	5.0 U		5.0	0.019
87-86-5	Pentachlorophenol	10 U	UJM	10	0.075
85-01-8	Phenanthrene	5.0 U		5.0	0.016
108-95-2	Phenol	5.0 U		5.0	0.006
129-00-0	Pyrene	5.0 U		5.0	0.033

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/16/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**13SW2**	QC Batch:	90165 -116
Sample #:	**346022**	Anal. Batch:	209010
Matrix:	Surface Water	Percent Solids:	n/a
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/L)**	**Qualifier**	
(M) 1-Eicosanol	629-96-9	0.91	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	0.84	E	NJ,+
1-Hexadecanol	36653-82-4	0.51	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	1.63	E	NJ,+
Eicosane	112-95-8	0.54	E	NJ,+
Erucylamide	112-84-5	20.79	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U	UJ,I	210	9.53
51-28-5	2,4-Dinitrophenol	400 U	UJ,C	400	3.84
~~121-14-2~~	~~2,4-Dinitrotoluene~~	~~1200 E~~	~~J,V~~	~~210~~	~~3.78~~
606-20-2	**2,6-Dinitrotoluene**	**82 J**		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U		210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	4-Chloro-3-Methylphenol	210 U		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,I	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	400 U		400	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

~~J,V~~ 1/20/2004

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	**Benzo (a) Pyrene**	**9.0 J**		210	6.85
205-99-2	**Benzo (b) Fluoranthene**	**16 J**	J,1	210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
~~117-81-7~~	~~**Bis (2-ethylhexyl)-Phthalate**~~	~~**1500 E**~~	J,q	210	2.48 KS 1/20/2004
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	400 U		400	7.66
86-74-8	Carbazole	210 U	UJ,c	210	7.32
218-01-9	**Chrysene**	**15 J**		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**14 J**		210	2.28
131-11-3	**Dimethylphthalate**	**210**		210	3.97
~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**3900 E**~~	J,q	210	4.58 KS 1/20/2004
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**30 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**6.0 J**		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
~~86-30-6~~	~~**N-Nitroso-di-Phenylamine**~~	~~**1200 E**~~ J,Q	210	5.70
87-86-5	Pentachlorophenol	400 U	400	5.27
85-01-8	**Phenanthrene**	**11 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**26 J**	210	1.78

~~RB 1/20/04~~

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	82
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	60	E	NJ,t
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	140	E	NJ,t
Erucylamide	112-84-5	1500	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~130~~	~~E~~	

AS 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1000 U		1000	14.8
95-94-3	1,2,4,5-Tetrachloro-benzene	1000 U		1000	172
108-60-1	Bis (2-Chloroisopropyl)-Ether	1000 U		1000	7.92
95-95-4	2,4,5-Trichlorophenol	1000 U		1000	20.0
88-06-2	2,4,6-Trichlorophenol	1000 U		1000	15.7
120-83-2	2,4-Dichlorophenol	1000 U		1000	21.1
105-67-9	2,4-Dimethylphenol	1000 U	UJ,I	1000	47.6
51-28-5	2,4-Dinitrophenol	2000 U	UJ,C	2000	19.2
121-14-2	√ **2,4-Dinitrotoluene**	**850 J**		1000	18.9
606-20-2	2,6-Dinitrotoluene	1000 U		1000	166
91-58-7	2-Chloronaphthalene	1000 U		1000	13.8
95-57-8	2-Chlorophenol	1000 U		1000	12.1
91-57-6	2-Methylnaphthalene	1000 U		1000	16.4
95-48-7	2-Methylphenol	1000 U		1000	29.0
88-74-4	2-Nitroaniline	1000 U		1000	27.6
88-75-5	2-Nitrophenol	1000 U		1000	10.2
91-94-1	3,3'-Dichlorobenzidine	1000 U		1000	332
99-09-2	3-Nitroaniline	1000 U	UJ,C	1000	110
534-52-1	4,6-Dinitro-2-Methylphenol	1000 U		1000	27.1
101-55-3	4-Bromophenyl Phenylether	1000 U		1000	20.3
59-50-7	4-Chloro-3-Methylphenol	1000 U		1000	31.3
106-47-8	4-Chloroaniline	1000 U	UJ,C	1000	7.56
7005-72-3	4-Chlorophenylphenyl-Ether	1000 U		1000	19.6
106-44-5	4-Methylphenol	1000 U		1000	38.2
100-01-6	4-Nitroaniline	1000 U		1000	43.5
100-02-7	4-Nitrophenol	2000 U	UJ,C	2000	17.0
83-32-9	Acenaphthene	1000 U		1000	10.3
208-96-8	Acenaphthylene	1000 U		1000	9.00
98-86-2	Acetophenone	1000 U		1000	11.4

Use only 2,4-DNT, see neat analysis - 1/20/2004

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	1000 U	1000	27.7
1912-24-9	Atrazine	1000 U	1000	41.3
100-52-7	Benzaldehyde	1000 U	1000	24.3
56-55-3	Benzo (a) Anthracene	1000 U	1000	79.8
50-32-8	Benzo (a) Pyrene	1000 U	1000	34.3
205-99-2	Benzo (b) Fluoranthene	1000 U	1000	58.6
191-24-2	Benzo (g,h,i,) Perylene	1000 U	1000	52.3
207-08-9	Benzo (k) Fluoranthene	1000 U	1000	80.4
111-91-1	Bis (2-Chloroethoxy)-Methane	1000 U	1000	18.8
111-44-4	Bis (2-Chloroethyl) Ether	1000 U	1000	10.4
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1400**	1000	12.4
85-68-7	Butyl Benzyl Phthalate	1000 U	1000	26.9
105-60-2	Caprolactam	2000 U UJ,c	2000	38.3
86-74-8	Carbazole	1000 U UJ,c	1000	36.6
218-01-9	Chrysene	1000 U	1000	61.2
53-70-3	Dibenzo (a,h) Anthracene	1000 U	1000	35.4
132-64-9	Dibenzofuran	1000 U	1000	19.0
84-66-2	Diethylphthalate	1000 U	1000	11.4
131-11-3	**Dimethylphthalate**	**160 J**	1000	19.9
84-74-2	**Di-n-Butylphthalate**	**5100**	1000	22.9
117-84-0	Di-n-Octylphthalate	1000 U	1000	18.6
206-44-0	**Fluoranthene**	**30 J**	1000	14.1
86-73-7	Fluorene	1000 U	1000	10.1
118-74-1	Hexachlorobenzene	1000 U	1000	15.1
87-68-3	Hexachlorobutadiene	1000 U	1000	23.2
77-47-4	Hexachlorocyclopentadiene	1000 U	1000	11.9
67-72-1	Hexachloroethane	1000 U	1000	14.0
193-39-5	Indeno (1,2,3-cd) Pyrene	1000 U	1000	23.5
78-59-1	Isophorone	1000 U	1000	10.4
91-20-3	Naphthalene	1000 U	1000	16.5
98-95-3	Nitrobenzene	1000 U	1000	19.2

Use only bis(2ethylhexyl)phthalate and di-n-butylphthalate, see neat analysis - JS 1/20/2004

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1A**	QC Batch:	89985 -118
Sample #:	**346248DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	6

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
~~621-64-7~~	~~N-Nitrosodi-n-Propylamine~~	~~1000 U~~	~~1000~~	~~19.7~~
86-30-6	**N-Nitroso-di-Phenylamine**	**1000**	1000	28.5
87-86-5	Pentachlorophenol	2000 U	~~2000~~	~~26.3~~
85-01-8	Phenanthrene	~~1000 U~~	1000	13.8
108-95-2	Phenol	1000 U	1000	23.8
~~129-00-0~~	**Pyrene**	**20 J**	1000	8.88

Use only n-nitroso-di-Phenylamine, see next analysis - JB 1/20/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1B**	QC Batch:	89985 -118
Sample #:	**346249**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U	UJ,I	220	10.3
51-28-5	2,4-Dinitrophenol	420 U	UJ,C	420	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,I	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	420 U		420	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1B**	QC Batch:	89985 -118
Sample #:	**346249**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	420 U		420	8.29
86-74-8	Carbazole	220 U	VSIC	220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**8.0 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**93 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1B**	QC Batch:	89985 -118
Sample #:	**346249**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	420 U	420	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1B**	QC Batch:	89985 -118
Sample #:	**346249**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	78
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	CAS Number	Result (ug/kg dr	Qualifier	
(Z)-9-Octadecenamide	301-02-0	1600	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	110	E	B,X
2-Ethyl-1-Hexanol	104-76-7	33	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~77~~	~~E~~	~~SS~~ 1/20/2004
Phosphonic acid, dioctadecyl ester	19047-85-9	24	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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Individual sample results relate only to the sample tested.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1C**	QC Batch:	89985 -118
Sample #:	**346250**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U	UJ,I	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	UJ,C	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U		220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,I	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U		430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/03/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB1C**	QC Batch:	89985 -118
Sample #:	**346250**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**17 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U		430	8.29
86-74-8	Carbazole	220 U	UJ,c	220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**10 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**130 J**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1C**	QC Batch:	89985 -118
Sample #:	**346250**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/03/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB1C**	QC Batch:	89985 -118
Sample #:	**346250**	Anal. Batch:	209010
Matrix:	Soil	Percent Solids:	77
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	200	E	NJ,+
2(5H)-Furanone, 5,5-dimethyl-	20019-64-1	49	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~530~~	~~E~~	AS 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U	UJ,I	210	9.53
51-28-5	2,4-Dinitrophenol	410 U	UJ,C	410	3.84
~~121-14-2~~	~~2,4-Dinitrotoluene~~	~~32000 E~~	~~J,Q~~	210	3.78 KS 1/15/04
606-20-2	**2,6-Dinitrotoluene**	**3300 E**	J,Q	210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U	UJ,C	210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	4-Chloro-3-Methylphenol	210 U		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,C	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U	UJ,C	410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	***Benzo (a) Pyrene**	**10 JJ**	J,i	210	6.85
205-99-2	*Benzo (b) Fluoranthene	210 UJ	UJ,i	210	11.7
191-24-2	*Benzo (g,h,i,) Perylene	210 UJ	UJ,i	210	10.5
207-08-9	*Benzo (k) Fluoranthene	210 UJ	UJ,i	210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1200 E**	J,q	210	2.48
85-68-7	**Butyl Benzyl Phthalate**	**240**		210	5.38
105-60-2	Caprolactam	410 U	UJ,c	410	7.66
86-74-8	Carbazole	210 U	UJ,c	210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	*Dibenzo (a,h) Anthracene	210 UJ	UJ,i	210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**14 J**		210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**30000 E**~~	~~J,q~~	~~210~~	~~4.58~~
117-84-0	**Di-n-Octylphthalate**	**38 J**		210	3.72
206-44-0	**Fluoranthene**	**8.8 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	*Indeno (1,2,3-cd) Pyrene	210 UJ	UJ,i	210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

~~4.58~~ R 1/14/04

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
~~86-30-6~~	~~**N-Nitroso-di-Phenylamine**~~	~~**3700 E**~~ J,Q	~~210~~	~~5.70~~ tb 1/15/04
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	**Phenanthrene**	**3.8 J**	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**6.7 J**	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	170	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-ethylhexyl ester	85-69-8	560	E	NJ,+
Benzenamine, 4-nitro-N-phenyl-	836-30-6	310	E	NJ,+
Benzeneamine, 2-nitro-N-phenyl-	119-75-5	520	E	NJ,+

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/05/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251DL**	Anal. Batch:	209001
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	310

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	53000 U		53000	763
95-94-3	1,2,4,5-Tetrachloro-benzene	53000 U		53000	8900
108-60-1	Bis (2-Chloroisopropyl)-Ether	53000 U		53000	409
95-95-4	2,4,5-Trichlorophenol	53000 U		53000	1040
88-06-2	2,4,6-Trichlorophenol	53000 U		53000	812
120-83-2	2,4-Dichlorophenol	53000 U		53000	1090
105-67-9	2,4-Dimethylphenol	53000 U	UJ,1	53000	2460
51-28-5	2,4-Dinitrophenol	100000 U		100000	992
121-14-2	✓**2,4-Dinitrotoluene**	**28000 J**		53000	977
606-20-2	2,6-Dinitrotoluene	53000 U		53000	8590
91-58-7	2-Chloronaphthalene	53000 U		53000	713
95-57-8	2-Chlorophenol	53000 U		53000	623
91-57-6	2-Methylnaphthalene	53000 U		53000	849
95-48-7	2-Methylphenol	53000 U		53000	1500
88-74-4	2-Nitroaniline	53000 U		53000	1430
88-75-5	2-Nitrophenol	53000 U		53000	527
91-94-1	3,3'-Dichlorobenzidine	53000 U		53000	17200
99-09-2	3-Nitroaniline	53000 U		53000	5670
534-52-1	4,6-Dinitro-2-Methylphenol	53000 U		53000	1400
101-55-3	4-Bromophenyl Phenylether	53000 U		53000	1050
59-50-7	4-Chloro-3-Methylphenol	53000 U		53000	1620
106-47-8	4-Chloroaniline	53000 U	UJ,1	53000	391
7005-72-3	4-Chlorophenylphenyl-Ether	53000 U		53000	1010
106-44-5	4-Methylphenol	53000 U		53000	1970
100-01-6	4-Nitroaniline	53000 U		53000	2250
100-02-7	4-Nitrophenol	100000 U		100000	877
83-32-9	Acenaphthene	53000 U		53000	533
208-96-8	Acenaphthylene	53000 U		53000	465
98-86-2	Acetophenone	53000 U		53000	589

Use only 2,4 DNT, see neat analysis ~~A~~ 1/19/04

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/05/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251DL**	Anal. Batch:	209001
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	310

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
120-12-7	Anthracene	53000 U	53000	1430
1912-24-9	Atrazine	53000 U	53000	2130
100-52-7	Benzaldehyde	53000 U	53000	1260
56-55-3	Benzo (a) Anthracene	53000 U	53000	4120
50-32-8	Benzo (a) Pyrene	53000 U	53000	1770
205-99-2	Benzo (b) Fluoranthene	53000 U	53000	3030
191-24-2	Benzo (g,h,i,) Perylene	53000 U	53000	2700
207-08-9	Benzo (k) Fluoranthene	53000 U	53000	4150
111-91-1	Bis (2-Chloroethoxy)-Methane	53000 U	53000	973
111-44-4	Bis (2-Chloroethyl) Ether	53000 U	53000	536
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**1200 J**	53000	642
85-68-7	Butyl Benzyl Phthalate	53000 U	53000	1390
105-60-2	Caprolactam	100000 U VJ,c	100000	1980
86-74-8	Carbazole	53000 U	53000	1890
218-01-9	Chrysene	53000 U	53000	3160
53-70-3	Dibenzo (a,h) Anthracene	53000 U	53000	1830
132-64-9	Dibenzofuran	53000 U	53000	980
84-66-2	**Diethylphthalate**	**1400 J**	53000	589
131-11-3	Dimethylphthalate	53000 U	53000	1030
84-74-2	√ **Di-n-Butylphthalate**	**130000**	53000	1180
117-84-0	Di-n-Octylphthalate	53000 U	53000	961
206-44-0	Fluoranthene	53000 U	53000	729
86-73-7	Fluorene	53000 U	53000	521
118-74-1	Hexachlorobenzene	53000 U	53000	778
87-68-3	Hexachlorobutadiene	53000 U	53000	1200
77-47-4	Hexachlorocyclopentadiene	53000 U	53000	614
67-72-1	Hexachloroethane	53000 U	53000	724
193-39-5	Indeno (1,2,3-cd) Pyrene	53000 U	53000	1220
78-59-1	Isophorone	53000 U	53000	536
91-20-3	Naphthalene	53000 U	53000	853
98-95-3	Nitrobenzene	53000 U	53000	992

Use only Di-n-butylphthalate, see neat analysis ✱ 1/19/04

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/05/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3A**	QC Batch:	89985 -118
Sample #:	**346251DL**	Anal. Batch:	209001
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	310

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
~~621-64-7~~	~~N-Nitrosodi-n-Propylamine~~	~~53000 U~~	~~53000~~	~~1020~~
86-30-6	✓ **N-Nitroso-di-Phenylamine**	**4700 J**	53000	1470
87-86-5	Pentachlorophenol	100000 U	100000	~~1360~~
85-01-8	Phenanthrene	~~53000 U~~	53000	713
108-95-2	Phenol	53000 U	53000	1230
~~129-00-0~~	Pyrene	53000 U	53000	459

Use only n-nitroso-di-phenylamine, see neat run ✱ 1/19/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3B**	QC Batch:	89985 -118
Sample #:	**346252**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U	UJ,l	210	9.53
51-28-5	2,4-Dinitrophenol	410 U	UJ,c	410	3.84
121-14-2	**2,4-Dinitrotoluene**	**23 J**		210	3.78
606-20-2	2,6-Dinitrotoluene	210 U		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U	UJ,c	210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	4-Chloro-3-Methylphenol	210 U		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,c	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U	UJ,c	410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB3B**	QC Batch:	89985 -118
Sample #:	**346252**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**20 J**		210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U	UJ,c	410	7.66
86-74-8	Carbazole	210 U	UJ,c	210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**10 J**		210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
84-74-2	**Di-n-Butylphthalate**	**320**		210	4.58
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	Fluoranthene	210 U		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3B**	QC Batch:	89985 -118
Sample #:	**346252**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	**N-Nitroso-di-Phenylamine**	**8.0 J**	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	Pyrene	210 U	210	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3B**	QC Batch:	89985 -118
Sample #:	**346252**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	420	E	NJ,t
1-Dodecanol	112-53-8	47	E	NJ,t
1-Pentadecanol	629-76-5	40	E	NJ,t
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	94	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~370~~	~~E~~	~~1/20/2004~~

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB3C**	QC Batch:	89985 -118
Sample #:	**346253**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	200 U		200	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	200 U		200	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	200 U		200	1.58
95-95-4	2,4,5-Trichlorophenol	200 U		200	4.01
88-06-2	2,4,6-Trichlorophenol	200 U		200	3.14
120-83-2	2,4-Dichlorophenol	200 U		200	4.22
105-67-9	2,4-Dimethylphenol	200 U	UJ,I	200	9.53
51-28-5	2,4-Dinitrophenol	390 U	UJ,C	390	3.84
121-14-2	2,4-Dinitrotoluene	200 U		200	3.78
606-20-2	2,6-Dinitrotoluene	200 U		200	33.2
91-58-7	2-Chloronaphthalene	200 U		200	2.76
95-57-8	2-Chlorophenol	200 U		200	2.41
91-57-6	2-Methylnaphthalene	200 U		200	3.29
95-48-7	2-Methylphenol	200 U		200	5.81
88-74-4	2-Nitroaniline	200 U		200	5.52
88-75-5	2-Nitrophenol	200 U		200	2.04
91-94-1	3,3'-Dichlorobenzidine	200 U		200	66.5
99-09-2	3-Nitroaniline	200 U	UJ,C	200	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	200 U		200	5.41
101-55-3	4-Bromophenyl Phenylether	200 U		200	4.06
59-50-7	4-Chloro-3-Methylphenol	200 U		200	6.25
106-47-8	4-Chloroaniline	200 U	UJ,C	200	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	200 U		200	3.92
106-44-5	4-Methylphenol	200 U		200	7.64
100-01-6	4-Nitroaniline	200 U		200	8.70
100-02-7	4-Nitrophenol	390 U	UJ,C	390	3.40
83-32-9	Acenaphthene	200 U		200	2.06
208-96-8	Acenaphthylene	200 U		200	1.80
98-86-2	Acetophenone	200 U		200	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB3C**	QC Batch:	89985 -118
Sample #:	**346253**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	200 U		200	5.54
1912-24-9	Atrazine	200 U		200	8.26
100-52-7	Benzaldehyde	200 U		200	4.86
56-55-3	Benzo (a) Anthracene	200 U		200	16.0
50-32-8	Benzo (a) Pyrene	200 U		200	6.85
205-99-2	Benzo (b) Fluoranthene	200 U		200	11.7
191-24-2	Benzo (g,h,i,) Perylene	200 U		200	10.5
207-08-9	Benzo (k) Fluoranthene	200 U		200	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	200 U		200	3.77
111-44-4	Bis (2-Chloroethyl) Ether	200 U		200	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**		200	2.48
85-68-7	Butyl Benzyl Phthalate	200 U		200	5.38
105-60-2	Caprolactam	390 U	UJ,C	390	7.66
86-74-8	Carbazole	200 U	UJ,C	200	7.32
218-01-9	Chrysene	200 U		200	12.2
53-70-3	Dibenzo (a,h) Anthracene	200 U		200	7.08
132-64-9	Dibenzofuran	200 U		200	3.79
84-66-2	**Diethylphthalate**	**8.0 J**		200	2.28
131-11-3	Dimethylphthalate	200 U		200	3.97
84-74-2	**Di-n-Butylphthalate**	**320**		200	4.58
117-84-0	Di-n-Octylphthalate	200 U		200	3.72
206-44-0	Fluoranthene	200 U		200	2.82
86-73-7	Fluorene	200 U		200	2.02
118-74-1	Hexachlorobenzene	200 U		200	3.01
87-68-3	Hexachlorobutadiene	200 U		200	4.64
77-47-4	Hexachlorocyclopentadiene	200 U		200	2.38
67-72-1	Hexachloroethane	200 U		200	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	200 U		200	4.70
78-59-1	Isophorone	200 U		200	2.08
91-20-3	Naphthalene	200 U		200	3.30
98-95-3	Nitrobenzene	200 U		200	3.84

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3C**	QC Batch:	89985 -118
Sample #:	**346253**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	200 U	200	3.95
86-30-6	N-Nitroso-di-Phenylamine	200 U	200	5.70
87-86-5	Pentachlorophenol	390 U	390	5.27
85-01-8	Phenanthrene	200 U	200	2.76
108-95-2	Phenol	200 U	200	4.75
129-00-0	Pyrene	200 U	200	1.78

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB3C**	QC Batch:	89985 -118
Sample #:	**346253**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	84
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	340	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	65	E	B,X
2-Ethyl-1-Hexanol	104-76-7	30	E	NJ,+
Erucylamide	112-84-5	950	E	B,X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~340~~	~~E~~	~~AB 1/20/2004~~

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	210 U		210	2.95
95-94-3	1,2,4,5-Tetrachloro-benzene	210 U		210	34.4
108-60-1	Bis (2-Chloroisopropyl)-Ether	210 U		210	1.58
95-95-4	2,4,5-Trichlorophenol	210 U		210	4.01
88-06-2	2,4,6-Trichlorophenol	210 U		210	3.14
120-83-2	2,4-Dichlorophenol	210 U		210	4.22
105-67-9	2,4-Dimethylphenol	210 U	UJ,I	210	9.53
51-28-5	2,4-Dinitrophenol	410 U	UJ,C	410	3.84
121-14-2	**2,4-Dinitrotoluene**	**1000**		210	3.78
606-20-2	**2,6-Dinitrotoluene**	**100 J**		210	33.2
91-58-7	2-Chloronaphthalene	210 U		210	2.76
95-57-8	2-Chlorophenol	210 U		210	2.41
91-57-6	2-Methylnaphthalene	210 U		210	3.29
95-48-7	2-Methylphenol	210 U		210	5.81
88-74-4	2-Nitroaniline	210 U		210	5.52
88-75-5	2-Nitrophenol	210 U		210	2.04
91-94-1	3,3'-Dichlorobenzidine	210 U		210	66.5
99-09-2	3-Nitroaniline	210 U	UJ,C	210	22.0
534-52-1	4,6-Dinitro-2-Methylphenol	210 U		210	5.41
101-55-3	4-Bromophenyl Phenylether	210 U		210	4.06
59-50-7	4-Chloro-3-Methylphenol	210 U		210	6.25
106-47-8	4-Chloroaniline	210 U	UJ,C	210	1.51
7005-72-3	4-Chlorophenylphenyl-Ether	210 U		210	3.92
106-44-5	4-Methylphenol	210 U		210	7.64
100-01-6	4-Nitroaniline	210 U		210	8.70
100-02-7	4-Nitrophenol	410 U	UJ,C	410	3.40
83-32-9	Acenaphthene	210 U		210	2.06
208-96-8	Acenaphthylene	210 U		210	1.80
98-86-2	Acetophenone	210 U		210	2.28

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	210 U		210	5.54
1912-24-9	Atrazine	210 U		210	8.26
100-52-7	Benzaldehyde	210 U		210	4.86
56-55-3	Benzo (a) Anthracene	210 U		210	16.0
50-32-8	Benzo (a) Pyrene	210 U		210	6.85
205-99-2	Benzo (b) Fluoranthene	210 U		210	11.7
191-24-2	Benzo (g,h,i,) Perylene	210 U		210	10.5
207-08-9	Benzo (k) Fluoranthene	210 U		210	16.1
111-91-1	Bis (2-Chloroethoxy)-Methane	210 U		210	3.77
111-44-4	Bis (2-Chloroethyl) Ether	210 U		210	2.08
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**110 J**		210	2.48
85-68-7	Butyl Benzyl Phthalate	210 U		210	5.38
105-60-2	Caprolactam	410 U	UJ,C	410	7.66
86-74-8	Carbazole	210 U	UJ,C	210	7.32
218-01-9	Chrysene	210 U		210	12.2
53-70-3	Dibenzo (a,h) Anthracene	210 U		210	7.08
132-64-9	Dibenzofuran	210 U		210	3.79
84-66-2	**Diethylphthalate**	**10 J**		210	2.28
131-11-3	Dimethylphthalate	210 U		210	3.97
~~84-74-2~~	~~**Di-n-Butylphthalate**~~	~~**3000 E**~~	J,Q	210	~~4.58~~ dm 1/15/04
117-84-0	Di-n-Octylphthalate	210 U		210	3.72
206-44-0	**Fluoranthene**	**3.0 J**		210	2.82
86-73-7	Fluorene	210 U		210	2.02
118-74-1	Hexachlorobenzene	210 U		210	3.01
87-68-3	Hexachlorobutadiene	210 U		210	4.64
77-47-4	Hexachlorocyclopentadiene	210 U		210	2.38
67-72-1	Hexachloroethane	210 U		210	2.80
193-39-5	Indeno (1,2,3-cd) Pyrene	210 U		210	4.70
78-59-1	Isophorone	210 U		210	2.08
91-20-3	Naphthalene	210 U		210	3.30
98-95-3	Nitrobenzene	210 U		210	3.84

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	210 U	210	3.95
86-30-6	**N-Nitroso-di-Phenylamine**	**120 J**	210	5.70
87-86-5	Pentachlorophenol	410 U	410	5.27
85-01-8	Phenanthrene	210 U	210	2.76
108-95-2	Phenol	210 U	210	4.75
129-00-0	**Pyrene**	**3.0 J**	210	1.78

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/18/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	
		Analyzed:	11/04/03 JMK1
Sample ID:	**ASB2A**	Anal. Method:	USEPA-8270C
Sample #:	**346254**	QC Batch:	89985 -118
Matrix:	Soil	Anal. Batch:	209009
		Percent Solids:	80
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	190	E	NJ,t
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	490	E	NJ,t
Erucylamide	112-84-5	1100	E	B,x
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~680~~	~~E~~	~~A~~ 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	6.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	1100 U		1100	15.3
95-94-3	1,2,4,5-Tetrachloro-benzene	1100 U		1100	178
108-60-1	Bis (2-Chloroisopropyl)-Ether	1100 U		1100	8.18
95-95-4	2,4,5-Trichlorophenol	1100 U		1100	20.7
88-06-2	2,4,6-Trichlorophenol	1100 U		1100	16.2
120-83-2	2,4-Dichlorophenol	1100 U		1100	21.8
105-67-9	2,4-Dimethylphenol	1100 U	UJ,I	1100	49.2
51-28-5	2,4-Dinitrophenol	2100 U	UJ,C	2100	19.8
121-14-2	**2,4-Dinitrotoluene**	**710** J		1100	19.5
606-20-2	2,6-Dinitrotoluene	1100 U		1100	172
91-58-7	2-Chloronaphthalene	1100 U		1100	14.3
95-57-8	2-Chlorophenol	1100 U		1100	12.5
91-57-6	2-Methylnaphthalene	1100 U		1100	17.0
95-48-7	2-Methylphenol	1100 U		1100	30.0
88-74-4	2-Nitroaniline	1100 U		1100	28.5
88-75-5	2-Nitrophenol	1100 U		1100	10.5
91-94-1	3,3'-Dichlorobenzidine	1100 U		1100	343
99-09-2	3-Nitroaniline	1100 U	UJ,C	1100	113
534-52-1	4,6-Dinitro-2-Methylphenol	1100 U		1100	28.0
101-55-3	4-Bromophenyl Phenylether	1100 U		1100	21.0
59-50-7	4-Chloro-3-Methylphenol	1100 U		1100	32.3
106-47-8	4-Chloroaniline	1100 U	UJ,C	1100	7.81
7005-72-3	4-Chlorophenylphenyl-Ether	1100 U		1100	20.3
106-44-5	4-Methylphenol	1100 U		1100	39.5
100-01-6	4-Nitroaniline	1100 U		1100	45.0
100-02-7	4-Nitrophenol	2100 U	UJ,C	2100	17.5
83-32-9	Acenaphthene	1100 U		1100	10.7
208-96-8	Acenaphthylene	1100 U		1100	9.30
98-86-2	Acetophenone	1100 U		1100	11.8

Do not use, see neat analysis - AS 1/20/2004

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	6.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	1100 U		1100	28.6
1912-24-9	Atrazine	1100 U		1100	42.7
100-52-7	Benzaldehyde	1100 U		1100	25.1
56-55-3	Benzo (a) Anthracene	1100 U		1100	82.5
50-32-8	Benzo (a) Pyrene	1100 U		1100	35.4
205-99-2	Benzo (b) Fluoranthene	1100 U		1100	60.5
191-24-2	Benzo (g,h,i,) Perylene	1100 U		1100	54.1
207-08-9	Benzo (k) Fluoranthene	1100 U		1100	83.1
111-91-1	Bis (2-Chloroethoxy)-Methane	1100 U		1100	19.5
111-44-4	Bis (2-Chloroethyl) Ether	1100 U		1100	10.7
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**90 J**		1100	12.8
85-68-7	Butyl Benzyl Phthalate	1100 U		1100	27.8
105-60-2	Caprolactam	2100 U	UJ,C	2100	39.6
86-74-8	Carbazole	1100 U	UJ,C	1100	37.8
218-01-9	Chrysene	1100 U		1100	63.2
53-70-3	Dibenzo (a,h) Anthracene	1100 U		1100	36.6
132-64-9	Dibenzofuran	1100 U		1100	19.6
84-66-2	Diethylphthalate	1100 U		1100	11.8
131-11-3	Dimethylphthalate	1100 U		1100	20.5
84-74-2	√**Di-n-Butylphthalate**	**4300**		1100	23.7
117-84-0	Di-n-Octylphthalate	1100 U		1100	19.2
206-44-0	Fluoranthene	1100 U		1100	14.6
86-73-7	Fluorene	1100 U		1100	10.4
118-74-1	Hexachlorobenzene	1100 U		1100	15.6
87-68-3	Hexachlorobutadiene	1100 U		1100	24.0
77-47-4	Hexachlorocyclopentadiene	1100 U		1100	12.3
67-72-1	Hexachloroethane	1100 U		1100	14.5
193-39-5	Indeno (1,2,3-cd) Pyrene	1100 U		1100	24.3
78-59-1	Isophorone	1100 U		1100	10.7
91-20-3	Naphthalene	1100 U		1100	17.1
98-95-3	Nitrobenzene	1100 U		1100	19.8

Use only di-n-Butylphthalate, see neat analysis -AS 1/20/2004

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB2A**	QC Batch:	89985 -118
Sample #:	**346254DL**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	6.2

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	1100 U	1100	20.4
86-30-6	**N-Nitroso-di-Phenylamine**	**80 J**	1100	29.5
87-86-5	Pentachlorophenol	2100 U	2100	27.2
85-01-8	Phenanthrene	1100 U	1100	14.3
108-95-2	Phenol	1100 U	1100	24.6
129-00-0	Pyrene	1100 U	1100	9.18

Do not use - AS 1/20/2004

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB2B**	QC Batch:	89985 -118
Sample #:	**346255**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U	UJ,l	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	UJ,c	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U	UJ,c	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U	UJ,c	430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2B**	QC Batch:	89985 -118
Sample #:	**346255**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**22 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U	UJ,C	430	8.29
86-74-8	Carbazole	220 U	UJ,C	220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	**Diethylphthalate**	**10 J**		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**590**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2B**	QC Batch:	89985 -118
Sample #:	**346255**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/18/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	
		Analyzed:	11/04/03 JMK1
Sample ID:	**ASB2B**	Anal. Method:	USEPA-8270C
Sample #:	**346255**	QC Batch:	89985 -118
Matrix:	Soil	Anal. Batch:	209009
		Percent Solids:	76
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	230	E	NJ,+
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	510	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	87	E	B, X
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~1200~~	~~E~~	~~AS~~ 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**SBD-10**	QC Batch:	89985 -118
Sample #:	**346256**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	220 U		220	3.20
95-94-3	1,2,4,5-Tetrachloro-benzene	220 U		220	37.3
108-60-1	Bis (2-Chloroisopropyl)-Ether	220 U		220	1.72
95-95-4	2,4,5-Trichlorophenol	220 U		220	4.34
88-06-2	2,4,6-Trichlorophenol	220 U		220	3.41
120-83-2	2,4-Dichlorophenol	220 U		220	4.58
105-67-9	2,4-Dimethylphenol	220 U	UJ,I	220	10.3
51-28-5	2,4-Dinitrophenol	430 U	UJ,c	430	4.16
121-14-2	2,4-Dinitrotoluene	220 U		220	4.10
606-20-2	2,6-Dinitrotoluene	220 U		220	36.0
91-58-7	2-Chloronaphthalene	220 U		220	2.99
95-57-8	2-Chlorophenol	220 U		220	2.61
91-57-6	2-Methylnaphthalene	220 U		220	3.56
95-48-7	2-Methylphenol	220 U		220	6.29
88-74-4	2-Nitroaniline	220 U		220	5.98
88-75-5	2-Nitrophenol	220 U		220	2.21
91-94-1	3,3'-Dichlorobenzidine	220 U		220	72.0
99-09-2	3-Nitroaniline	220 U	UJ,c	220	23.8
534-52-1	4,6-Dinitro-2-Methylphenol	220 U		220	5.86
101-55-3	4-Bromophenyl Phenylether	220 U		220	4.39
59-50-7	4-Chloro-3-Methylphenol	220 U		220	6.77
106-47-8	4-Chloroaniline	220 U	UJ,c	220	1.64
7005-72-3	4-Chlorophenylphenyl-Ether	220 U		220	4.25
106-44-5	4-Methylphenol	220 U		220	8.28
100-01-6	4-Nitroaniline	220 U		220	9.43
100-02-7	4-Nitrophenol	430 U	UJ,c	430	3.68
83-32-9	Acenaphthene	220 U		220	2.24
208-96-8	Acenaphthylene	220 U		220	1.95
98-86-2	Acetophenone	220 U		220	2.47

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**SBD-10**
Sample #:	**346256**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/11/03 @ 00:00
Sampler:	B.F.& J.S.
Received:	10/14/03 @ 09:30
Prepared:	10/18/03 by DJM
Prep. Method:	USEPA-3550B
Analyzed:	11/04/03 by JMK1
Anal. Method:	USEPA-8270C
QC Batch:	89985 -118
Anal. Batch:	209009
Percent Solids:	72
Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	220 U		220	6.01
1912-24-9	Atrazine	220 U		220	8.94
100-52-7	Benzaldehyde	220 U		220	5.27
56-55-3	Benzo (a) Anthracene	220 U		220	17.3
50-32-8	Benzo (a) Pyrene	220 U		220	7.42
205-99-2	Benzo (b) Fluoranthene	220 U		220	12.7
191-24-2	Benzo (g,h,i,) Perylene	220 U		220	11.3
207-08-9	Benzo (k) Fluoranthene	220 U		220	17.4
111-91-1	Bis (2-Chloroethoxy)-Methane	220 U		220	4.08
111-44-4	Bis (2-Chloroethyl) Ether	220 U		220	2.25
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**16 J**		220	2.69
85-68-7	Butyl Benzyl Phthalate	220 U		220	5.82
105-60-2	Caprolactam	430 U	UJ,C	430	8.29
86-74-8	Carbazole	220 U	UJ,C	220	7.93
218-01-9	Chrysene	220 U		220	13.3
53-70-3	Dibenzo (a,h) Anthracene	220 U		220	7.67
132-64-9	Dibenzofuran	220 U		220	4.11
84-66-2	Diethylphthalate	220 U		220	2.47
131-11-3	Dimethylphthalate	220 U		220	4.30
84-74-2	**Di-n-Butylphthalate**	**640**		220	4.97
117-84-0	Di-n-Octylphthalate	220 U		220	4.03
206-44-0	Fluoranthene	220 U		220	3.06
86-73-7	Fluorene	220 U		220	2.18
118-74-1	Hexachlorobenzene	220 U		220	3.26
87-68-3	Hexachlorobutadiene	220 U		220	5.03
77-47-4	Hexachlorocyclopentadiene	220 U		220	2.57
67-72-1	Hexachloroethane	220 U		220	3.03
193-39-5	Indeno (1,2,3-cd) Pyrene	220 U		220	5.10
78-59-1	Isophorone	220 U		220	2.25
91-20-3	Naphthalene	220 U		220	3.58
98-95-3	Nitrobenzene	220 U		220	4.16

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**SBD-10**
Sample #:	**346256**
Matrix:	Soil
Unit:	ug/kg dry

Sampled:	10/11/03 @ 00:00
Sampler:	B.F.& J.S.
Received:	10/14/03 @ 09:30
Prepared:	10/18/03 by DJM
Prep. Method:	USEPA-3550B
Analyzed:	11/04/03 by JMK1
Anal. Method:	USEPA-8270C
QC Batch:	89985 -118
Anal. Batch:	209009
Percent Solids:	72
Dilution Factor:	1.3

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	220 U	220	4.28
86-30-6	N-Nitroso-di-Phenylamine	220 U	220	6.18
87-86-5	Pentachlorophenol	430 U	430	5.71
85-01-8	Phenanthrene	220 U	220	2.99
108-95-2	Phenol	220 U	220	5.15
129-00-0	Pyrene	220 U	220	1.92

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**SBD-10**	QC Batch:	89985 -118
Sample #:	**346256**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	72
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
(Z)-9-Octadecenamide	301-02-0	94	E	NJ,+
1,2-Benzenedicarboxylic acid, butyl 2-methylpropyl ester	17851-53-5	510	E	NJ,+
2,4,6-Triallyloxy-1,3,5-triazine	101-37-1	69	E	B,x
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~2000~~	~~E~~	~~AS~~ 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046 RAAP	Analyzed:	11/04/03 by JMK1
		Anal. Method:	USEPA-8270C
Sample ID:	**ASB2C**	QC Batch:	89985 -118
Sample #:	**346257**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
92-52-4	1,1'-Biphenyl	230 U		230	3.44
95-94-3	1,2,4,5-Tetrachloro-benzene	230 U		230	40.2
108-60-1	Bis (2-Chloroisopropyl)-Ether	230 U		230	1.85
95-95-4	2,4,5-Trichlorophenol	230 U		230	4.68
88-06-2	2,4,6-Trichlorophenol	230 U		230	3.67
120-83-2	2,4-Dichlorophenol	230 U		230	4.93
105-67-9	2,4-Dimethylphenol	230 U	UJ,I	230	11.1
51-28-5	2,4-Dinitrophenol	450 U	UJ,C	450	4.48
121-14-2	2,4-Dinitrotoluene	230 U		230	4.41
606-20-2	2,6-Dinitrotoluene	230 U		230	38.8
91-58-7	2-Chloronaphthalene	230 U		230	3.22
95-57-8	2-Chlorophenol	230 U		230	2.81
91-57-6	2-Methylnaphthalene	230 U		230	3.84
95-48-7	2-Methylphenol	230 U		230	6.78
88-74-4	2-Nitroaniline	230 U		230	6.44
88-75-5	2-Nitrophenol	230 U		230	2.38
91-94-1	3,3'-Dichlorobenzidine	230 U	UJ,M	230	77.6
99-09-2	3-Nitroaniline	230 U	UJ,C	230	25.6
534-52-1	4,6-Dinitro-2-Methylphenol	230 U		230	6.31
101-55-3	4-Bromophenyl Phenylether	230 U		230	4.73
59-50-7	4-Chloro-3-Methylphenol	230 U		230	7.29
106-47-8	4-Chloroaniline	230 U	UJ,C	230	1.76
7005-72-3	4-Chlorophenylphenyl-Ether	230 U		230	4.58
106-44-5	4-Methylphenol	230 U		230	8.92
100-01-6	4-Nitroaniline	230 U	UJ,M	230	10.2
100-02-7	4-Nitrophenol	450 U	UJ,C	450	3.96
83-32-9	Acenaphthene	230 U		230	2.41
208-96-8	Acenaphthylene	230 U		230	2.10
98-86-2	Acetophenone	230 U		230	2.66

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2C**	QC Batch:	89985 -118
Sample #:	**346257**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result		Reporting Limit	MDL
120-12-7	Anthracene	230 U		230	6.47
1912-24-9	Atrazine	230 U		230	9.63
100-52-7	Benzaldehyde	230 U		230	5.67
56-55-3	Benzo (a) Anthracene	230 U		230	18.6
50-32-8	Benzo (a) Pyrene	230 U		230	7.99
205-99-2	Benzo (b) Fluoranthene	230 U		230	13.7
191-24-2	Benzo (g,h,i,) Perylene	230 U		230	12.2
207-08-9	Benzo (k) Fluoranthene	230 U		230	18.8
111-91-1	Bis (2-Chloroethoxy)-Methane	230 U		230	4.40
111-44-4	Bis (2-Chloroethyl) Ether	230 U		230	2.42
117-81-7	**Bis (2-ethylhexyl)-Phthalate**	**34 J**		230	2.90
85-68-7	**Butyl Benzyl Phthalate**	**9.0 J**		230	6.27
105-60-2	Caprolactam	450 U	UJ,C	450	8.93
86-74-8	Carbazole	230 U	UJ,C	230	8.54
218-01-9	Chrysene	230 U		230	14.3
53-70-3	Dibenzo (a,h) Anthracene	230 U		230	8.26
132-64-9	Dibenzofuran	230 U		230	4.42
84-66-2	**Diethylphthalate**	**8.0 J**		230	2.66
131-11-3	Dimethylphthalate	230 U		230	4.63
84-74-2	**Di-n-Butylphthalate**	**600**		230	5.35
117-84-0	Di-n-Octylphthalate	230 U		230	4.34
206-44-0	Fluoranthene	230 U		230	3.29
86-73-7	Fluorene	230 U		230	2.35
118-74-1	Hexachlorobenzene	230 U		230	3.51
87-68-3	Hexachlorobutadiene	230 U		230	5.42
77-47-4	Hexachlorocyclopentadiene	230 U	UJ,M	230	2.77
67-72-1	Hexachloroethane	230 U		230	3.27
193-39-5	Indeno (1,2,3-cd) Pyrene	230 U		230	5.49
78-59-1	Isophorone	230 U		230	2.42
91-20-3	Naphthalene	230 U		230	3.85
98-95-3	Nitrobenzene	230 U		230	4.48

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	11/04/03 by JMK1
	RAAP	Anal. Method:	USEPA-8270C
Sample ID:	**ASB2C**	QC Batch:	89985 -118
Sample #:	**346257**	Anal. Batch:	209009
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Semivolatile Organics OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
621-64-7	N-Nitrosodi-n-Propylamine	230 U	230	4.61
86-30-6	N-Nitroso-di-Phenylamine	230 U	230	6.65
87-86-5	Pentachlorophenol	450 U	450	6.15
85-01-8	Phenanthrene	230 U	230	3.22
108-95-2	Phenol	230 U	230	5.54
129-00-0	Pyrene	230 U	230	2.07

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/18/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	
		Analyzed:	11/04/03 JMK1
Sample ID:	**ASB2C**	Anal. Method:	USEPA-8270C
Sample #:	**346257**	QC Batch:	89985 -118
Matrix:	Soil	Anal. Batch:	209009
		Percent Solids:	73
		Dilution Factor:	1

Tentatively Identified Compound Scan USEPA Method 8270	**CAS Number**	**Result (ug/kg dr**	**Qualifier**	
1,2-Benzenedicarboxylic acid, bis(2-methylpropyl) ester	84-69-5	500	E	NJ,+
1-Heptadecanol	1454-85-9	260	E	NJ,+
Bis(2-ethylhexyl)maleate	142-16-5	76	E	NJ,+
~~Hydrocarbons, Total~~	~~XXXXXX~~	~~4300~~	~~E~~	AS 1/20/2004

Any tentatively identified compound listed above was detected in this sample in addition to those reported in the requested target list.

The compounds found that were also in the initial calibration standard were quantified using a response factor from the initial calibration. The results provided are not considered estimated and are flagged 'Q'.

Results quantified from the initial calibration, but estimated due to levels above the linear range of the calibration curve, are flagged 'CE'.

A forward library search was also performed to tentatively identify other analytes present in this sample. The results for any compound listed above that is not present in a calibration standard, has been calculated using total peak areas from reconstructed ion chromatograms and a response factor of 1. These results must be considered estimated and are flagged 'E'.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**EQB5**	QC Batch:	90710 -114
Sample #:	**346013**	Anal. Batch:	208739
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**EQB6**	QC Batch:	90710 -114
Sample #:	**346015**	Anal. Batch:	208739
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**13SD3**	QC Batch:	91080 -118
Sample #:	**346017**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	68
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.1
208-96-8	Acenaphthylene	310 U	310	17.4
120-12-7	**Anthracene**	**9.4 J**	31	1.05
56-55-3	**Benzo (a) Anthracene**	**30 J**	31	1.20
50-32-8	**Benzo (a) Pyrene**	**49**	31	1.50
205-99-2	**Benzo (b) Fluoranthene**	**36**	31	1.95
191-24-2	**Benzo (g,h,i,) Perylene**	**88**	31	18.8
207-08-9	**Benzo (k) Fluoranthene**	**24 J**	31	1.50
218-01-9	**Chrysene**	**84**	31	1.80
53-70-3	**Dibenzo (a,h) Anthracene**	**6.2 J**	31	2.10
206-44-0	**Fluoranthene**	**19 J**	31	2.55
86-73-7	Fluorene	31 U	31	1.95
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**45**	31	1.05
91-20-3	Naphthalene	150 U	150	11.9
85-01-8	**Phenanthrene**	**5.2 J**	31	0.900
129-00-0	**Pyrene**	**14 J**	31	1.35

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SDD1**	QC Batch:	91080 -118
Sample #:	**346018**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	63
Unit:	ug/kg dry	Dilution Factor:	1.6

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	160 U	160	15.0
208-96-8	Acenaphthylene	330 U	330	18.6
120-12-7	Anthracene	33 U	33	1.12
56-55-3	Benzo (a) Anthracene	33 U	33	1.28
50-32-8	Benzo (a) Pyrene	33 U	33	1.60
205-99-2	Benzo (b) Fluoranthene	33 U	33	2.08
191-24-2	Benzo (g,h,i,) Perylene	33 U	33	20.0
207-08-9	Benzo (k) Fluoranthene	33 U	33	1.60
218-01-9	**Chrysene**	**2.6 J**	33	1.92
53-70-3	Dibenzo (a,h) Anthracene	33 U	33	2.24
206-44-0	Fluoranthene	33 U	33	2.72
86-73-7	Fluorene	33 U	33	2.08
193-39-5	Indeno (1,2,3-cd) Pyrene	33 U	33	1.12
91-20-3	Naphthalene	160 U	160	12.6
85-01-8	Phenanthrene	33 U	33	0.960
129-00-0	Pyrene	33 U	33	1.44

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SD2**	QC Batch:	91080 -118
Sample #:	**346019**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	65
Unit:	ug/kg dry	Dilution Factor:	1.5

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	150 U	150	14.1
208-96-8	Acenaphthylene	320 U	320	17.4
120-12-7	**Anthracene**	**3.8 J**	32	1.05
56-55-3	**Benzo (a) Anthracene**	**21 J**	32	1.20
50-32-8	**Benzo (a) Pyrene**	**26 J**	32	1.50
205-99-2	**Benzo (b) Fluoranthene**	**23 J**	32	1.95
191-24-2	**Benzo (g,h,i,) Perylene**	**40**	32	18.8
207-08-9	**Benzo (k) Fluoranthene**	**12 J**	32	1.50
218-01-9	**Chrysene**	**19 J**	32	1.80
53-70-3	Dibenzo (a,h) Anthracene	32 U	32	2.10
206-44-0	**Fluoranthene**	**48**	32	2.55
86-73-7	Fluorene	32 U	32	1.95
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**18 J**	32	1.05
91-20-3	Naphthalene	150 U	150	11.9
85-01-8	**Phenanthrene**	**16 J**	32	0.900
129-00-0	**Pyrene**	**45**	32	1.35

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**13SW3**	QC Batch:	90710 -114
Sample #:	**346020**	Anal. Batch:	208739
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**SWD1**	QC Batch:	90710 -114
Sample #:	**346021**	Anal. Batch:	208739
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0279
208-96-8	Acenaphthylene	1.2 U	1.2	0.0525
120-12-7	Anthracene	1.2 U	1.2	0.0024
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.0026
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.0069
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0138
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0539
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.0043
218-01-9	Chrysene	1.2 U	1.2	0.0034
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0416
206-44-0	Fluoranthene	1.2 U	1.2	0.0074
86-73-7	Fluorene	1.2 U	1.2	0.0096
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.0050
91-20-3	Naphthalene	0.62 U	0.62	0.0422
85-01-8	Phenanthrene	1.2 U	1.2	0.0032
129-00-0	Pyrene	1.2 U	1.2	0.0194

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Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**13SW2**	QC Batch:	90710 -114
Sample #:	**346022**	Anal. Batch:	208739
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1.1

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	1.2 U	1.2	0.0307
208-96-8	Acenaphthylene	1.2 U	1.2	0.0578
120-12-7	Anthracene	1.2 U	1.2	0.00264
56-55-3	Benzo (a) Anthracene	0.062 U	0.062	0.00286
50-32-8	Benzo (a) Pyrene	0.062 U	0.062	0.00759
205-99-2	Benzo (b) Fluoranthene	0.090 U	0.090	0.0152
191-24-2	Benzo (g,h,i,) Perylene	1.2 U	1.2	0.0593
207-08-9	Benzo (k) Fluoranthene	0.12 U	0.12	0.00473
218-01-9	Chrysene	1.2 U	1.2	0.00374
53-70-3	Dibenzo (a,h) Anthracene	0.24 U	0.24	0.0458
206-44-0	Fluoranthene	1.2 U	1.2	0.00814
86-73-7	Fluorene	1.2 U	1.2	0.0106
193-39-5	Indeno (1,2,3-cd) Pyrene	0.062 U	0.062	0.00550
91-20-3	Naphthalene	0.62 U	0.62	0.0464
85-01-8	Phenanthrene	1.2 U	1.2	0.00352
129-00-0	Pyrene	1.2 U	1.2	0.0213

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB1A**	QC Batch:	91218 -118
Sample #:	**346248**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	82
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result		Reporting Limit	MDL
83-32-9	Acenaphthene	120 U		120	11.3
208-96-8	Acenaphthylene	260 U		260	13.9
120-12-7	Anthracene	26 U		26	0.840
56-55-3	Benzo (a) Anthracene	26 U		26	0.960
50-32-8	Benzo (a) Pyrene	26 U	UJ,c	26	1.20
205-99-2	Benzo (b) Fluoranthene	26 U		26	1.56
191-24-2	Benzo (g,h,i,) Perylene	26 U		26	15.0
207-08-9	Benzo (k) Fluoranthene	26 U		26	1.20
218-01-9	**Chrysene**	**5.0 J**		26	1.44
53-70-3	Dibenzo (a,h) Anthracene	26 U		26	1.68
206-44-0	**Fluoranthene**	**17 J**	J,c	26	2.04
86-73-7	Fluorene	26 U		26	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U		26	0.840
91-20-3	Naphthalene	120 U		120	9.48
85-01-8	**Phenanthrene**	**3.1 J**		26	0.720
129-00-0	**Pyrene**	**11 J**		26	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB1B**	QC Batch:	91218 -118
Sample #:	**346249**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	78
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	Benzo (a) Anthracene	27 U	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	Chrysene	27 U	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	Fluoranthene	27 U	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	27 U	27	0.780
129-00-0	Pyrene	27 U	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB1C**	QC Batch:	91218 -118
Sample #:	**346250**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	77
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	270 U	270	15.1
120-12-7	Anthracene	27 U	27	0.910
56-55-3	Benzo (a) Anthracene	27 U	27	1.04
50-32-8	Benzo (a) Pyrene	27 U	27	1.30
205-99-2	Benzo (b) Fluoranthene	27 U	27	1.69
191-24-2	Benzo (g,h,i,) Perylene	27 U	27	16.3
207-08-9	Benzo (k) Fluoranthene	27 U	27	1.30
218-01-9	Chrysene	27 U	27	1.56
53-70-3	Dibenzo (a,h) Anthracene	27 U	27	1.82
206-44-0	Fluoranthene	27 U	27	2.21
86-73-7	Fluorene	27 U	27	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	27 U	27	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	27 U	27	0.780
129-00-0	Pyrene	27 U	27	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB3A**	QC Batch:	91218 -118
Sample #:	**346251**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	260 U	260	15.1
120-12-7	Anthracene	26 U	26	0.910
56-55-3	Benzo (a) Anthracene	26 U	26	1.04
50-32-8	Benzo (a) Pyrene	26 U	26	1.30
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.69
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	16.3
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.30
218-01-9	Chrysene	26 U	26	1.56
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.82
206-44-0	Fluoranthene	26 U	26	2.21
86-73-7	Fluorene	26 U	26	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	**Phenanthrene**	**1.9 J**	26	0.780
129-00-0	Pyrene	26 U	26	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB3B**	QC Batch:	91218 -118
Sample #:	**346252**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	260 U	260	15.1
120-12-7	Anthracene	26 U	26	0.910
56-55-3	Benzo (a) Anthracene	26 U	26	1.04
50-32-8	Benzo (a) Pyrene	26 U	26	1.30
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.69
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	16.3
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.30
218-01-9	Chrysene	26 U	26	1.56
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.82
206-44-0	Fluoranthene	26 U	26	2.21
86-73-7	Fluorene	26 U	26	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	26 U	26	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	26 U	26	0.780
129-00-0	Pyrene	26 U	26	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:30
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB3C**	QC Batch:	91218 -118
Sample #:	**346253**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	84
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	120 U	120	11.3
208-96-8	Acenaphthylene	250 U	250	13.9
120-12-7	Anthracene	25 U	25	0.840
56-55-3	Benzo (a) Anthracene	25 U	25	0.960
50-32-8	Benzo (a) Pyrene	25 U	25	1.20
205-99-2	Benzo (b) Fluoranthene	25 U	25	1.56
191-24-2	Benzo (g,h,i,) Perylene	25 U	25	15.0
207-08-9	Benzo (k) Fluoranthene	25 U	25	1.20
218-01-9	**Chrysene**	**1.8 J**	25	1.44
53-70-3	Dibenzo (a,h) Anthracene	25 U	25	1.68
206-44-0	**Fluoranthene**	**8.7 J**	25	2.04
86-73-7	Fluorene	25 U	25	1.56
193-39-5	Indeno (1,2,3-cd) Pyrene	25 U	25	0.840
91-20-3	Naphthalene	120 U	120	9.48
85-01-8	**Phenanthrene**	**3.0 J**	25	0.720
129-00-0	**Pyrene**	**9.9 J**	25	1.08

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	11/27/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB2A**	QC Batch:	91218 -118
Sample #:	**346254**	Anal. Batch:	210003
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.25

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	11.8
208-96-8	Acenaphthylene	260 U	260	14.5
120-12-7	Anthracene	26 U	26	0.875
56-55-3	**Benzo (a) Anthracene**	**3.6 J**	26	1.00
50-32-8	Benzo (a) Pyrene	26 U	26	1.25
205-99-2	Benzo (b) Fluoranthene	26 U	26	1.63
191-24-2	Benzo (g,h,i,) Perylene	26 U	26	15.6
207-08-9	Benzo (k) Fluoranthene	26 U	26	1.25
218-01-9	**Chrysene**	**3.7 J**	26	1.50
53-70-3	Dibenzo (a,h) Anthracene	26 U	26	1.75
206-44-0	**Fluoranthene**	**7.7 J**	26	2.13
86-73-7	Fluorene	26 U	26	1.63
193-39-5	**Indeno (1,2,3-cd) Pyrene**	**6.2 J**	26	0.875
91-20-3	Naphthalene	130 U	130	9.88
85-01-8	**Phenanthrene**	**4.0 J**	26	0.750
129-00-0	**Pyrene**	**21 J**	26	1.13

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB2B**	QC Batch:	91218 -118
Sample #:	**346255**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	76
Unit:	ug/kg dry	Dilution Factor:	1.3

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	130 U	130	12.2
208-96-8	Acenaphthylene	280 U	280	15.1
120-12-7	Anthracene	28 U	28	0.910
56-55-3	Benzo (a) Anthracene	28 U	28	1.04
50-32-8	Benzo (a) Pyrene	28 U	28	1.30
205-99-2	Benzo (b) Fluoranthene	28 U	28	1.69
191-24-2	Benzo (g,h,i,) Perylene	28 U	28	16.3
207-08-9	Benzo (k) Fluoranthene	28 U	28	1.30
218-01-9	Chrysene	28 U	28	1.56
53-70-3	Dibenzo (a,h) Anthracene	28 U	28	1.82
206-44-0	Fluoranthene	28 U	28	2.21
86-73-7	Fluorene	28 U	28	1.69
193-39-5	Indeno (1,2,3-cd) Pyrene	28 U	28	0.910
91-20-3	Naphthalene	130 U	130	10.3
85-01-8	Phenanthrene	28 U	28	0.780
129-00-0	Pyrene	28 U	28	1.17

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by TAJ
		Anal. Method:	USEPA-8310
Sample ID:	**SBD-10**	QC Batch:	91218 -118
Sample #:	**346256**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	72
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	290 U	290	16.2
120-12-7	Anthracene	29 U	29	0.980
56-55-3	Benzo (a) Anthracene	29 U	29	1.12
50-32-8	Benzo (a) Pyrene	29 U	29	1.40
205-99-2	Benzo (b) Fluoranthene	29 U	29	1.82
191-24-2	Benzo (g,h,i,) Perylene	29 U	29	17.5
207-08-9	Benzo (k) Fluoranthene	29 U	29	1.40
218-01-9	Chrysene	29 U	29	1.68
53-70-3	Dibenzo (a,h) Anthracene	29 U	29	1.96
206-44-0	Fluoranthene	29 U	29	2.38
86-73-7	Fluorene	29 U	29	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	29 U	29	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	29 U	29	0.840
129-00-0	Pyrene	29 U	29	1.26

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/18/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8310
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by TAJ
	RAAP	Anal. Method:	USEPA-8310
Sample ID:	**ASB2C**	QC Batch:	91218 -118
Sample #:	**346257**	Anal. Batch:	209020
Matrix:	Soil	Percent Solids:	73
Unit:	ug/kg dry	Dilution Factor:	1.4

CAS Number	Polynuclear Aromatic Hydrocarbons	Analytical Result	Reporting Limit	MDL
83-32-9	Acenaphthene	140 U	140	13.2
208-96-8	Acenaphthylene	650 U	650	16.2
120-12-7	Anthracene	65 U	65	0.980
56-55-3	Benzo (a) Anthracene	65 U	65	1.12
50-32-8	Benzo (a) Pyrene	65 U	65	1.40
205-99-2	Benzo (b) Fluoranthene	65 U	65	1.82
191-24-2	Benzo (g,h,i,) Perylene	65 U	65	17.5
207-08-9	Benzo (k) Fluoranthene	65 U	65	1.40
218-01-9	Chrysene	65 U	65	1.68
53-70-3	Dibenzo (a,h) Anthracene	65 U	65	1.96
206-44-0	Fluoranthene	65 U	65	2.38
86-73-7	Fluorene	65 U	65	1.82
193-39-5	Indeno (1,2,3-cd) Pyrene	65 U	65	0.980
91-20-3	Naphthalene	140 U	140	11.1
85-01-8	Phenanthrene	65 U	65	0.840
129-00-0	Pyrene	65 U	65	1.26

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**EQB5**	QC Batch:	89804 -117
Sample #:	**346013**	Anal. Batch:	208354
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/27/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**EQB6**	QC Batch:	89804 -117
Sample #:	**346015**	Anal. Batch:	208354
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/24/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**13SD3**	QC Batch:	90908 -121
Sample #:	**346017**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	68
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/21/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/24/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SDD1**	QC Batch:	90908 -121
Sample #:	**346018**	Anal. Batch:	208771
Matrix:	Soil	Percent Solids:	63
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**	Prepared:	10/21/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/24/03 by JMK1
Sample ID:	**13SD2**	Anal. Method:	USEPA-8330
Sample #:	**346019**	QC Batch:	90908 -121
Matrix:	Soil	Anal. Batch:	208771
Unit:	mg/kg dry	Percent Solids:	65
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/27/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**13SW3**	QC Batch:	89804 -117
Sample #:	**346020**	Anal. Batch:	208354
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**SWD1**	QC Batch:	89804 -117
Sample #:	**346021**	Anal. Batch:	208354
Matrix:	Surface Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U	0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U	0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U	0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U	0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U	0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U	1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U	0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U	2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U	1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U	2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.277
98-95-3	Nitrobenzene	0.65 U	0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U	0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**	Prepared:	10/17/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/28/03 by JMK1
Sample ID:	**13SW2**	Anal. Method:	USEPA-8330
Sample #:	**346022**	QC Batch:	89804 -117
Matrix:	Surface Water	Anal. Batch:	208354
Unit:	ug/L	Percent Solids:	n/a
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result		Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.65 U		0.65	0.150
99-65-0	1,3-Dinitrobenzene	0.65 U		0.65	0.121
118-96-7	2,4,6-Trinitrotoluene	0.65 U		0.65	0.102
121-14-2	2,4-Dinitrotoluene	0.65 U		0.65	0.114
606-20-2	2,6-Dinitrotoluene	0.65 U		0.65	0.217
35572-78-2	2-Amino-4,6-dinitro-toluene	1.0 U		1.0	0.245
88-72-2	2-Nitrotoluene	0.65 U		0.65	0.175
99-08-1	3-Nitrotoluene	2.0 U		2.0	0.413
19406-51-0	4-Amino-2,6-dinitro-toluene	1.0 U		1.0	0.239
99-99-0	4-Nitrotoluene	2.0 U		2.0	0.488
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U		1.0	0.277
98-95-3	Nitrobenzene	0.65 U		0.65	0.0825
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.65 U		0.65	0.109
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	2.0 U	UJ, M	2.0	0.0931

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046 RAAP
Sample ID:	**ASB1A**
Sample #:	**346248**
Matrix:	Soil
Unit:	mg/kg dry

Sampled:	10/11/03 @ 08:45
Sampler:	B.F.& J.S.
Received:	10/14/03 @ 09:30
Prepared:	10/23/03 by DJM
Prep. Method:	USEPA-8330
Analyzed:	10/28/03 by JMK1
Anal. Method:	USEPA-8330
QC Batch:	90905 -123
Anal. Batch:	208354
Percent Solids:	82
Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/23/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/28/03 by JMK1
Sample ID:	**ASB1B**	Anal. Method:	USEPA-8330
Sample #:	**346249**	QC Batch:	90905 -123
Matrix:	Soil	Anal. Batch:	209312
Unit:	mg/kg dry	Percent Solids:	78
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**ASB1C**	QC Batch:	90905 -123
Sample #:	**346250**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	77
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**ASB3A**	QC Batch:	90905 -123
Sample #:	**346251**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
~~121-14-2~~	~~2,4-Dinitrotoluene~~	~~25 E~~ J,Y	~~0.50~~	~~0.142~~
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

~~2,4-Dinitrotoluene~~ ~~25 E~~ ~~0.142~~ ~~0.50~~ ~~0.142~~ ~~1/15/04~~ see dilution

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**ASB3A**	QC Batch:	90905 -123
Sample #:	**346251DL**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	5

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.700
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.795
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.835
121-14-2	✓ **2,4-Dinitrotoluene**	**20**	0.50	0.710
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	1.25
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.755
88-72-2	2-Nitrotoluene	1.0 U	1.0	1.33
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.920
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.810
99-99-0	4-Nitrotoluene	1.0 U	1.0	1.26
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	1.15
98-95-3	Nitrobenzene	0.50 U	0.50	0.510
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.655
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.845

Use only 2,4-DNT, ✓ 1/20/04

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/23/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/28/03 by JMK1
Sample ID:	**ASB3B**	Anal. Method:	USEPA-8330
Sample #:	**346252**	QC Batch:	90905 -123
Matrix:	Soil	Anal. Batch:	209312
Unit:	mg/kg dry	Percent Solids:	80
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**
Project:	Richmond, VA
	RAAP
Submittal #:	**36440-6**
Submittal:	Delivery Order 0046
	RAAP
Sample ID:	**ASB3C**
Sample #:	**346253**
Matrix:	Soil
Unit:	mg/kg dry

Sampled:	10/11/03 @ 12:30
Sampler:	B.F.& J.S.
Received:	10/14/03 @ 09:30
Prepared:	10/23/03 by DJM
Prep. Method:	USEPA-8330
Analyzed:	10/28/03 by JMK1
Anal. Method:	USEPA-8330
QC Batch:	90905 -123
Anal. Batch:	209312
Percent Solids:	84
Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JMK1
		Anal. Method:	USEPA-8330
Sample ID:	**ASB2A**	QC Batch:	90905 -123
Sample #:	**346254**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	80
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:10
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**ASB2B**	QC Batch:	90905 -123
Sample #:	**346255**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	76
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/23/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8330
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by JMK1
	RAAP	Anal. Method:	USEPA-8330
Sample ID:	**SBD-10**	QC Batch:	90905 -123
Sample #:	**346256**	Anal. Batch:	209312
Matrix:	Soil	Percent Solids:	72
Unit:	mg/kg dry	Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	2,4-Dinitrotoluene	0.50 U	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 11:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**	Prepared:	10/23/03 by DJM
Submittal:	Delivery Order 0046 RAAP	Prep. Method:	USEPA-8330
		Analyzed:	10/28/03 by JMK1
Sample ID:	**ASB2C**	Anal. Method:	USEPA-8330
Sample #:	**346257**	QC Batch:	90905 -123
Matrix:	Soil	Anal. Batch:	209312
Unit:	mg/kg dry	Percent Solids:	73
		Dilution Factor:	1

CAS Number	Explosives	Analytical Result	Reporting Limit	MDL
99-35-4	1,3,5-Trinitrobenzene	0.50 U	0.50	0.140
99-65-0	1,3-Dinitrobenzene	0.50 U	0.50	0.159
118-96-7	2,4,6-Trinitrotoluene	0.50 U	0.50	0.167
121-14-2	**2,4-Dinitrotoluene**	**0.20 J**	0.50	0.142
606-20-2	2,6-Dinitrotoluene	1.0 U	1.0	0.250
35572-78-2	2-Amino-4,6-dinitro-toluene	0.50 U	0.50	0.151
88-72-2	2-Nitrotoluene	1.0 U	1.0	0.266
99-08-1	3-Nitrotoluene	1.0 U	1.0	0.184
19406-51-0	4-Amino-2,6-dinitro-toluene	0.50 U	0.50	0.162
99-99-0	4-Nitrotoluene	1.0 U	1.0	0.251
2691-41-0	Octahydro-1,3,5,7-tetra-nitro-1,3,5,7-tetrazocine	1.0 U	1.0	0.229
98-95-3	Nitrobenzene	0.50 U	0.50	0.102
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine	0.50 U	0.50	0.131
479-45-8	Methyl-2,4,6-trinitro-phenylnitramine	1.0 U	1.0	0.169

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/18/03 by MSN
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**EQB5**	QC Batch:	90180 -114
Sample #:	**346013**	Anal. Batch:	208237
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	0.10 U	0.10	0.0016
72-55-9	4,4'-DDE	0.10 U	0.10	0.0025
50-29-3	4,4'-DDT	0.10 U	0.10	0.0018
309-00-2	Aldrin	0.050 U	0.050	0.0019
319-84-6	Alpha-BHC	0.050 U	0.050	0.0014
57-74-9	A-Chlordane	0.050 U	0.050	0.0024
5103-74-2	G-Chlordane	0.050 U	0.050	0.0023
319-85-7	Beta-BHC	0.050 U	0.050	0.0039
319-86-8	Delta-BHC	0.050 U	0.050	0.0025
60-57-1	Dieldrin	0.10 U	0.10	0.0034
115-29-7	Endosulfan I	0.050 U	0.050	0.0026
33213-65-9	Endosulfan II	0.10 U	0.10	0.0021
1031-07-8	Endosulfan Sulfate	0.10 U	0.10	0.0022
72-20-8	Endrin	0.10 U	0.10	0.0038
7421-93-4	Endrin Aldehyde	0.10 U	0.10	0.0053
53494-70-5	Endrin Ketone	0.10 U	0.10	0.0020
58-89-9	Lindane	0.050 U	0.050	0.0016
76-44-8	Heptachlor	0.050 U	0.050	0.0021
1024-57-3	Heptachlor Epoxide	0.050 U	0.050	0.0022
72-43-5	Methoxychlor	0.50 U	0.50	0.0032
8001-35-2	Toxaphene	1.0 U	1.0	0.118

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/18/03 by MSN
		Anal. Method:	USEPA-8081A
Sample ID:	**EQB6**	QC Batch:	90180 -114
Sample #:	**346015**	Anal. Batch:	208237
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	0.10 U	0.10	0.0016
72-55-9	4,4'-DDE	0.10 U	0.10	0.0025
50-29-3	4,4'-DDT	0.10 U	0.10	0.0018
309-00-2	Aldrin	0.050 U	0.050	0.0019
319-84-6	Alpha-BHC	0.050 U	0.050	0.0014
57-74-9	A-Chlordane	0.050 U	0.050	0.0024
5103-74-2	G-Chlordane	0.050 U	0.050	0.0023
319-85-7	Beta-BHC	0.050 U	0.050	0.0039
319-86-8	Delta-BHC	0.050 U	0.050	0.0025
60-57-1	Dieldrin	0.10 U	0.10	0.0034
115-29-7	Endosulfan I	0.050 U	0.050	0.0026
33213-65-9	Endosulfan II	0.10 U	0.10	0.0021
1031-07-8	Endosulfan Sulfate	0.10 U	0.10	0.0022
72-20-8	Endrin	0.10 U	0.10	0.0038
7421-93-4	Endrin Aldehyde	0.10 U	0.10	0.0053
53494-70-5	Endrin Ketone	0.10 U	0.10	0.0020
58-89-9	Lindane	0.050 U	0.050	0.0016
76-44-8	Heptachlor	0.050 U	0.050	0.0021
1024-57-3	Heptachlor Epoxide	0.050 U	0.050	0.0022
72-43-5	Methoxychlor	0.50 U	0.50	0.0032
8001-35-2	Toxaphene	1.0 U	1.0	0.118

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/31/03 by JLRM
	RAAP	Anal. Method:	USEPA-8081A
Sample ID:	**ASB2A**	QC Batch:	90181 -116
Sample #:	**346254**	Anal. Batch:	208635
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Chlorinated Pesticides OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
72-54-8	4,4'-DDD	25 U	25	0.286
72-55-9	4,4'-DDE	25 U	25	0.210
50-29-3	4,4'-DDT	25 U	25	0.216
309-00-2	Aldrin	25 U	25	0.365
319-84-6	Alpha-BHC	25 U	25	0.364
57-74-9	A-Chlordane	25 U	25	0.521
5103-74-2	G-Chlordane	25 U	25	0.844
319-85-7	Beta-BHC	25 U	25	1.36
319-86-8	Delta-BHC	25 U	25	0.982
60-57-1	Dieldrin	25 U	25	0.371
115-29-7	Endosulfan I	25 U	25	1.09
33213-65-9	Endosulfan II	25 U	25	0.257
1031-07-8	Endosulfan Sulfate	25 U	25	0.604
72-20-8	Endrin	25 U	25	0.358
7421-93-4	Endrin Aldehyde	25 U	25	1.33
53494-70-5	Endrin Ketone	25 U	25	0.330
58-89-9	Lindane	25 U	25	0.233
76-44-8	Heptachlor	25 U	25	0.846
1024-57-3	Heptachlor Epoxide	25 U	25	0.546
72-43-5	Methoxychlor	25 U	25	0.336
8001-35-2	Toxaphene	210 U	210	28.0

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**EQB5**	QC Batch:	89851 -114
Sample #:	**346013**	Anal. Batch:	207778
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	0.30 U	0.30	0.0753
11104-28-2	PCB-1221	0.50 U	0.50	0.0504
11141-16-5	PCB-1232	0.30 U	0.30	0.0794
53469-21-9	PCB-1242	0.30 U	0.30	0.0809
12672-29-6	PCB-1248	0.25 U	0.25	0.0828
11097-69-1	PCB-1254	0.10 U	0.10	0.0341
11096-82-5	PCB-1260	0.20 U	0.20	0.0481

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/14/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-3510C
Submittal:	Delivery Order 0046	Analyzed:	10/16/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**EQB6**	QC Batch:	89851 -114
Sample #:	**346015**	Anal. Batch:	207778
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	0.30 U	0.30	0.0753
11104-28-2	PCB-1221	0.50 U	0.50	0.0504
11141-16-5	PCB-1232	0.30 U	0.30	0.0794
53469-21-9	PCB-1242	0.30 U	0.30	0.0809
12672-29-6	PCB-1248	0.25 U	0.25	0.0828
11097-69-1	PCB-1254	0.10 U	0.10	0.0341
11096-82-5	PCB-1260	0.20 U	0.20	0.0481

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/16/03 by JRR
Submittal #:	**36440-6**	Prep. Method:	USEPA-3550B
Submittal:	Delivery Order 0046	Analyzed:	10/23/03 by JLRM
	RAAP	Anal. Method:	USEPA-8082
Sample ID:	**ASB2A**	QC Batch:	89881 -116
Sample #:	**346254**	Anal. Batch:	208229
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Polychlorinated Biphenyls OLM04.2 TCL	Analytical Result	Reporting Limit	MDL
12674-11-2	PCB-1016	82 U	82	19.2
11104-28-2	PCB-1221	41 U	41	2.40
11141-16-5	PCB-1232	41 U	41	6.00
53469-21-9	PCB-1242	41 U	41	3.60
12672-29-6	PCB-1248	41 U	41	6.00
11097-69-1	**PCB-1254**	**9.9 J**	41	3.60
11096-82-5	PCB-1260	41 U	41	8.40

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by JLRM
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**EQB5**	QC Batch:	90447 -117
Sample #:	**346013**	Anal. Batch:	208365
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	0.50 U	0.50	0.053
93-72-1	2,4,5-TP (Silvex)	0.50 U	0.50	0.104
94-75-7	2,4-D	5.0 U	5.0	0.670
94-82-6	2,4-DB	5.0 U	5.0	0.955
75-99-0	Dalapon	5.0 U	5.0	0.862
1918-00-9	Dicamba	0.50 U	0.50	0.104
120-36-5	Dichlorprop	5.0 U	5.0	0.195
88-85-7	Dinoseb	1.0 U	1.0	0.168
94-74-6	MCPA	250 U	250	76.8
93-65-2	MCPP	250 U	250	74.8

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046 RAAP	Analyzed:	10/28/03 by JLRM
		Anal. Method:	USEPA-8151A
Sample ID:	**EQB6**	QC Batch:	90447 -117
Sample #:	**346015**	Anal. Batch:	208365
Matrix:	QC Water	Percent Solids:	n/a
Unit:	ug/L	Dilution Factor:	1

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	0.50 U	0.50	0.053
93-72-1	2,4,5-TP (Silvex)	0.50 U	0.50	0.104
94-75-7	2,4-D	5.0 U	5.0	0.670
94-82-6	2,4-DB	5.0 U	5.0	0.955
75-99-0	Dalapon	5.0 U	5.0	0.862
1918-00-9	Dicamba	0.50 U	0.50	0.104
120-36-5	Dichlorprop	5.0 U	5.0	0.195
88-85-7	Dinoseb	1.0 U	1.0	0.168
94-74-6	MCPA	250 U	250	76.8
93-65-2	MCPP	250 U	250	74.8

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 10:15
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
		Prepared:	10/17/03 by DJM
Submittal #:	**36440-6**	Prep. Method:	USEPA-8151A
Submittal:	Delivery Order 0046	Analyzed:	10/28/03 by JLRM
	RAAP	Anal. Method:	USEPA-8151A
Sample ID:	**ASB2A**	QC Batch:	90218 -117
Sample #:	**346254**	Anal. Batch:	208365
Matrix:	Soil	Percent Solids:	80
Unit:	ug/kg dry	Dilution Factor:	1.2

CAS Number	Herbicides	Analytical Result	Reporting Limit	MDL
93-76-5	2,4,5-T	62 U	62	2.40
93-72-1	2,4,5-TP (Silvex)	62 U	62	4.80
94-75-7	2,4-D	250 U	250	19.2
94-82-6	2,4-DB	250 U	250	74.4
75-99-0	Dalapon	310 U	310	68.4
1918-00-9	Dicamba	250 U	250	2.40
120-36-5	Dichlorprop	250 U	250	20.4
88-85-7	Dinoseb	250 U	250	25.2
94-74-6	MCPA	25000 U	25000	1680
93-65-2	MCPP	25000 U	25000	6070

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 09:45
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **EQB5**
Sample #: **346013**
Matrix: QC Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	100 U		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Barium, Total	10 U		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Total	0.3 J	B,P	4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Calcium, Total	500 U		500	33.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Chromium, Total	4.5		1.0	0.554	ug/L	10/30/03	MSG	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Total	21 J	B,P	100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Lead, Total	1.0 U		1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Magnesium, Total	500 U		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Total	10 U		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Nickel, Total	1.0 U		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Potassium, Total	200 U		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U		2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Total	0.5 U		0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Sodium, Total	280 J	B,P	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Thallium, Total	0.5 J		1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Vanadium, Total	10 U		10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Total	20 U		20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 11:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **EQB6**
Sample #: **346015**
Matrix: QC Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	100 U		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Barium, Total	10 U		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Calcium, Total	500 U		500	33.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Chromium, Total	0.9 J	B,P	1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Total	7.6 J	B,P	100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Lead, Total	1.0 U		1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Magnesium, Total	500 U		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Total	10 U		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Nickel, Total	1.0 U		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Potassium, Total	200 U		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U		2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Total	0.5 U		0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Sodium, Total	180 J	B,P	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Thallium, Total	0.4 J		1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Vanadium, Total	10 U		10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Total	4.6 J		20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SD3**
Sample #: **346017**
Matrix: Soil

Percent Solids: 68

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	23400		500	5.10	mg/kg dry	10/23/03	DSC	USEPA-6010B
Antimony, Total	3.5		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	169		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.3		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.0		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2080	K,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	40		5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	13		1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	36		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	37100		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	247		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3870	K,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	544		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.13		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	19		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1950		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	1.2		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12	J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	52	J	100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.52		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	44		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	541		40	3.35	mg/kg dry	10/23/03	DSC	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SDD1**
Sample #: **346018**
Matrix: Soil

Percent Solids: 63

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	19600		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	1.9		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.7		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	131		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.3		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	0.94 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	1620	K,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	31		5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	12		1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	31		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	32000		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	271		50	1.09	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	3030	K,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	644		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.11		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	18		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1520		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	1.2		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.14 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	38 J		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.49 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	32		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	541		40	3.35	mg/kg dry	10/23/03	DSC	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SD2**
Sample #: **346019**
Matrix: Soil

Percent Solids: 65

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	9870		50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.18 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.3		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	101		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.83 J		1.0	0.167	mg/kg dry	11/03/03	JMF	USEPA-6010B
Cadmium, Total	0.57 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
* Calcium, Total	1270	K,M	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	27		5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.9		1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	14		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	34600		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	132		25	0.545	mg/kg dry	10/24/03	DWJ	USEPA-6020
* Magnesium, Total	2130	K,M	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	720		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.033 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	12		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1020		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.85 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.12 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	53 J		100	8.92	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Thallium, Total	0.46 J		0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	19		1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	442		40	3.35	mg/kg dry	10/23/03	DSC	USEPA-6010B

* See attached Statement of Data Qualifications.

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SW3**
Sample #: **346020**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	66 J		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Aluminum, Dissolved	100 U		100	18.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Antimony, Total	0.7 J		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Antimony, Dissolved	0.8 J		2.0	0.552	ug/L	10/30/03	MSG	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Dissolved	2.0 U		2.0	0.429	ug/L	10/30/03	MSG	EPA-200.8/6020
Barium, Total	21		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Barium, Dissolved	18		10	1.82	ug/L	10/29/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Dissolved	4.0 U		4.0	0.295	ug/L	10/29/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Cadmium, Dissolved	0.5 U		0.5	0.135	ug/L	10/30/03	MSG	EPA-200.8/6020
Calcium, Total	13000		2500	170	ug/L	10/23/03	KLVM	EPA-200.7/6010B
Calcium, Dissolved	13000		2500	170	ug/L	10/29/03	DSC	EPA-200.7/6010B
Chromium, Total	0.8 J	B,P	1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Chromium, Dissolved	0.6 J		2.0	0.554	ug/L	10/30/03	MSG	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cobalt, Dissolved	20 U		20	3.91	ug/L	10/29/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Dissolved	20 U		20	5.36	ug/L	10/29/03	DSC	EPA-200.7/6010B
Iron, Total	180		100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Dissolved	38 J		100	2.95	ug/L	10/29/03	DSC	EPA-200.7/6010B
Lead, Total	0.9 J	B,P	1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Lead, Dissolved	1.0 U		1.0	0.281	ug/L	10/30/03	MSG	EPA-200.8/6020
Magnesium, Total	5400		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Magnesium, Dissolved	5500		500	57.4	ug/L	10/29/03	DSC	EPA-200.7/6010B
Manganese, Total	30		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Dissolved	7.9 J		10	3.16	ug/L	10/29/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Mercury, Dissolved	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Nickel, Total	0.8 J		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Nickel, Dissolved	1.0 J		2.0	0.410	ug/L	10/30/03	MSG	EPA-200.8/6020
Potassium, Total	1900		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SW3**
Sample #: **346020**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Potassium, Dissolved	1600	200	59.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U	2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Selenium, Dissolved	3.0 U	3.0	0.933	ug/L	10/30/03	MSG	EPA-200.8/6020
Silver, Total	0.5 U	0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Dissolved	0.5 U	0.5	0.0765	ug/L	10/30/03	MSG	EPA-200.8/6020
Sodium, Total	5100 J,S	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Sodium, Dissolved	5100	500	76.9	ug/L	10/29/03	DSC	EPA-200.7/6010B
Thallium, Total	0.3 J	1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Thallium, Dissolved	1.0 U	1.0	0.208	ug/L	10/30/03	MSG	EPA-200.8/6020
Vanadium, Total	10 U	10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Vanadium, Dissolved	10 U	10	2.89	ug/L	10/29/03	DSC	EPA-200.7/6010B
Zinc, Total	20 U	20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Dissolved	20 U	20	4.55	ug/L	10/29/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SWD1**
Sample #: **346021**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	53 J		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Aluminum, Dissolved	100 U		100	18.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Antimony, Dissolved	2.0 U		2.0	0.552	ug/L	10/30/03	MSG	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Dissolved	2.0 U		2.0	0.429	ug/L	10/30/03	MSG	EPA-200.8/6020
Barium, Total	21		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Barium, Dissolved	17		10	1.82	ug/L	10/29/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Dissolved	4.0 U		4.0	0.295	ug/L	10/29/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Cadmium, Dissolved	0.5 U		0.5	0.135	ug/L	10/30/03	MSG	EPA-200.8/6020
Calcium, Total	13000		2500	170	ug/L	10/23/03	KLVM	EPA-200.7/6010B
Calcium, Dissolved	13000		2500	170	ug/L	10/29/03	DSC	EPA-200.7/6010B
Chromium, Total	0.6 J	B,P	1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Chromium, Dissolved	0.8 J		2.0	0.554	ug/L	10/30/03	MSG	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cobalt, Dissolved	20 U		20	3.91	ug/L	10/29/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Dissolved	20 U		20	5.36	ug/L	10/29/03	DSC	EPA-200.7/6010B
Iron, Total	170		100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Dissolved	36 J		100	2.95	ug/L	10/29/03	DSC	EPA-200.7/6010B
Lead, Total	0.9 J	B,P	1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Lead, Dissolved	1.0 U		1.0	0.281	ug/L	10/30/03	MSG	EPA-200.8/6020
Magnesium, Total	5300		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Magnesium, Dissolved	5400		500	57.4	ug/L	10/29/03	DSC	EPA-200.7/6010B
Manganese, Total	24		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Dissolved	4.3 J		10	3.16	ug/L	10/29/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Mercury, Dissolved	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Nickel, Total	0.8 J		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Nickel, Dissolved	0.8 J		2.0	0.410	ug/L	10/30/03	MSG	EPA-200.8/6020
Potassium, Total	1800		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SWD1**
Sample #: **346021**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Potassium, Dissolved	1700		200	59.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U		2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Selenium, Dissolved	3.0 U		3.0	0.933	ug/L	10/30/03	MSG	EPA-200.8/6020
Silver, Total	0.5 U		0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Dissolved	0.5 U		0.5	0.0765	ug/L	10/30/03	MSG	EPA-200.8/6020
Sodium, Total	5000	J,S	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Sodium, Dissolved	5000		500	76.9	ug/L	10/29/03	DSC	EPA-200.7/6010B
Thallium, Total	0.24 J		1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Thallium, Dissolved	1.0 U		1.0	0.208	ug/L	10/30/03	MSG	EPA-200.8/6020
Vanadium, Total	10 U		10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Vanadium, Dissolved	10 U		10	2.89	ug/L	10/29/03	DSC	EPA-200.7/6010B
Zinc, Total	20 U		20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Dissolved	20 U		20	4.55	ug/L	10/29/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SW2**
Sample #: **346022**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	74 J		100	18.7	ug/L	10/17/03	DSC	EPA-200.7/6010B
Aluminum, Dissolved	100 U		100	18.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Antimony, Total	1.0 U		1.0	0.552	ug/L	10/16/03	JMF	EPA-200.8/6020
Antimony, Dissolved	2.0 U		2.0	0.552	ug/L	10/30/03	MSG	EPA-200.8/6020
Arsenic, Total	1.0 U		1.0	0.429	ug/L	10/16/03	JMF	EPA-200.8/6020
Arsenic, Dissolved	2.0 U		2.0	0.429	ug/L	10/30/03	MSG	EPA-200.8/6020
Barium, Total	22		10	1.82	ug/L	10/17/03	DSC	EPA-200.7/6010B
Barium, Dissolved	18		10	1.82	ug/L	10/29/03	DSC	EPA-200.7/6010B
Beryllium, Total	4.0 U		4.0	0.295	ug/L	10/17/03	DSC	EPA-200.7/6010B
Beryllium, Dissolved	4.0 U		4.0	0.295	ug/L	10/29/03	DSC	EPA-200.7/6010B
Cadmium, Total	0.5 U		0.5	0.135	ug/L	10/16/03	JMF	EPA-200.8/6020
Cadmium, Dissolved	0.5 U		0.5	0.135	ug/L	10/30/03	MSG	EPA-200.8/6020
Calcium, Total	13000		2500	170	ug/L	10/23/03	KLVM	EPA-200.7/6010B
Calcium, Dissolved	13000		2500	170	ug/L	10/29/03	DSC	EPA-200.7/6010B
Chromium, Total	0.8 J	B,P	1.0	0.554	ug/L	10/16/03	JMF	EPA-200.8/6020
Chromium, Dissolved	2.0 U		2.0	0.554	ug/L	10/30/03	MSG	EPA-200.8/6020
Cobalt, Total	10 U		10	3.91	ug/L	10/17/03	DSC	EPA-200.7/6010B
Cobalt, Dissolved	20 U		20	3.91	ug/L	10/29/03	DSC	EPA-200.7/6010B
Copper, Total	10 U		10	5.36	ug/L	10/17/03	DSC	EPA-200.7/6010B
Copper, Dissolved	20 U		20	5.36	ug/L	10/29/03	DSC	EPA-200.7/6010B
Iron, Total	190		100	2.95	ug/L	10/17/03	DSC	EPA-200.7/6010B
Iron, Dissolved	37 J		100	2.95	ug/L	10/29/03	DSC	EPA-200.7/6010B
Lead, Total	0.6 J	B,P	1.0	0.281	ug/L	10/16/03	JMF	EPA-200.8/6020
Lead, Dissolved	1.0 U		1.0	0.281	ug/L	10/30/03	MSG	EPA-200.8/6020
Magnesium, Total	5700		500	57.4	ug/L	10/17/03	DSC	EPA-200.7/6010B
Magnesium, Dissolved	5600		500	57.4	ug/L	10/29/03	DSC	EPA-200.7/6010B
Manganese, Total	27		10	3.16	ug/L	10/17/03	DSC	EPA-200.7/6010B
Manganese, Dissolved	10		10	3.16	ug/L	10/29/03	DSC	EPA-200.7/6010B
Mercury, Total	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Mercury, Dissolved	0.4 U		0.4	0.0584	ug/L	10/22/03	MSS	USEPA-7470A
Nickel, Total	0.96 J		1.0	0.410	ug/L	10/16/03	JMF	EPA-200.8/6020
Nickel, Dissolved	1.1 J		2.0	0.410	ug/L	10/30/03	MSG	EPA-200.8/6020
Potassium, Total	1800		200	59.7	ug/L	10/17/03	DSC	EPA-200.7/6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 14:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SW2**
Sample #: **346022**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Potassium, Dissolved	1600	200	59.7	ug/L	10/29/03	DSC	EPA-200.7/6010B
Selenium, Total	2.0 U	2.0	0.933	ug/L	10/16/03	JMF	EPA-200.8/6020
Selenium, Dissolved	3.0 U	3.0	0.933	ug/L	10/30/03	MSG	EPA-200.8/6020
Silver, Total	0.5 U	0.5	0.0765	ug/L	10/16/03	JMF	EPA-200.8/6020
Silver, Dissolved	0.5 U	0.5	0.0765	ug/L	10/30/03	MSG	EPA-200.8/6020
Sodium, Total	5100 J,S	500	76.9	ug/L	10/17/03	DSC	EPA-200.7/6010B
Sodium, Dissolved	5100	500	76.9	ug/L	10/29/03	DSC	EPA-200.7/6010B
Thallium, Total	1.0 U	1.0	0.208	ug/L	10/16/03	JMF	EPA-200.8/6020
Thallium, Dissolved	1.0 U	1.0	0.208	ug/L	10/30/03	MSG	EPA-200.8/6020
Vanadium, Total	10 U	10	2.89	ug/L	10/17/03	DSC	EPA-200.7/6010B
Vanadium, Dissolved	10 U	10	2.89	ug/L	10/29/03	DSC	EPA-200.7/6010B
Zinc, Total	5.5 J	20	4.55	ug/L	10/17/03	DSC	EPA-200.7/6010B
Zinc, Dissolved	20 U	20	4.55	ug/L	10/29/03	DSC	EPA-200.7/6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 08:45
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB1A**
Sample #: **346248**
Matrix: Soil

Percent Solids: 82

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	32000		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.086 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.0		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	86		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.53 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.94 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	2569		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	38	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	8.8	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	155		5.0	1.84	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Iron, Total	41600		200	42.4	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Lead, Total	76		10	0.218	mg/kg dry	10/24/03	DWJ	USEPA-6020
Magnesium, Total	2450		250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	315		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.067 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1540		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.56 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.070 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	95 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.24 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	68	L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	78		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 09:00
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB1B**
Sample #: **346249**
Matrix: Soil

Percent Solids: 78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	30800	250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.8	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	99	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.90 J	1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	1.0 U	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	408	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	31 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	24 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	20	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	37500	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	26	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2050	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1750	25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.019 J	0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	16	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1840	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.52 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.061 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	122	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.43 J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	66 L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	56	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 09:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB1C**
Sample #: **346250**
Matrix: Soil

Percent Solids: 77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	36300	250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.18 J	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	8.1	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	115	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.8	1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	0.46 J	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	126 J	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	40 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	15 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	43	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	42200	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	19	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	5870	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	1170	25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.075 J	0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	28	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	3780	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.99 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.11 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	54 J	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.45 J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	56 L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	109	20	2.59	mg/kg dry	10/27/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 12:00
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB3A**
Sample #: **346251**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	32100	250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.9	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	114	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.62 J	1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.0 U	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	3910	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	33 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	24 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	36	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	38300	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	34	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2090	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	2400	25	1.32	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Mercury, Total	0.052 J	0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	12	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1410	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.30 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.054 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	207	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.48 J	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	68 L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	56	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 12:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB3B**
Sample #: **346252**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28300	250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	1.6	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	63	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.57 J	1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.75 J	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	644	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	30 J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	12 J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	17	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	36500	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	11	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1980	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	483	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.030 J	0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	13	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1670	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.40 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.048 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	237	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.20 J B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	66 L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	46	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 12:30
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB3C**
Sample #: **346253**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	24500	50	1.83	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U	0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.2	0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	50	5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.64 J	1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	1.0 U	1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	293	250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	41 J,m	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	11 J,s	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	14	2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	33600	1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	12	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	1160	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	330	5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.025 J	0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	14	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1010	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.40 J	1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.074 J	3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	131	100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.15 J B,x	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	42 L,m	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	44	4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 10:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2A**
Sample #: **346254**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	28500		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.071 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	2.9		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	61		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.55 J		1.0	0.0333	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Cadmium, Total	0.26 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	6100		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	36	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	9.3	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	57		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	38100		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	25		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	3180		250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	426		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.045 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	13		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1220		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.47 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.072 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	77 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	63	L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	58		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 10:10
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2B**
Sample #: **346255**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	32300		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	3.4		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	77		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	1.3		1.0	0.167	mg/kg dry	11/03/03	KLVM	USEPA-6010B
Cadmium, Total	0.36 J		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	867		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	39	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	14	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	19		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	40300		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	8.8	J,F	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	5220	J,F	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	648		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.014 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	36	J,F	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	2750	J,F	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.60 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.093 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	77 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.23 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	55	L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	45		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 00:00
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SBD-10**
Sample #: **346256**
Matrix: Soil

Percent Solids: 72

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	34800		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.068 J		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.7		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	98		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.86 J		1.0	0.167	mg/kg dry	11/03/03	JMF	USEPA-6010B
Cadmium, Total	1.0 U		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	380		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Chromium, Total	41	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	22	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	23		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	38000		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	13	J,f	1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2800	J,f	250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	859		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.022 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	21	J,f	0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1560	J,f	100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.50 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.094 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	50 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.22 J	B,x	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
Vanadium, Total	49	L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	37		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 11:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2C**
Sample #: **346257**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result		Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Aluminum, Total	35000		250	9.15	mg/kg dry	10/27/03	KLVM	USEPA-6010B
Antimony, Total	0.50 U		0.50	0.0518	mg/kg dry	10/21/03	MSG	USEPA-6020
Arsenic, Total	4.5		0.40	0.0232	mg/kg dry	10/23/03	DWJ	USEPA-6020
Barium, Total	88		5.0	0.106	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Beryllium, Total	0.59 J		1.0	0.167	mg/kg dry	11/03/03	JMF	USEPA-6010B
Cadmium, Total	1.0 U		1.0	0.182	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Calcium, Total	310		250	16.6	mg/kg dry	10/23/03	KLVM	USEPA-6010B
* Chromium, Total	52	J,M	5.0	0.912	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Cobalt, Total	20	J,S	1.0	0.208	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Copper, Total	22		2.0	0.368	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Iron, Total	40200		1000	71.6	mg/kg dry	10/23/03	DSC	USEPA-6010B
Lead, Total	12		1.0	0.0218	mg/kg dry	10/23/03	DWJ	USEPA-6020
Magnesium, Total	2120		250	3.21	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Manganese, Total	704		5.0	0.264	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Mercury, Total	0.020 J		0.10	0.0077	mg/kg dry	10/21/03	MSS	USEPA-7471A
Nickel, Total	20		0.50	0.0356	mg/kg dry	10/23/03	DWJ	USEPA-6020
Potassium, Total	1260		100	5.00	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Selenium, Total	0.45 J		1.0	0.0502	mg/kg dry	10/23/03	DWJ	USEPA-6020
Silver, Total	0.075 J		3.0	0.0044	mg/kg dry	10/24/03	DWJ	USEPA-6020
Sodium, Total	50 J		100	18.1	mg/kg dry	10/28/03	DWJ	USEPA-6010B
Thallium, Total	0.21 J	B,X	0.50	0.0270	mg/kg dry	10/24/03	DWJ	USEPA-6020
* Vanadium, Total	54	L,M	1.0	0.207	mg/kg dry	10/23/03	KLVM	USEPA-6010B
Zinc, Total	40		4.0	0.517	mg/kg dry	10/23/03	KLVM	USEPA-6010B

* See attached Statement of Data Qualifications.

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 09:45
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**EQB5**		
Sample #:	**346013**		
Matrix:	QC Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 11:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**EQB6**		
Sample #:	**346015**		
Matrix:	QC Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 13:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SD3**		
Sample #:	**346017**		
Matrix:	Soil	Percent Solids:	68

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	68	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.20 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 00:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**SDD1**		
Sample #:	**346018**		
Matrix:	Soil	Percent Solids:	63

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	63	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.39 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA	Sampler:	B.F. & J.S.
	RAAP	Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**13SD2**		
Sample #:	**346019**		
Matrix:	Soil	Percent Solids:	65

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	65	0.1	0.1	%	10/14/03	TAM	SW-846 3550B
Cyanide, Total	0.07 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 13:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **13SW3**
Sample #: **346020**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/10/03 @ 00:00
Sampler: B.F. & J.S.
Received: 10/11/03 @ 08:45

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **SWD1**
Sample #: **346021**
Matrix: Surface Water

Percent Solids: n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/10/03 @ 14:00
Project:	Richmond, VA RAAP	Sampler:	B.F. & J.S.
		Received:	10/11/03 @ 08:45
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**13SW2**		
Sample #:	**346022**		
Matrix:	Surface Water	Percent Solids:	n/a

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Cyanide, Total	10 U	10	3.40	ug/L	10/16/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 08:45
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**ASB1A**		
Sample #:	**346248**		
Matrix:	Soil	Percent Solids:	82

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	82	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.06 J	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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TriMatrix Laboratories, Inc.

ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**ASB1B**		
Sample #:	**346249**		
Matrix:	Soil	Percent Solids:	78

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	78	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/20/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 09:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**ASB1C**		
Sample #:	**346250**		
Matrix:	Soil	Percent Solids:	77

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	77	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.47 J	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:00
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**ASB3A**		
Sample #:	**346251**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.15 J	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 12:15
Project:	Richmond, VA RAAP	Sampler:	B.F.& J.S.
		Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046 RAAP		
Sample ID:	**ASB3B**		
Sample #:	**346252**		
Matrix:	Soil	Percent Solids:	80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 12:30
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB3C**
Sample #: **346253**
Matrix: Soil

Percent Solids: 84

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	84	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 10:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2A**
Sample #: **346254**
Matrix: Soil

Percent Solids: 80

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	80	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.23 J	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 10:10
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2B**
Sample #: **346255**
Matrix: Soil

Percent Solids: 76

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	76	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.18 J	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client:	**URS Corporation**	Sampled:	10/11/03 @ 00:00
Project:	Richmond, VA	Sampler:	B.F.& J.S.
	RAAP	Received:	10/14/03 @ 09:30
Submittal #:	**36440-6**		
Submittal:	Delivery Order 0046		
	RAAP		
Sample ID:	**SBD-10**		
Sample #:	**346256**		
Matrix:	Soil	Percent Solids:	72

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	72	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.14 J	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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ANALYTICAL REPORT

Client: **URS Corporation**
Project: Richmond, VA
RAAP

Sampled: 10/11/03 @ 11:15
Sampler: B.F.& J.S.
Received: 10/14/03 @ 09:30

Submittal #: **36440-6**
Submittal: Delivery Order 0046
RAAP
Sample ID: **ASB2C**
Sample #: **346257**
Matrix: Soil

Percent Solids: 73

Parameter	Analytical Result	Reporting Limit	MDL	Unit	Analysis Date	Chem	Reference Citation
Percent Solids	73	0.1	0.1	%	10/16/03	TAM	SW-846 3550B
Cyanide, Total	0.50 U	0.50	0.0356	mg/kg dry	10/24/03	JLB	USEPA-9012A

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DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-6
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do sample preservation, collection and storage condition meet method requirement?	x		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

1.0 Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500 at 3.8C.

2.0 All samples from Area A were collected on Saturday 10/11/03 and could not be shipped until Monday the 13th. Samples were received at laboratory on Tuesday the 14th. The encore aliquots could not be used since the holding time to preservation had expired. All sample aliquots were taken from bulk.

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	see above		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	x		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		x	

Notes: The second source for methyl acetate was analyzed after sample analyses, but passed at 89% - no action was taken.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	x		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?	x		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			x
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.			x
	1 or more <10% / 1 high/low / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high			
	Positives: L / J / J / L / K			
	Non-detects: R / UJ / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?	x		
7.4	Are there any RPD outside the QC limits not to exceed 50%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			x
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	x		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively identified and approximate concentration).		x	
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 22			
	Number of target compounds in each analysis:50			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-6
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Do sample preservation, collection and storage condition meet method requirement?		x	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	x		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		x	

Notes:

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common phthalate contaminants) the amount in the associated blank.	x		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	x		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the Dv report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	x		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	x		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD ≤ 15%, ICV %D < 30%, and CCV %D ≤ 20%.		x	
	For initial Calibration: for %RSD > ±15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 60%, J(+)/UJ(-), >60%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < 0.05? (n-nitroso-di-n-propylamine,hexachlorocyclopentadiene,2,4-dinitrophenol, & 4-nitrophenol) If yes, J(+)/R(-).		x	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	x		
5.2	Are DFTPP enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	x		
	If DFTPP was analyzed simultaneously with any calibration standard or blank, the instrument performance check (IPC) is rejected "R" as well as all associated data.			
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune?	x		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If the DFTPP criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria not to exceed 10-150% for all samples and method blanks?		x	
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?		x	
	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)	x		
	1 or more <10% / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / L / K Non-detects: R / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 10-150%?	x		
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 10-150%?	x		
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?		x	
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).		x	
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		x	

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentativelyidenified, and approximate concentration).	x		
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	x		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			x

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	x		
	Number of samples: 18			
	Number of target compounds in each analysis:66			
	Number of results rejected and not reported:0			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100.0%			

Notes:

DATA VALIDATION WORKSHEET

Polyaromatic Hydrocarbons

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
_____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-6
Test Name: PAH
Method No.: 8310-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyses, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	18			
	Number of target compounds in each analysis:	16			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-6
Test Name: Explosives
Method No.: 8330-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: 13SD2 RPDs out
13SW2 tetryl 42/40% (50%)
ASB2C RPDs out

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	18			
	Number of target compounds in each analysis:	14			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer:	AS	**Project Name:**	Radford SSP
Date:	January-04	**Project Number:**	15291974.30000
DV Level:	II III IV	**Laboratory:**	TriMatrix
Review Document:		**SDG No.:**	36440-6
X SW-846 - 8081/8082		**Test Name:**	PEST/PCB
X NFG - Region III Modifications		**Method No.:**	8081A/8082
___ CLP			

1.0 Laboratory Deliverables		**Yes**	**No**	**NA**
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Do any soil samples contain more than 50% water?		x	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV report.			

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Preservation/ Holding Times		**Yes**	**No**	**NA**
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampleing to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		x	

Notes: sampled on 10/2/03, extracted on 10/8-9/03, analyzed 10/10-30/03

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix)?	x		
3.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to five times the amount in the associated blank.		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note it in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards included in the calibration curve? 1016 and 1260 need at least three peaks at five concentrations. The multi-component target compounds (the other Aroclors, Toxaphene, & Chlordane) must each be analyzed separately at a single concentration level during the initial calibration sequence.	x		
4.2	Has a continuing calibration standard been analyzed for every 12 hours or twenty samples?	x		
4.3	Are all calibration standard (IC and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r>0.99, %RSD < ± 20% and %D < ± 15%		x	
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Do all standard retention times in the continuing calibration fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	x		

Notes:

5.0 GC/ECD Instrument Performance Check for Pesticides		Yes	No	NA
5.1	Is the 4,4'-DDT breakdown </= to 15%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non-detect DDT results, DDD/DDE - R(+).	x		
5.2	Is the endrin breakdown </= to 15%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	x		

Notes:

6.0 Surrogate Recovery					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
6.2	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.				x		
6.3	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?				x		
6.4	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?						x
6.5	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)						x
	# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance			
	1 out	high/low	No action	No action			
	2 out	2 high same column	K	No action			
		2 low same column	L, UL	No action			
		mixed same column	J, UJ	No action			
		2 high diff columns	J	Not applicable			
		2 low diff columns	J, UJ	Not applicable			
		mixed diff columns	Professional judgement	Not applicable			
	3 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		2 high, 1 low	K (2 high)	J (1 low 2nd column)			
		2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)			
		other mixed	J, UJ	Not applicable			
	4 out	All high	K	Not applicable			
		All low	L, UL	Not applicable			
		Mixed	J, UJ	Not applicable			
	If any recovery is >0% and <10% then L(+)/R(-).						
	If any recovery is 0% then R(+/-).						

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 30-150%?	pest	pcb	
7.4	Are there any RPDs outside the QC limits not to exceed 60%?	pest	pcb	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD from SDG 36440-1

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	x		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 30-150%?			
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		x	
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	If Yes, J(+) only.			

Notes:

9.0 Field Duplicate		Yes	No	NA
9.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
9.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A/SBD1 submitted in SDG 36440-2, BDL for pest and 0.053/0.051 for Aroclor 1254.

10.0 Compound Identification and Detection Limit Verification		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns < 40%? If No, J(+).	x		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		

Notes:

11.0 Pesticide Cleanup Checks		Yes	No	NA
11.1	Is Form IX PEST-1 present and complete for each lot of Florisil Cartridges used? (Florisil Cleanup is required for all Pest/PCB extracts to reduce matrix interference caused by polar compounds.)			x
	Every lot number of Florisil cartridges used for sample cleanup must be checked by spiking with 2,4,5-trichlorophenol and the midpoint concentration of Individual Standard Mixture A.			
11.2	Are all samples listed on the Pesticide Florisil cartridge Check Form?			
11.3	Are percent recoveries of pesticide and surrogate compounds within control limit, 80-120%(if the recovery of 2,4,5-trichlorophenol < 5%), for the florisil cartridge check? If No, the raw data should be examined for the presence of polar interferences and professional judgement should be used in qualifying the data.			

Notes:

Florisil cleanup was performed, no laboratory submission for these CLP descriptors was provided.

12.0 Data Completeness				Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	Pest	PCB	x		
	Number of samples:	3	3			
	Number of target compounds in each analysis:	21	7			
	Number of results rejected and not reported:	0	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)					
	% Completeness =	100%	100%			

Notes:

DATA VALIDATION WORKSHEET

Herbicides

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

__X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
__X__ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: TriMatrix
SDG No.: 36440-6
Test Name: Herbicides
Method No.: 8151A

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?		see above	
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 25-150% for all samples and method blanks?		x	
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?		x	
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.		x	
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 25-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%?	x		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MS/MSD see SDG 36440-1

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 25-150%?	x		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?		x	
	Action: If Yes, J(+) only.			

Notes: original extraction Dinoseb LCS recovery low, re-extraction passed.

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: QSB1A and SDB-3 submitted in SDG 36440-2 were both non-detect.

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	3			
	Number of target compounds in each analysis:	10			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

Project Name: Radford SSP
SDG No.: 36440-6 **Reviewer:** AS
Project No.: 15291974.30000 **Date:** January-04

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	x			x			x			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			x			x			x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x			x			x			x	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{O}C $\pm$ 2 ^{O}C)		x			x			x			x	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x			x			x			x		

Note: ten coolers @ 3.8C, 2.8C, 2.6C, 9.8C, 2.6C, 2.1C, 3.9C, 2.1C, 2.0C, & 3.5C.

Cooler TM0436 received at laboratory at 9.8C contained EQB5 for all parameters except VOC. All VOC sample containers were received in TM0500.

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		x			x		x			x		

Note: 38SB2C was collected on 10/3/03 and distilled/analyzed on 10/21/03 the 18th day.

Since cooler temperature of 9.8C is less than 10C, no qualifying action was taken.

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	7 + BLK			4 + BLK			5 + BLK			6 + BLK		
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	x			x			x			x		
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.										x		
3.4	Was an initial calibration check standard (labelled LCS by TriMatrix) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	x			x			x			x		
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	x			x			x			x		
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	x			x			x			x		
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	x					x	x			x		
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K							passed within 70-130%			passed within 59-101%		

Note: A high point added to Al, Ba, Ca, Fe, Mg, Mn, & K curves and the RLs were elevated by 5.

4.0 Blanks		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x			x			x			x		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	x			x			x			x		
4.3	Are there reported MB or ICB/CCBs values > RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > RL?		x			x			x			x	
	Sample Results Non-detects > RL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± RL?	x			x				x			x	
	Sample Results > RL												
	< 5X Blank Contamination B												

Note: _____

5.0 ICP Interference Check Sample (ICS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	x			x								
5.2	Are the ICS AB recoveries within 80% - 120%?	x			x								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	x			x								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			x			x						
	If not...												
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)												
	< -RL > RL < 50% 50% - 79% >120%												
	L(+)/UL(-) K(+) L(+)/R(-) L(+)/UL(-) K(+)												

Note: _____

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x			x			x			x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x			x			x			x	
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note: _____

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	x			x			x			x		
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	x			x			x			x		

Note: _____

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	x			x			x			x		
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous and lab limits for soil?												
	%R > 125% 30%< %R < 74% < 30%	x				x		x			x		
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	x			x					x			x

Note: 13SD2 Calcium and Magnesium, post digetion spike passes

13SW2 passes for pre and post

ASB2C Chromium and Vanadium, post digestion spike recovery passes

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	x			x			x			x		

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			x								
10.2	Was a five-fold dilution performed?	x			x								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	x				x							

Note: Serial Dilution: 13SW2 - total sodium 15.7% , post digestion spike recovery pass

Serial Dilution: ASB2C - cobalt 30.0% , post digestion spike recovery passes

Serial Dilution: 13SD2 - calcium 12.6% , post digestion spike recovery pass

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x			x			x			x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report		x			x							

Note: _____

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x			x			x			x		
12.2	Were all dilution reflected in the positive results and detection limits?	x			x			x			x		
12.3	Were the Internal Standard recoveries within 30-120%	x			x								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	x											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	x											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	x											

Note: _____

Several metals by 6010B and lead by 6020 were analyzed straight and then at dilution due to the presence of high target concentrations

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	x			x			x			x		
13.1.1	Number of samples: 18												
13.1.2	Number of target compounds in each analysis: various												
13.1.3	Number of results rejected and not reported: 0												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%	100%			100%			100%			100%		

Note: _____

Cart 1
602-R-12

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1140 000058

Project Number	Project Name
89604 317	TCFAAP

Project Contact (Name and Phone Number): Doreen Fenn (804) 765 9008

Samplers: Brett Fisher / John Spangler

LAB: Test - Metric

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) (T,N)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted]	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
375G1 B	10/10/03 915	5		X	5	F	/	3	X														346012
EQB 5	10/10/03 945	5		X	4	HPC E	/	14	X	X	X	X	X	X		X						X	346013
Trip Blank	10/10/03 945 T							2	X														346014
	TIME for TB added - WR 10/13/03																						

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

TM #3 1

Cart 602-R-12

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1139

000059

Project Number	Project Name
96049317	RFAAP

Project Contact (Name and Phone Number): Darren Rasnic (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	[redacted] Hard	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB 6	10/10/03 1100	5		X	4	ABS EF	U	14	X	X	X	X	X	X		X						X	346015
Trip Blk	10/10/03 1100							2	X														346016
	TIME for TB added - WR 10/13/03																						

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

TMO 616

VOC Rack # 400, 602-R-12
Carts 4 + 1

Radford Army Ammunition Plant
Chain Of Custody Record

Vol Soil Fridge No 1111

Project Number	Project Name
69604 317	RFAAP

Project Contact (Name and Phone Number): Darren Rentz (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330)	Dioxin/Furan(8290)	TAL Metals (Including Mercury) (ICP)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
1355D3	10/10/03 1300	5		X	5	F	/	5	X	X	X			X		X							346017
5DD1	10/10/03 —	5		X	5	F	/	5	X	X	X			X		X							346018
1355D2	10/10/03 1400	5		X	5	F	/	5	X	X	X			X		X							346019
1355D2MS	10/10/03 1400	5		X	5	F	/	5	X	X	X			X		X							—
1355D2MSD	10/10/03 1400	5		X	5	F	/	5	X	X	X			X		X							—

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

TM0086 3

Radford Army Ammunition Plant
Chain Of Custody Record

Nº 1116

000061

Project Number	Project Name
96043.17	RFAAP

Project Contact (Name and Phone Number): Darren Reese (804) 765-9000

Samplers: Brett Fisher / John Sparks

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [illegible])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
155W3	10/10/03 1300	5		X	1	BC EF	F/U	14		X	X			X		X				3	60	20	Metals also filtered

Box #1			Box #2			Box #3		Box #4	
1.	Surface Water	6. Trip Blank	A.	HCl + Ice	F. Ice Only	F.	Filtered	R.	Rush - 3 Day
2.	Ground Water	7. Oil	B.	HNO3 + Ice	G. Other _____	U.	Unfiltered	S.	Standard 28 Day
3.	Leachate	8. Waste	C.	NaOH + Ice	H. NaHSO4 + Ice			T.	Timely 14 Day
4.	Rinsate	9. Other _____	D.	H2SO4 + Ice	I. ZnAc + NaOH + Ice			O.	Other _____
5.	Soil Sediment/Sludge		E.	Unpreserved					

Relinquished by:	Date/Time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

TM0435

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1117 00062

Project Number	Project Name
960317	RFAAP

Project Contact (Name and Phone Number): Darren Keene (804) 965 9000

Samplers: Brett Fisher / John Spagna

LAB: TH: Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
SWD1	10/10/03	5		X	1	BC EF	F/U	14		X	X			X		X					346021		Metals also filtered

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

TM0166

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1113

000063

Project Number	Project Name
09604 317	RFAAP

Project Contact (Name and Phone Number): Darren Renna (804)965-9000

Samplers: Brett Fisher / John Snyder

LAB: Tri-Matrix

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)/CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135WS	10/10/03 1300	5		X	1	ABC EF	F/U		X														Metals filtered —
135WD1	10/10/03 —	5		X	1	↓	↓	JAF	X														as well —
135WS2	10/10/03 1400	5		X	1			(14)	X	X	X			X		X							346022
135WS2 MS	10/10/03 1400	5		X	1				X														—
135WS2 MSD	10/10/03 1400	5		X	1	↓	↓		X														—
TRIP BLANK	10/10/03	1400						2	X														

added by us 10/16/03

Box #1			Box #2			Box #3	Box #4	
1. Surface Water	6. Trip Blank		A. HCl + Ice	F. Ice Only		F. Filtered	R. Rush - 3 Day	
2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other _____		U. Unfiltered	S. Standard 28 Day	
3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice			T. Timely 14 Day	
4. Rinsate	9. Other _____		D. H2SO4 + Ice	I. ZnAc + NaOH + Ice			O. Other _____	
5. Soil Sediment/Sludge			E. Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

Radford Army Ammunition Plant
Chain Of Custody Record

Nº 1114

0000641

Project Number	Project Name
09604-317	RFAAP

Project Contact (Name and Phone Number): Darren Rentz (804) 965 9000

Samplers: Brett Fisher / John Spagnolo

LAB:

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /Ca	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135W2M3	10/10/03 1400	5		X	1	BC CF	F/U	14		X	X			X		X							Metals filtered as well.

Box #1			Box #2			Box #3		Box #4	
1.	Surface Water	6. Trip Blank	A.	HCl + Ice	F. Ice Only	F.	Filtered	R.	Rush - 3 Day
2.	Ground Water	7. Oil	B.	HNO3 + Ice	G. Other _____	U.	Unfiltered	S.	Standard 28 Day
3.	Leachate	8. Waste	C.	NaOH + Ice	H. NaHSO4 + Ice			T.	Timely 14 Day
4.	Rinsate	9. Other _____	D.	H2SO4 + Ice	I. ZnAc + NaOH + Ice			O.	Other _____
5.	Soil Sediment/Sludge		E.	Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

23-1

TM0579

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1115

000065

Project Number	Project Name
09604817	RFAAP

Project Contact (Name and Phone Number): Darren Rense (804) 965 9000

Samplers: Brad Fisher / John Spagler

LAB:

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135W2 MSD	10/10/03 1400	5		X	1	S&F	F/U	14		X	X			X		X							Metals also filtered

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1810				
Relinquished by:	Date/time	Received by: (for lab) JAF	Date/Time 10/11/03 08:45	**NOTE:** Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

23-1

TMA389

Cart 7
TM0128
000081

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1118

Project Number	Project Name
09604317	SSP

Project Contact (Name and Phone Number): Darren Renn 804 965 9000

Samplers: John Spangler

LAB: TAMA Texas

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [redacted])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
A5D1A	10/11/03 8:45			X	5	F	-	5	X	X	X			X		X							
A5B1B	10/11/03 9:00			X	5	F	-	5	X	X	X			X		X							
A5B1C	9:15			X	5	F	-	5	X	X	X			X		X							
A5B3A	12:00			X	5	F	-	5	X	X	X			X		X							
A5B3B	12:15			X	5	F	-	5	X	X	X			X		X							
A5B3C	12:30			X	5	F	-	5	X	X	X			X		X							

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/Time	Received by:	Relinquished by:	Date/Time	Received by:
John Spangler	10/13/03 1800				
Relinquished by:	Date/Time	Received by: (for lab) John Plaka	Date/Time 10/14/03 9:30	**NOTE:** Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

36440-6

Cart 7
TM0621

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1119

Project Number	Project Name
09601317	RFAAP 55P

Project Contact (Name and Phone Number): Darren Reams

Samplers: T Spangler

LAB: TRIMATRIX

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, [illegible])	Dioxin/Furan(8290)	TAL Metals (Including Mercury) /CN	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	~~Paint Filter (9095B)~~ Hexo	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
ASB2A	10-11-03 10:15	S		X	5	F	-	7	X	X	X	X	X	X		X						X	
ASB2B	10:30	S		X	5	F	-	5	X	X	X			X		X							
SBD-10	—	S		X	5	F	-	5	X	X	X			X		X							
ASB2C	11:15	S		X	5	F	-	5	X	X	X			X		X							
ASB2C-MS	11:15	S		X	5	F	-	5	X	X	X			X		X							—
ASB2C-MSD	11:15	S		X	5	F	-	5	X	X	X			X		X							—

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
T Spangler	10/13/03 1400				
Relinquished by:	Date/time	Received by: (for lab) Lu Plakos	Date/Time 10/14/03 9:30		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

27-9

36440-6

2

DataChem Laboratories

PETN and Nitroglycerin

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0424-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: The laboratory incorrectly interpreted the field identification symbol 'S' for '5'. The field sample identifications were manually corrected by the data reviewer. The units displayed on the sample results forms were 'ug/g'. Since the project reporting units of 'mg/Kg' is the same as 'ug/g', the data reviewer manually entered 'or mg/Kg' on the sample result forms.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10060315052560
Page 1

G039001M

DCL Report Group..: **03E-0424-01**

Date Printed.....: 06-OCT-03 15:05

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211265-1	NA	NA
LCS	QC-211265-1	NA	NA
FSB1A	03E04093	30-SEP-03	01-OCT-03
FSB1B	03E04094	30-SEP-03	01-OCT-03
FSB1C	03E04095	30-SEP-03	01-OCT-03
FSB2A	03E04096	30-SEP-03	01-OCT-03
FSB2AMS	03E04096MS	30-SEP-03	01-OCT-03
FSB2AMSD	03E04096MSD	30-SEP-03	01-OCT-03
FSB2B	03E04097	30-SEP-03	01-OCT-03
SBD-1	03E04098	30-SEP-03	01-OCT-03
FSB2C	03E04099	30-SEP-03	01-OCT-03

Analyst: Gloria W. Heung — Date 10/6/03

Reviewer: Thomas T McKay — Date 10/9/03

Lab Supervisor: Richard W. Wade — Date 10/9/03

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10080317203891
Page 1

G039100B

DCL Report Group..: **03E-0426-01**

Date Printed.....: 08-OCT-03 17:20

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

VALUE CHANGES
AS 2/2/2004

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
FSB3A	03E04106	01-OCT-03	02-OCT-03
FSB3B	03E04107	01-OCT-03	02-OCT-03
FSB3C	03E04108	01-OCT-03	02-OCT-03
46SB1A	03E04109	01-OCT-03	02-OCT-03
46SB1B	03E04110	01-OCT-03	02-OCT-03
46SB1C	03E04111	01-OCT-03	02-OCT-03
~~465B2A~~ 46SB2A	03E04112	01-OCT-03	02-OCT-03
~~465B2B~~ 46SB2B	03E04113	01-OCT-03	02-OCT-03
~~465B2C~~ 46SB2C	03E04114	01-OCT-03	02-OCT-03
SBD2	03E04115	01-OCT-03	02-OCT-03
~~375B1A~~ 37SB1A	03E04116	01-OCT-03	02-OCT-03
Method Blank	BL-211265-1	NA	NA
LCS	QC-211265-1	NA	NA

Analyst: Gloria W. Heung — Date: 10-9-03 / ~~10/8/03~~ 10-9-03 GH

Reviewer: Thomas T McKay — Date: 10/9/03

Lab Supervisor: Richard W. Wade — Date: 10/9/02

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10060315052560
Page 3

S0390063

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

Client Sample Name: **FSB1A**
DCL Sample Name...: **03E04093**
DCL Report Group..: **03E-0424-01**

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 14:00
Reporting Units...: ug/g or mg/kg ts 2/4/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.9

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 14:16	0.268	ND		U	1	1.20
Nitroglycerin	03-OCT-03 14:16	0.195	ND		U	1	0.602

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0390064

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: FSB1B
DCL Sample Name...: 03E04094
DCL Report Group..: 03E-0424-01

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 14:15
Reporting Units....: ug/g or mg/kg TS 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.3

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 14:38	0.295	ND		U	1	1.32
Nitroglycerin	03-OCT-03 14:38	0.214	ND		U	1	0.661

007

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006

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0390065

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

Client Sample Name: **FSB1C**
DCL Sample Name...: **03E04095**
DCL Report Group..: **03E-0424-01**

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 14:30
Reporting Units...: ug/g or mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 36.7

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 15:01	0.352	ND		U	1	1.58
Nitroglycerin	03-OCT-03 15:01	0.256	ND		U	1	0.790

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0390066

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

Client Sample Name: FSB2A
DCL Sample Name...: 03E04096
DCL Report Group..: 03E-0424-01

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 15:00
Reporting Units....: ug/g or mg/kg ts 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.7

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 15:24	0.304	ND		U	1	1.36
Nitroglycerin	03-OCT-03 15:24	0.221	ND		U	1	0.682

DATA CHEM LABORATORIES
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SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0390069

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **FSB2B**
DCL Sample Name...: **03E04097**
DCL Report Group..: **03E-0424-01**

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 15:15
Reporting Units...: ug/g or mg/kg ks 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 18.4

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 16:55	0.273	ND		U	1	1.23
Nitroglycerin	03-OCT-03 16:55	0.199	ND		U	1	0.613

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039006B

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD-1**
DCL Sample Name...: **03E04098**
DCL Report Group..: **03E-0424-01**

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 00:00
Reporting Units...: ug/g or mg/kg 4/21/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 10.8

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 17:18	0.250	ND		U	1	1.12
Nitroglycerin	03-OCT-03 17:18	0.182	ND		U	1	0.561

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039006C

Date Printed.....: 06-OCT-03 15:05

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 01-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **FSB2C**
DCL Sample Name...: **03E04099**
DCL Report Group..: **03E-0424-01**

Matrix.....: SOIL
Date Sampled.....: 30-SEP-03 00:00
Reporting Units...: ug/g or mg/kg 12/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.0

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 17:41	0.279	ND		U	1	1.25
Nitroglycerin	03-OCT-03 17:41	0.203	ND		U	1	0.625

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100K

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: **FSB3A**
DCL Sample Name...: **03E04106**
DCL Report Group..: **03E-0426-01**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 08:00
Reporting Units...: ug/g or mg/kg ✓ 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 14.5

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 18:04	0.261	ND		U	1	1.17
Nitroglycerin	03-OCT-03 18:04	0.189	ND		U	1	0.585

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SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100L

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: **FSB3B**
DCL Sample Name...: **03E04107**
DCL Report Group..: **03E-0426-01**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 08:15
Reporting Units...: ug/g or mg/kg 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.1

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 18:27	0.266	ND		U	1	1.19
Nitroglycerin	03-OCT-03 18:27	0.193	ND		U	1	0.596

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100M

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: **FSB3C**
DCL Sample Name...: **03E04108**
DCL Report Group..: **03E-0426-01**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 08:30
Reporting Units...: ug/g or mg/kg 3/2/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 31.2

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 18:49	0.324	ND		U	1	1.45
Nitroglycerin	03-OCT-03 18:49	0.235	ND		U	1	0.727

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100N

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: **46SB1A**
DCL Sample Name...: **03E04109**
DCL Report Group..: **03E-0426-01**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 12:10
Reporting Units....: ug/g or mg/kg *2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 17.0

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 19:35	0.269	ND		U	1	1.20
Nitroglycerin	03-OCT-03 19:35	0.195	ND		U	1	0.602

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100P

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: **46SB1B**
DCL Sample Name...: **03E04110**
DCL Report Group..: **03E-0426-01**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 12:20
Reporting Units...: ug/g or mg/kg ds 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 28.5

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 19:58	0.312	ND		U	1	1.40
Nitroglycerin	03-OCT-03 19:58	0.227	ND		U	1	0.699

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100Q

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: 46SB1C
DCL Sample Name...: 03E04111
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 12:50
Reporting Units...: ug/g or mg/kg ts 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 23.6

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 20:21	0.292	ND		U	1	1.31
Nitroglycerin	03-OCT-03 20:21	0.212	ND		U	1	0.654

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100R

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: ~~465B2A~~ 4/2/04 46SB2A
DCL Sample Name...: 03E04112
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 13:25
Reporting Units...: ug/g or mg/kg 4/2/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 19.7

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 20:44	0.278	ND		U	1	1.25
Nitroglycerin	03-OCT-03 20:44	0.202	ND		U	1	0.623

VALUE CHANGES

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SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100S

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

As 2/2/2004
Client Sample Name: ~~465B2B~~ 46SB2B
DCL Sample Name...: 03E04113
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 13:40
Reporting Units...: ug/g or mg/kg As 2/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.4

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 21:08	0.280	ND		U	1	1.26
Nitroglycerin	03-OCT-03 21:08	0.204	ND		U	1	0.628

VALUE CHANGES

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100T

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: ~~465B2C~~ 465B2C
DCL Sample Name...: 03E04114
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 13:50
Reporting Units...: ug/g or mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 36.1

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 21:31	0.349	ND		U	1	1.56
Nitroglycerin	03-OCT-03 21:31	0.254	ND		U	1	0.782

VALUE CHANGES

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10080317203891
Page 12

S039100V

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: SBD2
DCL Sample Name...: 03E04115
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 00:00
Reporting Units...: ug/g or mg/kg 12/3/04
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 35.9

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 21:55	0.348	ND		U	1	1.56
Nitroglycerin	03-OCT-03 21:55	0.253	ND		U	1	0.780

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039100W

Date Printed.....: 08-OCT-03 17:20

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 GM
Net Weight/Volume....: Not Required

Client Sample Name: ~~375B1A~~ 375B/A
DCL Sample Name...: 03E04116
DCL Report Group..: 03E-0426-01

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 15:30
Reporting Units...: ug/g or mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 28.7

DCL Analysis Group: G039100L
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	03-OCT-03 22:18	0.313	ND		U	1	1.40
Nitroglycerin	03-OCT-03 22:18	0.227	ND		U	1	0.701

VALUE CHANGES

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DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:

X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0424-01 & 426-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD1	FSB2B		SBD2	46SB2C
PETN	ND	ND		ND	ND
nitroglycerin	ND	ND		ND	ND

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	18			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S0390067

Client Name.....: URS Group, Inc.
Release Number.....: 09604-317

Matrix.....: SOIL
Reporting Units.....: ug/g

DCL Preparation Group: G039100L
Date Prepared.....: 02-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04096MS**
Date Printed.....: 06-OCT-03 15:05

DCL Analysis Group: G039100L
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	03-OCT-03 15:47	ND	15.8	20.0	79.2	65.0/125.	
Nitroglycerin	03-OCT-03 15:47	ND	14.8	20.0	73.8	65.0/125.	

S0390068

DCL Sample Name...: **03E04096MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	03-OCT-03 16:10	16.6	82.8	16.2	0.725	4.5	0.00/35.0	
Nitroglycerin	03-OCT-03 16:10	15.8	79.1	15.3	1.06	6.9	0.00/35.0	

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DATA CHEM LABORATORIES
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ANALYTICAL REPORT

10080309513755X

Date _____
Laboratory Group Name 03E-0432-03
Account No. 08001

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site 09604-317 Date of Collection October 03, 2003

Date Samples Received at Laboratory October 04, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 08, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
38SB2A	03E04150	SOIL	14.0							
38SB2A	03E04150MD	SOIL	13.9							
38SB2B	03E04151	SOIL	15.5							
SBD4	03E04152	SOIL	26.9							
38SB2C	03E04153	SOIL	5.1							
38SB1A	03E04154	SOIL	28.5							
38SB1B	03E04155	SOIL	24.2							
38SB1C	03E04156	SOIL	22.7							
38SB3A	03E04157	SOIL	32.8							
38SB3B	03E04158	SOIL	18.8							
38SB3C	03E04159	SOIL	18.0							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Reviewer: Michael J. Schwendiman

DATA CHEM LABORATORIES
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ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1
10080309341575X

Date _____
Laboratory Group Name 03E-0429-03
Account No. 08001

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site 09604-317 Date of Collection October 02, 2003

Date Samples Received at Laboratory October 03, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 08, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
37SB2A	03E04126	SLUDGE	56.4							
37SB2AMD	03E04126MD	SLUDGE	57.6							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: Norman Breese

Reviewer: Michael J. Schwendiman

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DATA CHEM LABORATORIES
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ANALYTICAL REPORT

10080309273673X

Date _____
Laboratory Group Name 03E-0426-02
Account No. 08001

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site 09604-317 Date of Collection October 01, 2003

Date Samples Received at Laboratory October 02, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 08, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
FSB3A	03E04106	SOIL	14.5							
FSB3A	03E04106MD	SOIL	14.2							
FSB3B	03E04107	SOIL	16.1							
FSB3C	03E04108	SOIL	31.2							
46SB1A	03E04109	SOIL	17.0							
46SB1B	03E04110	SOIL	28.5							
46SB1C	03E04111	SOIL	23.6							
465B2A	03E04112	SOIL	19.7							
465B2B	03E04113	SOIL	20.4							
465B2C	03E04114	SOIL	36.1							
SBD2	03E04115	SOIL	35.9							
375B1A	03E04116	SOIL	28.7							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Analyst: Norman Breese

Reviewer: Michael J. Schwendiman

This report contains 10 pages

Date of Extraction:	OCT 2, 2003	DataChem Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0424-01, 0426-01		Matrix: SOIL
Group/Lot ID:	G039100L		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211265-1	BL-211265-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211265-1	QC-211265-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04093	FSB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04094	FSB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04095	FSB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04096	FSB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04096MS	FSB2AMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
8	03E04096MSD	FSB2AMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
9	03E04097	FSB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04098	SBD-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04099	FSB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04106	FSB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04107	FSB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04108	FSB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04109	46SB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04110	46SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
17	03E04111	46SB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18	03E04112	465B2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
19	03E04113	465B2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
20	03E04114	465B2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
21	03E04115	SBD2	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
22	03E04116	375B1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
23										
24										
25										
26										
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36										
37										
38										
39										
40										

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By:	
Matrix Spike:	239 ws 2	1/30/04 By:	
Matrix Spike:	----------	---------- By:	
Extractionist:	Bonnie Yan	10/2/03	
Checker:	Wen Yang	10/02/03	Sonicators tunned by:

*=Entry Error

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

37, 38, 46, F

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Soil
Analysis SOP#:	OL-SW-8332		
DCL Set ID's:	03E-0424-01		
	03E-0426-01		

RECEIVED
BY JS DATE 10/15/03

General Set Information: This set contained eighteen soil samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/g.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

This report contains
47 pages

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04096. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low level sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10-9-03

Gloria W. Heung Date

03E-0424

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1074

Project Number	Project Name
07607-317	RFAAP

Project Contact (Name and Phone Number): Dawson Rowe (804) 765-9000

Samplers: Brett Eisler / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
FSB1A	9/30/03 1400	5		X	5	F	/	1						X									03E04093
FSB1B	9/30/03 1415	5		X	5	F	/	1						X									94
FSB1C	9/30/03 1430	5		X	5	F	/	1						X									95
FSB2A	9/30/03 1500	5		X	5	F	/	1						X									96
FSB2A MS	9/30/03 1500	5		X	5	F	/	1						X									96ms
FSB2A MSD	9/30/03 1500	5		X	5	F	/	1						X									96msd
FSB2B	9/30/03 1515	5		X	5	F	/	1						X									97
SBD#-1	9/30/03	5		X	5	F	/	1						X									98
FSB2C	9/30/03	5		X	5	F	/	1						X									99

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Eisler	9/30/03	FedEx			
Relinquished by: FedEx	Date/time 10/1/03 0845	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0424

Date/Time of Receipt: 10/1/03 0845

Number of Coolers Received: 1

Condition of Coolers: (Acceptable)/Unacceptable

Custody Seals: (Present)/Absent/NA

(Intact)/Broken/NA

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA

(Frozen)/Melted/NA

Temperature Control: (Present)/Not Included

Location Temp Taken: (Control)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/No/(NA)

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0426	2 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/1/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 9/30/03 FedEx Tracking Number 832942539734

Sender's Name Brent Eisler Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

Faxed to Client? YES ☐ NO ☐

RICHMOND State VA ZIP 23230

Response Req'd

PROJEC Your Internal Billing Reference 09604-317

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc

Revised 6/28/01

Earliest Sampling Date: 30-Sep-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 15-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0424 * | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 01 Nitroglycerin/PETN by 8332	Analysis 02 Moisture	# Bottles
30-Sep-2003	FSB1A	03E04093			SOIL		X	X	1
30-Sep-2003	FSB1B	03E04094			SOIL		X	X	1
30-Sep-2003	FSB1C	03E04095			SOIL		X	X	1
30-Sep-2003	FSB2A	03E04096			SOIL		X	X	1
30-Sep-2003	FSB2AMS	03E04096MS		MS	SOIL		X	X JP 10/2/03	1
30-Sep-2003	FSB2AMSD	03E04096MSD		MSD	SOIL		X	X JP	1
30-Sep-2003	FSB2B	03E04097			SOIL		X	X	1
30-Sep-2003	SBD-1	03E04098			SOIL		X	X	1
30-Sep-2003	FSB2C	03E04099			SOIL		X	X	1
30-Sep2003	FSB2AMD	03E04096MD		MD	SOIL	JP 10/2/03		X	

R33-1 SA

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge	10/2 12:55		

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/1/2003 16:30

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 30-Sep-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 15-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0424* | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: Quinton Green 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 01 Nitroglycerin/PETN by 8332	Analysis 02 Moisture	# Bottles
30-Sep-2003	FSB1A	03E04093			SOIL		X	X	1
30-Sep-2003	FSB1B	03E04094			SOIL		X	X	1
30-Sep-2003	FSB1C	03E04095			SOIL		X	X	1
30-Sep-2003	FSB2A	03E04096			SOIL		X	X	1
30-Sep-2003	FSB2AMS	03E04096MS		MS	SOIL		X	X JP 10/2/03	1
30-Sep-2003	FSB2AMSD	03E04096MSD		MSD	SOIL		X	X JP	1
30-Sep-2003	FSB2B	03E04097			SOIL		X	X	1
30-Sep-2003	SBD-1	03E04098			SOIL		X	X	1
30-Sep-2003	FSB2C	03E04099			SOIL		X	X	1
30-Sep-2003	FSB2AMD	03E04096MD		MD	Soil			X	

JP 10/2/03

R33-1 SA

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 NB	10-02-03 15:00	Norman Brace	0/4 moisture & Solids - MCB 10/2/03
Norman Brace	10-02-03 15:56	R-319-1 NB	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/1/2003 16:30

Form: COFC1.01-SWV2.30

03E-0426

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1076

Project Number	Project Name
9601-317	RFNAP

Project Contact (Name and Phone Number): Doreen Payne (804) 765-9060

Samplers: Brent Fisher / John Spangler

LAB: Datachem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
FSB3A	10/1/03 900	5		X	S	F	/	1						X									03E04106
FSB3B	10/1/03 915	5		X	S	F	/	1						X									07
FSB3C	10/1/03 930	5		X	S	F	/	1						X									08
465B1A	10/1/03 1210	5		X	S	F	/	1						X									09
465B1B	10/1/03 1220	5		X	S	F	/	1						X									10
465B1C	10/1/03 1250	5		X	S	F	/	1						X									11
465B2A	10/1/03 1325	5		X	S	F	/	1						X									12
465B2B	10/1/03 1340	5		X	S	F	/	1						X									13
465B2C	10/1/03 1350	5		X	S	F	/	1						X									14
SBD2	10/1/03 —	5		X	S	F	/	1						X									15
375B1A	10/1/03 1530	5		X	S	F	/	1						X									16
375B1B	10/1/03 1545	5		X	S	F	/	1						X									17
375B1C	10/1/03 1600	5		X	S	F	/	1						X									18

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brent Fisher	10/1/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/2/03 0900	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: CRS

Project/Task/Site: 03E-0426

Date/Time of Receipt: 10/2/03 0900

Number of Coolers Received: 1

Condition of Coolers: (Acceptable)/Unacceptable

Custody Seals: (Present)/Absent/NA

(Intact)/Broken/NA

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA

(Frozen)/Melted/NA

Temperature Control: (Present)/Not Included

Location Temp Taken: (Cooler)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/(No)/NA

PH Check:								
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA		
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA		
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA		
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0428	3 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/2/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Head Space in Bottles
- ☐ Insufficient Sample
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/1/03 FedEx Tracking Number 832942539013

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

Response Requi

Your Internal Billing Reference 09604-317

PROJECT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Earliest Sampling Date: 1-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 16-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0426 * | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: Quinton Green 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 03 Nitroglycerin/PETN by 8332	Analysis 04 Moisture	# Bottles
1-Oct-2003	~~375B1B~~	~~03E04117~~			~~SOIL~~ → CANCEL 10/6/03		X	X	1
1-Oct-2003	375B1C → B	03E04118			SOIL		X	X	1
	PR 10/6/03								

2B 3B

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/2/2003 10:57

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 1-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 16-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0426 * | **Reporting Group**

Account: 08001

Client: URS

Comments:

Verified: [signature] 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 01 Nitroglycerin/PETN by 8332	Analysis 02 Moisture	# Bottles
1-Oct-2003	FSB3A	03E04106			SOIL		X	X	1
1-Oct-2003	FSB3B	03E04107			SOIL		X	X	1
1-Oct-2003	FSB3C	03E04108			SOIL		X	X	1
1-Oct-2003	46SB1A	03E04109			SOIL		X	X	1
1-Oct-2003	46SB1B	03E04110			SOIL		X	X	1
1-Oct-2003	46SB1C	03E04111			SOIL		X	X	1
1-Oct-2003	465B2A	03E04112			SOIL		X	X	1
1-Oct-2003	465B2B	03E04113			SOIL		X	X	1
1-Oct-2003	465B2C	03E04114			SOIL		X	X	1
1-Oct-2003	SBD2	03E04115			SOIL		X	X	1

R-33-1 Cart 3P

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 MB	10/02/03 14:30	Norman Brewer	% moisture
Norman Brewer	10/02/03 15:18	R-318-1 MB	storage cart

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/2/2003 10:5

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 1-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 16-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0426 * | **Reporting Group**

Account: 08001

Client: URS

Comments:

Verified: 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 01 Nitroglycerin/PETN by 8332	Analysis 02 Moisture	# Bottles
1-Oct-2003	375B1A	03E04116			SOIL		X	X	1

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

R-33-1 Cart-3P

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 NB	10/07/03 14:30	Norman Bruce	% moisture
Norman Bruce	10/07/03 15:18	R-319-1 NB	cart storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/2/2003 10:56

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Fax To: URS - Andrea Sansom
(410)859-5202
Date Faxed:_____

Radford SSP

Corrective Action Log

Laboratory: DATACHEM LABORATORIES
Instrument: HPLC/UV
Method: EPA 532

Sample Date: 10/1/03
Analysis Date: _____

Project Number/ Batch Number	Affected Samples	Excursions	Criteria Comparison	Corrective Action Proposed
9604-317	375B1B 375B1C			SAMPLE 375B1B WAS removed as per Andrea Sansom's request. SAMPLE 375B1C WAS renamed 375B1B and analyzed. SET ID 03E-0426-03

Reviewed By: _____
Section Supervisor Date

Reviewed By: _____
QA/QC Officer Date

Reviewed By: _____
Project Supervisor Date

Pope, Paul E.

From: Andrea_Sansom@URSCorp.com
Sent: Friday, October 03, 2003 8:06 AM
To: roudebushw@trimatrixlabs.com; Mikesell, Tim; Pope, Paul E.
Cc: Darren_Renne@URSCorp.com
Subject: Radford SSP 37SB on hold

The samples that you have on hold:

discard 37SB1B
relabel 37SB1C as 37SB1B and analyze this sample

Samples that you receive today:

discard 37SB1B
analyze 37SB1C

After you have done this you should end up with 37SB1A and 37SB1B from one sample date and 37SB1C from the next sampling day.

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0426-03 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10100313391949
Page 1

G039100J

DCL Report Group..: **03E-0426-03**

Date Printed.....: 10-OCT-03 13:39

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211275-1	NA	NA
LCS	QC-211275-1	NA	NA
37SB1B	03E04118	01-OCT-03	02-OCT-03

Analyst: Gloria W. Heung — 10/10/03 Date

Reviewer: Thomas T McKay — 10/13/03 Date

Lab Supervisor: Richard W. Wade — 10/14/03 Date

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10100313423758
Page 1

G039200R

DCL Report Group..: **03E-0429-02**

Date Printed.....: 10-OCT-03 13:42

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
37SB2A	03E04126	02-OCT-03	03-OCT-03
37SB2AMS	03E04126MS	02-OCT-03	03-OCT-03
37SB2AMSD	03E04126MSD	02-OCT-03	03-OCT-03
Method Blank	BL-211275-1	NA	NA
LCS	QC-211275-1	NA	NA

Analyst: Gloria W. Heung — Date: 10-10-03

Reviewer: Thomas T McKay — Date: 10/13/03

Lab Supervisor: Richard W. Wade — Date: 10/14/03

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DATA CHEM LABORATORIES
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COVER PAGE

ANALYTICAL REPORT FOR URS

Phone(410) 859-5049 Fax(410) 859-5202
E-mail: Andrea_Sansom@URScorp.com

G039500J

DCL Report Group..: **03E-0432-02**

Date Printed.....: 10-OCT-03 13:42

Project Protocol #: P021C002
Client Ref Number.: 09604-317
Release Number....: 09604-317

Analysis Method(s): 8332

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
38SB2A	03E04150	03-OCT-03	04-OCT-03
38SB2B	03E04151	03-OCT-03	04-OCT-03
SBD4	03E04152	03-OCT-03	04-OCT-03
38SB2C	03E04153	03-OCT-03	04-OCT-03
38SB1A	03E04154	03-OCT-03	04-OCT-03
38SB1B	03E04155	03-OCT-03	04-OCT-03
38SB1C	03E04156	03-OCT-03	04-OCT-03
38SB3A	03E04157	03-OCT-03	04-OCT-03
38SB3B	03E04158	03-OCT-03	04-OCT-03
38SB3C	03E04159	03-OCT-03	04-OCT-03
Method Blank	BL-211275-1	NA	NA
LCS	QC-211275-1	NA	NA

Gloria W. Heung — Analyst: Gloria W. Heung — 10-10-03 — Date

Thomas T McKay — Reviewer: Thomas T McKay — 10/13/03 — Date

Richard W. Wade — Lab Supervisor: Richard W. Wade — 10/14/03 — Date

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039102N

Date Printed.....: 10-OCT-03 13:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 02-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB1B**
DCL Sample Name...: **03E04118**
DCL Report Group..: **03E-0426-03**

Matrix.....: SOIL
Date Sampled.....: 01-OCT-03 16:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 15.4

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Quál.	Dilution	CRDL
PETN	09-OCT-03 15:44	0.264	ND		U	1	1.18
Nitroglycerin	09-OCT-03 15:44	0.191	ND		U	1	0.591

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039200Y

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB2A**
DCL Sample Name...: **03E04126**
DCL Report Group..: **03E-0429-02**

Matrix.....: SLUDGE
Date Sampled.....: 02-OCT-03 09:30
Reporting Units...: mg/kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 56.4

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 16:06	0.511	ND		U	1	2.29
Nitroglycerin	09-OCT-03 16:06	0.372	ND		U	1	1.15

SAMPLE ANALYSIS DATA SHEET

S039500P

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB2A**
DCL Sample Name...: **03E04150**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 08:50
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 14.0

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 17:11	0.259	ND		U	1	1.16
Nitroglycerin	09-OCT-03 17:11	0.188	ND		U	1	0.581

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500Q

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB2B**
DCL Sample Name...: **03E04151**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 09:00
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 15.5

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 17:33	0.264	ND		U	1	1.18
Nitroglycerin	09-OCT-03 17:33	0.192	ND		U	1	0.592

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500R

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD4**
DCL Sample Name...: **03E04152**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 00:00
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.9

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 17:55	0.305	ND		U	1	1.37
Nitroglycerin	09-OCT-03 17:55	0.222	ND		U	1	0.684

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SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB2C**
DCL Sample Name...: **03E04153**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 09:10
Reporting Units...: mg/Kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 5.1

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 18:39	0.235	ND		U	1	1.05
Nitroglycerin	09-OCT-03 18:39	0.171	ND		U	1	0.527

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500T

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB1A**
DCL Sample Name...: **03E04154**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 10:45
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 28.5

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 19:01	0.312	ND		U	1	1.40
Nitroglycerin	09-OCT-03 19:01	0.227	ND		U	1	0.699

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500V

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB1B**
DCL Sample Name...: **03E04155**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 11:00
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.2

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 19:22	0.294	ND		U	1	1.32
Nitroglycerin	09-OCT-03 19:22	0.214	ND		U	1	0.660

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500W

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB1C**
DCL Sample Name...: **03E04156**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 11:20
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 22.7

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 19:44	0.288	ND		U	1	1.29
Nitroglycerin	09-OCT-03 19:44	0.210	ND		U	1	0.647

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500X

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB3A**
DCL Sample Name...: **03E04157**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 12:00
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 32.8

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 20:06	0.332	ND		U	1	1.49
Nitroglycerin	09-OCT-03 20:06	0.241	ND		U	1	0.744

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500Y

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB3B**
DCL Sample Name...: **03E04158**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 12:15
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 18.8

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 20:28	0.275	ND		U	1	1.23
Nitroglycerin	09-OCT-03 20:28	0.200	ND		U	1	0.616

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500Z

Date Printed.....: 10-OCT-03 13:42

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **38SB3C**
DCL Sample Name...: **03E04159**
DCL Report Group..: **03E-0432-02**

Matrix.....: SOIL
Date Sampled.....: 03-OCT-03 12:30
Reporting Units...: mg/Kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 18.0

DCL Analysis Group: G039601B
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 20:50	0.272	ND		U	1	1.22
Nitroglycerin	09-OCT-03 20:50	0.198	ND		U	1	0.610

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DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-042603,042902,043202
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD4	38SB2B
PETN	ND	ND
nitroglycerin	ND	ND

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	12			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S039200Z

Client Name.....: URS Group, Inc.
Release Number.....: 09604-317

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039601B
Date Prepared.....: 07-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04126MS**
Date Printed.....: 10-OCT-03 13:39

DCL Analysis Group: G039601B
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	09-OCT-03 16:28	ND	14.1	20.0	70.7	65.0/125.	
Nitroglycerin	09-OCT-03 16:28	ND	15.4	20.0	76.9	65.0/125.	

S0392010

DCL Sample Name...: **03E04126MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	09-OCT-03 16:50	13.1	65.7	13.6	1.00	7.3	0.00/35.0	
Nitroglycerin	09-OCT-03 16:50	14.9	74.4	15.1	0.496	3.3	0.00/35.0	

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Bmg 10/7/03

Date of Extraction:	OCT 7, 2003
Account #(s):	8001
DCL Set ID(s):	03E-0432-02 -0429.02 0426.03
Group/Lot ID:	G039601B

DataChem Laboratories Extraction Notebook

Book #	Ext 246	Page#
Matrix:	SOIL	
Method:	8332	

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211275-1	BL-211275-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211275-1	QC-211275-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04118	37SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04126	37SB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04126MS	37SB2AMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
6	03E04126MSD	37SB2AMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
7	03E04150	38SB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04151	38SB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04152	SBD4	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04153	38SB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04154	38SB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04155	38SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04156	38SB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04157	38SB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04158	38SB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04159	38SB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
17										
18										
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39										
40										

Bmg 10/7/03

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bmg	
Matrix Spike:	239 ws 2	11/30/04 By: Bmg	
Matrix Spike:	----------	----------By:	
Extractionist:	Bming Yang	10/7/03	
Checker:	Bmg	10/7/03	Sonicators tunned by:

*=Entry Error

37, 38

DATA CHEM LABORATORIES, INC.
A SORENSON COMPANY

RECEIVED
DATE 10/15/03

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332		
DCL Set ID's:	03E-0426-03		
	03E-0429-02		
	03E-0432-02		

General Set Information: This lot contained twelve solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/g.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

This report contains
45 pages

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04126. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/10/03

Gloria W. Heung Date

DataChem Laboratories
CHAIN-OF-CUSTODY

Earliest Sampling Date: 1-Oct-2003

Results due by: 16-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0426 * | **Reporting Group**

Account: 08001

Client: URS

Comments:

Verified: Quint Shen 10/2/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 03 Nitroglycerin/PETN by 8332	Analysis 04 Moisture	# Bottles
~~1-Oct-2003~~	~~375B1B~~	~~03E04117~~			~~SOIL~~	JP 10/7/03	X	X	1
1-Oct-2003	375B1C B JP 10/7/03	03E04118			SOIL		X	X	1

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

2B 38

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R.33-1 JB	10/07/03 12:30	Norman Beale	% Moisture
Norman Beale	10/07/03 14:24		

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/2/2003 10:57

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

03E-0426

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1076

Project Number	Project Name
07601-317	RFNAP

Project Contact (Name and Phone Number): Darren Payne (304) 765-7080

Samplers: Brent Fisher / John Spangler

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)
FSB3A	10/1/03 900	5		X	S	F	/	1						X								
FSB3B	10/1/03 915	5		X	S	F	/	1						X								
FSB3C	10/1/03 930	5		X	S	F	/	1						X								
465B1A	10/1/03 1210	5		X	S	F	/	1						X								
465B1B	10/1/03 1220	5		X	S	F	/	1						X								
465B1C	10/1/03 1250	5		X	S	F	/	1						X								
465B2A	10/1/03 1325	5		X	S	F	/	1						X								
465B2B	10/1/03 1340	5		X	S	F	/	1						X								
465B2C	10/1/03 1350	5		X	S	F	/	1						X								
SB02	10/1/03 /	5		X	S	F	/	1						X								
375B1A	10/1/03 1535	5		X	S	F	/	1						X								
~~375B1B~~	~~10/1/03 1545~~	~~5~~	~~—~~	~~X~~	~~S~~	~~F~~	~~/~~	~~1~~	~~—~~	~~—~~	~~—~~	~~—~~	~~—~~	~~X~~ → SAMPLE CANCELED	~~—~~	~~—~~	~~—~~	~~—~~	~~—~~	~~—~~	~~—~~	~~—~~
375B1C	10/1/03 1600	5		X	S	F	/	1						X								

LAB: Datachem

AIRBILL No:

Courier:

REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)

03E04106

1	07
	08
	09
	10
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	12
	13
	14
	15
	16
	17
	18

Box #1: 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Rinsate; 5. Soil Sediment/Sludge; 6. Trip Blank; 7. Oil; 8. Waste; 9. Other _____

Box #2: A. HCl + Ice; B. HNO3 + Ice; C. NaOH + Ice; D. H2SO4 + Ice; E. Unpreserved; F. Ice Only; G. Other _____; H. NaHSO4 + Ice; I. ZnAc + NaOH + ice

Box #3: F. Filtered; U. Unfiltered

Box #4: R. Rush - 3 Day; S. Standard 28 Day; T. Timely 14 Day; O. Other _____

Relinquished by:	Date/Time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/1/03 1500	FedEx			
FedEx	10/2/03 0900	(for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

place on hold

10/6/03 chang 375B1C → 375B1B Discard original 375B1B

Fax To: URS - Andrea Sansom
(410)859-5202
Date Faxed:_____

Radford SSP

Corrective Action Log

Laboratory: DATACHEM LABORATORIES
Instrument: HPLC/UV
Method: EPA 8332

Sample Date: 10/1/03
Analysis Date: _____

Project Number/ Batch Number	Affected Samples	Excursions	Criteria Comparison	Corrective Action Proposed
09604-317	375B1B 375B1C			SAMPLE 375B1B WAS REMOVED AS PER ANDREW SANSOM'S REQUEST. SAMPLE 375B1C WAS RENAMED 375B1B AND ANALYZED. SET ID 03E-0426-03

Reviewed By: _____ Section Supervisor Date

Reviewed By: _____ QA/QC Officer Date

Reviewed By: _____ Project Supervisor Date

DataChem Laboratories Client-Related Information Report (CRIR)

Cooler or Container Information Checklist (Fill In or Circle)

Client Name: LRS

Project/Task/Site: 03E-0426

Date/Time of Receipt: 10/2/03 0900

Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable	Temperature Control:	Present/Not Included
Custody Seals:	Present/Absent/NA	Location Temp Taken:	Cntnr/Between Samples
	Intact/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/No/NA	project specific guidelines?	Yes/No/NA
Ice Present:	Yes/No/NA	Are all applicable pHs within	
	Frozen/Melted/NA	specific guidelines?	Yes/No/NA

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA	
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA	
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA	
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A B, Gamma Spec	Yes/No/NA	

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0428	3 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/2/03 (Date)

Client-Related Information

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Head Space in Bottles
- ☐ Insufficient Sample
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

Date 10/1/03 FedEx Tracking Number 832942539013

Briefly Describe the Problem and the Action Taken:

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

Faxed to Client? Yes ☐ No ☐

City RICHMOND State VA ZIP 23230

Response Requi

Your Internal Billing Reference 09604-317

Project

Project Manager Comments:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc

Revised 6/28/01

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1067

Project Number	Project Name
07604-317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965-9000

Samplers: Brad Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330) RDX/HMX	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
375B1B	10/2/03 930	5		X	S	F	/	1						X		03E04124							375B2A has
375B1C	10/2/03 845	5		X	S	F	/	1						X				25					Mostly sludge. Collected
375B2A	10/2/03 930	5		X	S	F	/	1						X				26					MS/MSD because
375B2B	10/2/03 945	5		X	S	F	/	1						X				27					of matrix difference
375B2C	10/2/03 1000	5		X	S	F	/	1						X				28					Soil vs. Sludge
375B3A	10/2/03 1015	5		X	S	F	/	1						X				29					
375B3B	10/2/03 1030	5		X	S	F	/	1						X				30					
375B3BMS	10/2/03 1030	5		X	S	F	/	1						X				30MS					
375B3BMSD	10/2/03 1030	5		X	S	F	/	1						X				30MSD					
375B3C	10/2/03 1045	5		X	S	F	/	1						X				31					
375B2AMS	10/2/03 930	5		X	S	F	/	1						X				26MS					
375B2AMSD	10/2/03 930	5		X	S	F	/	1						X				26MSD					
05B1A	10/2/03 1300	5		X	S	F	/	1						X				32					
SBD3	10/2/03 —	5		X	S	F	/	1						X				33					

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature] 10/2/03	1800	FedEx			
FedEx 10/3/03	0900	(for lab) R-33-1			

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

Earliest Sampling Date: 2-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 17-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0429 *	Reporting Group	02	03								#
Client: URS		Account: 08001	Analysis	Nitroglycerin/PETN by 8332	Moisture								Bottles
Comments:													
Verified: JW 10/6/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2														
2-Oct-2003	37SB2A	03E04126			SLUDGE						X	X								1
2-Oct-2003	37SB2AMS	03E04126MS		MS	SLUDGE						X									1
2-Oct-2003	37SB2AMSD	03E04126MSD		MSD	SLUDGE						X									1
2-Oct-2003	37SB2AMD	03E04126MD		MD	SLUDGE							X								0

1C 58 ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R.33-1 RB	10/07/03 12:30	Norman Burch	%moisture
Norman Burch	10/07/03 14:24		

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/3/2003 12:57

Form: COFC1.01-SWV2.30

03E-0432

Radford Army Ammunition Plant
Chain Of Custody Record

No 1155

Project Number	Project Name
07604317	RFAAP

Project Contact (Name and Phone Number): Darren Penn (501) 965-7000

Samplers: Brett Fisher / John Spangler

LAB: DataChem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332), 8270N/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
38SB2A	10/3/03 850	5		X	S	F	/	1						X									03E04150
38SB2B	10/3/03 900	5		X	S	F	/	1						X									51
38SD4	10/3/03 —	5		X	S	F	/	1						X									52
38SB2C	10/3/03 910	5		X	S	F	/	1						X									53
38SB1A	10/3/03 1045	5		X	S	F	/	1						X									54
38SD1B	10/3/03 1100	5		X	S	F	/	1						X									55
38SB1C	10/3/03 1120	5		X	S	F	/	1						X									56
38SB3A	10/3/03 1200	5		X	S	F	/	1						X									57
38SB3B	10/3/03 1215	5		X	S	F	/	1						X									58
38SB3C	10/3/03 1230	5		X	S	F	/	1						X									59
EQB2	10/3/03 1500	5		X	W	F	/	2						X									60

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/3/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/4/03 0930	Received by: (for lab) [signature]	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 3-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 17-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0432 * | **Reporting Group** | 02 | 03

Client: URS | **Account:** 08001

Comments:

Verified: JW 10/6/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis				02 Nitroglycin/PETN by 8332	03 Moisture								# Bottles
3-Oct-2003	38SB2A	03E04150			SOIL						X	X								1
3-Oct-2003	38SB2B	03E04151			SOIL						X	X								1
3-Oct-2003	SBD4	03E04152			SOIL						X	X								1
3-Oct-2003	38SB2C	03E04153			SOIL						X	X								1
3-Oct-2003	38SB1A	03E04154			SOIL						X	X								1
3-Oct-2003	38SB1B	03E04155			SOIL						X	X								1
3-Oct-2003	38SB1C	03E04156			SOIL						X	X								1
3-Oct-2003	38SB3A	03E04157			SOIL						X	X								1
3-Oct-2003	38SB3B	03E04158			SOIL						X	X								1
3-Oct-2003	38SB3C	03E04159			SOIL						X	X								1

16C JS

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/Room/Shelf/Fridge	10/7/03 12:..		EXC

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/6/2003 11:03

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0432

Date/Time of Receipt: 10/4/03 0930

Number of Coolers Received: 1

Condition of Coolers: ~~Acceptable~~/Unacceptable

Custody Seals: ~~Present~~/Absent/NA

~~Intact~~/Broken/NA

Tamper Evident: Yes/~~No~~/NA

Ice Present: ~~Yes~~/No/NA

~~Frozen~~/Melted/NA

Temperature Control: ~~Present~~/Not Included

Location Temp Taken: ~~Cooler~~/Between Samples

Are all temperatures within project specific guidelines? ~~Yes~~/No/NA

Are all applicable pHs within specific guidelines? Yes/No/~~NA~~

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0431	°C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/4/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/3/03 FedEx Tracking Number 832942539080

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept./Floor/Suite/Room

Faxed to Client? YES ☐ NO ☐

City RICHMOND State VA ZIP 23230

Response Requi

PROJECT Your Internal Billing Reference 09604-317

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0429-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR URS Group, Inc.

G039200Q

DCL Report Group..: 03E-0429-01

Date Printed.....: 10-OCT-03 14:22

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211306-1	NA	NA
LCS	QC-211306-1	NA	NA
LCS Dup	QD-211306-1	NA	NA
EQB1	03E04123	02-OCT-03	03-OCT-03

Analyst: Rodney Lemon — Date 10/12/03

Reviewer: Gloria W. Heung — Date 10/13/03

Lab Supervisor: Richard W. Wade — Date 10/15/03

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR URS

Phone(410) 859-5049 Fax(410) 859-5202
E-mail: Andrea_Sansom@URScorp.com

G039500H

DCL Report Group..: **03E-0432-01**

Date Printed.....: 10-OCT-03 14:43

Project Protocol #: P021C002
Client Ref Number.: 09604-317
Release Number....: 09604-317

Analysis Method(s): 8332

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
EQB2	03E04160	03-OCT-03	04-OCT-03
Method Blank	BL-211306-1	NA	NA
LCS	QC-211306-1	NA	NA
LCS Dup	QD-211306-1	NA	NA

Analyst: Rodney Lemon — Date 10/13/03

Reviewer: Gloria W. Heung — Date 10/13/03

Lab Supervisor: Richard W. Wade — Date 10/15/03

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039200X

Date Printed.....: 10-OCT-03 17:45

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

Client Sample Name: **EQB1**
DCL Sample Name...: **03E04123**
DCL Report Group..: **03E-0429-01**

Matrix.....: WATER
Date Sampled.....: 02-OCT-03 16:20
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G0395013
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G0395013
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-03
Column Type.....: Ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 22:41	0.311	ND		U	1	0.970
Nitroglycerin	09-OCT-03 22:41	0.213	ND		U	1	0.970

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
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FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039500N

Date Printed.....: 10-OCT-03 14:43

Client Name.....: URS
Client Ref Number....: 09604-317
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 04-OCT-03 00:00

Client Sample Name: **EQB2**
DCL Sample Name...: **03E04160**
DCL Report Group..: **03E-0432-01**

Matrix.....: WATER
Date Sampled.....: 03-OCT-03 13:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G0395013
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G0395013
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC-03
Column Type.....: ultracarb ODS
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	09-OCT-03 23:03	0.311	ND		U	1	0.970
Nitroglycerin	09-OCT-03 23:03	0.213	ND		U	1	0.970

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0429-01 & 0432-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

Second column was used to not confirm primary column low level hits. The second column does not have an initial calibration or bracketing continuing calibrations. The one points provided are for retention time purposes only.

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	2			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DB 10/07/03

Date of Extraction:	10/06/03	**DataChem Laboratories Extraction Notebook**	Book # Ext 007 Page# 50
Account #(s):	8001		
DCL Set ID(s):	03E-0429-01/0432-01		Matrix: WATER
Group/Lot ID:	G0395013		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211306-1 DB 10/07/03	BL-211306-1	770mL	N/A	N/A	N/A	1mL	----	----	5mL
2	QC-211306-1	QC-211306-1	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
3	QD-211306-1	QD-211306-1	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
4	03E04123	EQB1	770mL	N/A	N/A	N/A	1mL	----	----	5mL
5	03E04160 DB 10/07/03	EQB2	770mL	N/A	N/A	N/A	1mL	----	----	5mL
6										
7										
8										
9										
10										
11										
12										
13										
14										
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37										
38										
39										
40										

DB 10/07/03

Solvents:	MeCN	CH672	Comments: Not Enough Sample
	NaCl	X25582	For MS/MSD DB 10/06/03
Surrogate Spike:	239WS3	01/30/2004 By: DB	
Matrix Spike:	239WS2	01/30/2004 By: DB	
Matrix Spike:	----------	---------- By: Na	
Extractionist:	[signature]	10/07/03	
Checker:	[signature]	10/07/03	Sonicators tunned by: NA

*=Entry Error

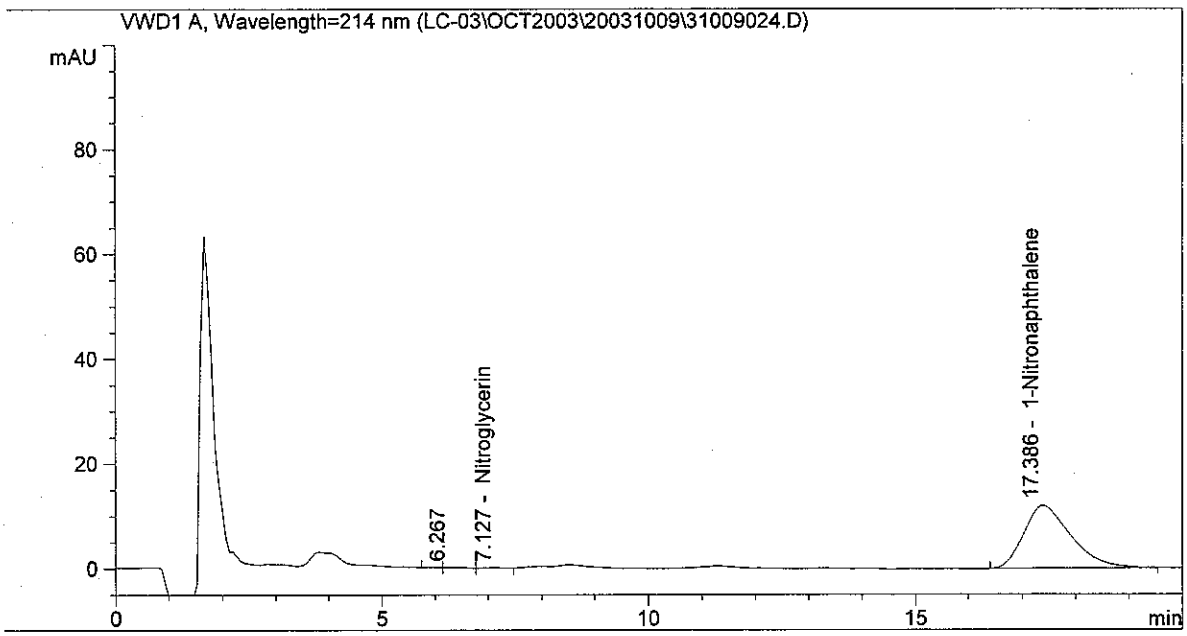
Recorded by

Data file : C:\HPCHEM\1\DATA\LC-03\OCT2003\20031009\31009024.D
Sample Name: 03E04123 1

Injection Date	: Thu, 9. Oct. 2003	Seq Line	: 24
Sample Name	: 03E04123	Vial No.	: 103
Acq Operator	: HEUNG	Inj. No.	: 1
Injection Time:	10:41:22 PM	Inj. Vol.	: -

Acq. Method : N0527LC3.M
Analysis Method : C:\HPCHEM\1\METHODS\OCT2003\N0527PR3.M
Last Changed : Fri, 10. Oct. 2003, 00:17:35 pm

SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By		Signal
Calib. Data Modified	:	Tue, 7. Oct. 2003, 03:26:24 pm
Multiplier	:	6.490000
Dilution	:	1.000000
Uncalibrated Peaks	:	not reported

Customized Report: sampacL

Signal VWD1 A, Wavelength=214 nm

Peak #	RT [min]	Type	Width [min]	Height	Area	Amount (ug/L)	Name
1	6.067	MF	0.292	0.082	1.442	0.000	
2	6.267	FM	0.295	0.122	2.161	0.000	N.C.
3	7.127	VP	0.344	0.066	1.484	~~0.252~~	~~Nitroglycerin~~
4	0.000		0.000	0.000	0.000	0.000	PETN
5	17.386	PB	0.929	12.080	733.963	9.538	1-Nitronaphtha

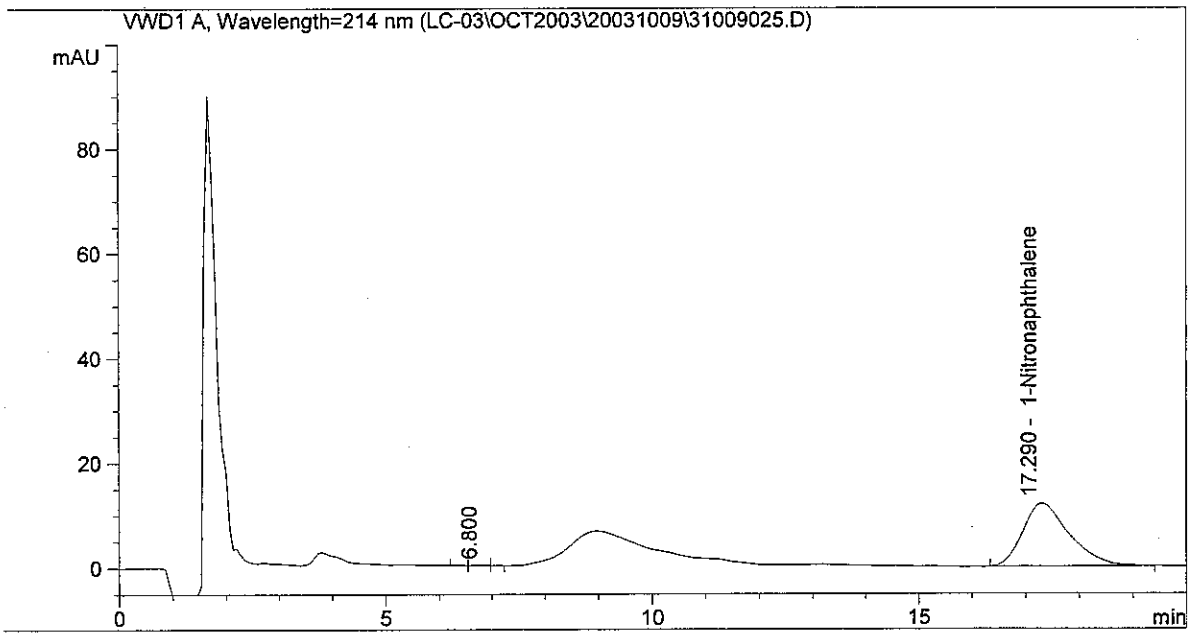
*** End of Report ***

Data file : C:\HPCHEM\1\DATA\LC-03\OCT2003\20031009\31009025.D
Sample Name: 03E04160 1

Injection Date	: Thu, 9. Oct. 2003	Seq Line	: 25
Sample Name	: 03E04160	Vial No.	: 104
Acq Operator	: HEUNG	Inj. No.	: 1
Injection Time:	11:03:51 PM	Inj. Vol.	: -

Acq. Method : N0527LC3.M
Analysis Method : C:\HPCHEM\1\METHODS\OCT2003\N0527PR3.M
Last Changed : Fri, 10. Oct. 2003, 00:17:35 pm

SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By		Signal
Calib. Data Modified	:	Tue, 7. Oct. 2003, 03:26:24 pm
Multiplier	:	6.490000
Dilution	:	1.000000
Uncalibrated Peaks	:	not reported

Customized Report: sampacL

Signal VWD1 A, Wavelength=214 nm

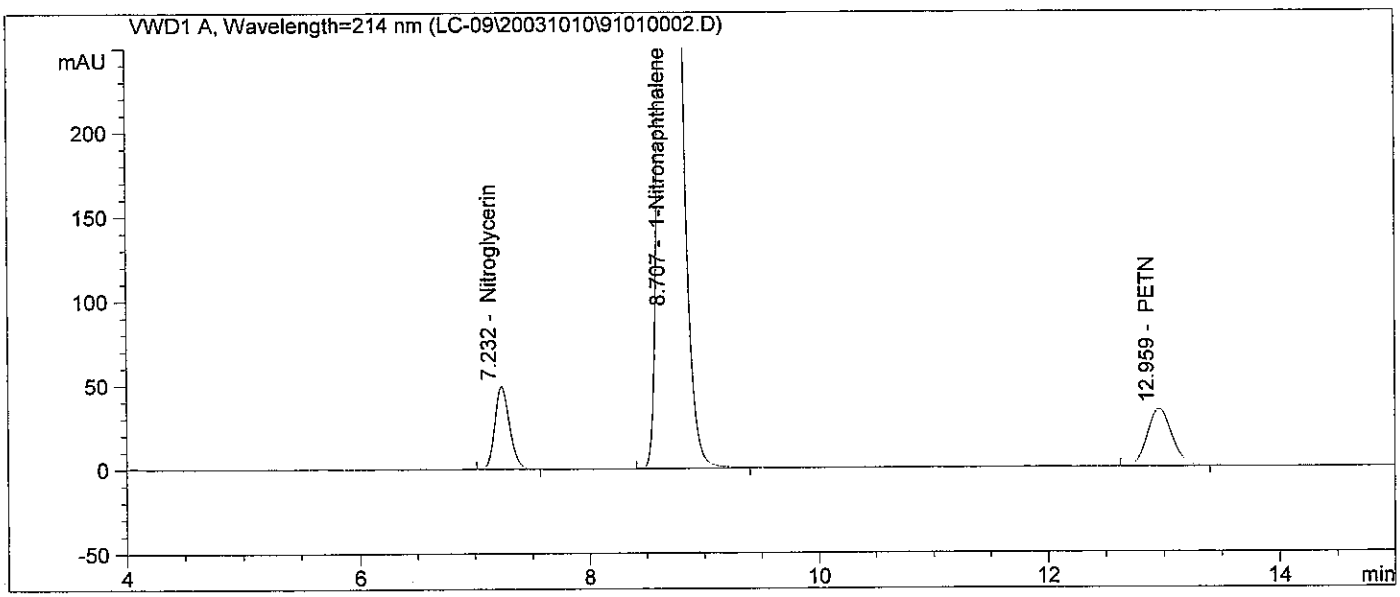
Peak #	RT [min]	Type	Width [min]	Height	Area	Amount (ug/L)	Name
1	6.368	VV	0.180	0.063	0.756	0.000	
2	6.800	MF	0.323	0.104	2.008	0.000	
3	6.974	FM	0.119	0.075	0.539	0.092	Nitroglycerin
4	0.000		0.000	0.000	0.000	0.000	PETN
5	17.290	PB	0.898	12.078	722.199	9.385	1-Nitronaphtha

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031010\91010002.D
Sample Name:CCV1 Info:239WS VAYO

Seq Line :2
Vial No. :2
Inj. No. :1

Injection Date :Fri, 10 Oct. 2003 03:45:21 PM
Acq. Method :8330CNEW.M
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Fri, 10 Oct. 2003, 06:00:23 pm
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Fri, 10 Oct. 2003, 05:10:04 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	RT [min]	Compound	Amount [ug/ml]	Area
MM	7.232	Nitroglycerin	20.46508	445.096
MM	8.707	1-Nitronaphthalene	21.31141	9.374e3
MM	12.959	PETN	20.12280	509.420
Totals:			61.89929	

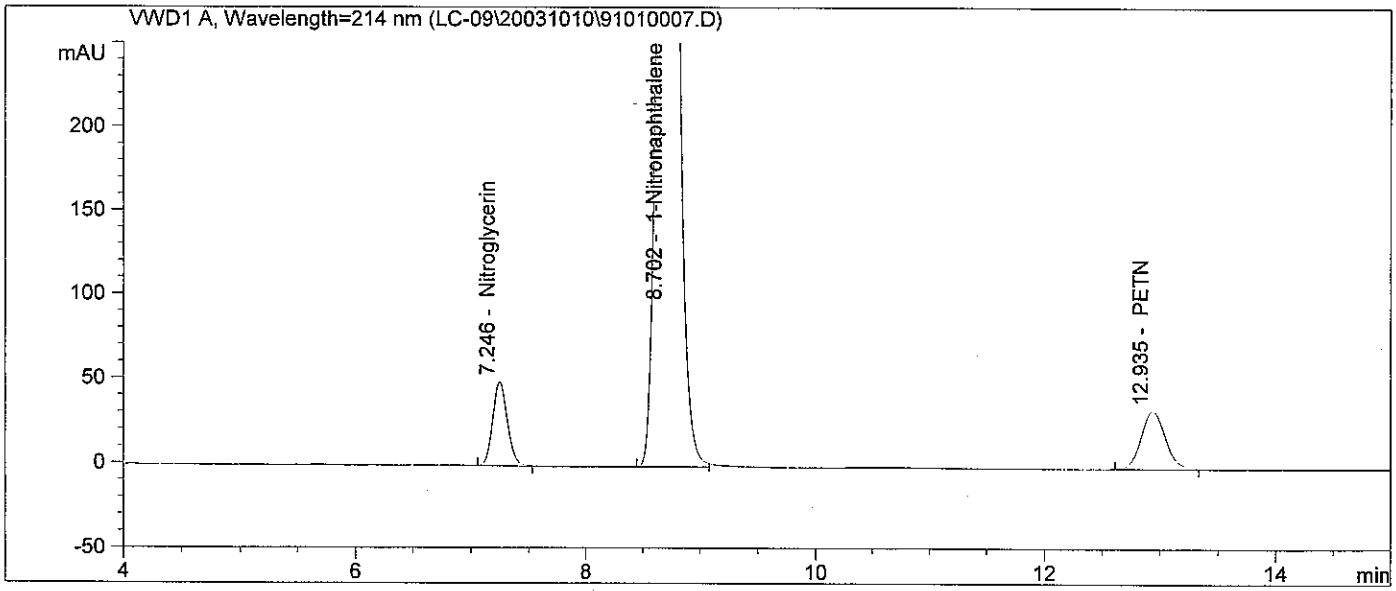
Analyst:_____

Comments:

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031010\91010007.D
Sample Name:CCV2 Info:239WS VAYO

Seq Line :7
Injection Date :Fri, 10 Oct. 2003 05:03:43 PM Vial No. :2
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Fri, 10 Oct. 2003, 06:00:23 pm
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Fri, 10 Oct. 2003, 05:10:04 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	RT [min]	Compound	Amount [ug/ml]	Area
MM	7.246	Nitroglycerin	20.28428	441.170
MM	8.702	1-Nitronaphthalene	21.22910	9.338e3
MM	12.935	PETN	20.05942	507.820
Totals:			61.57279	

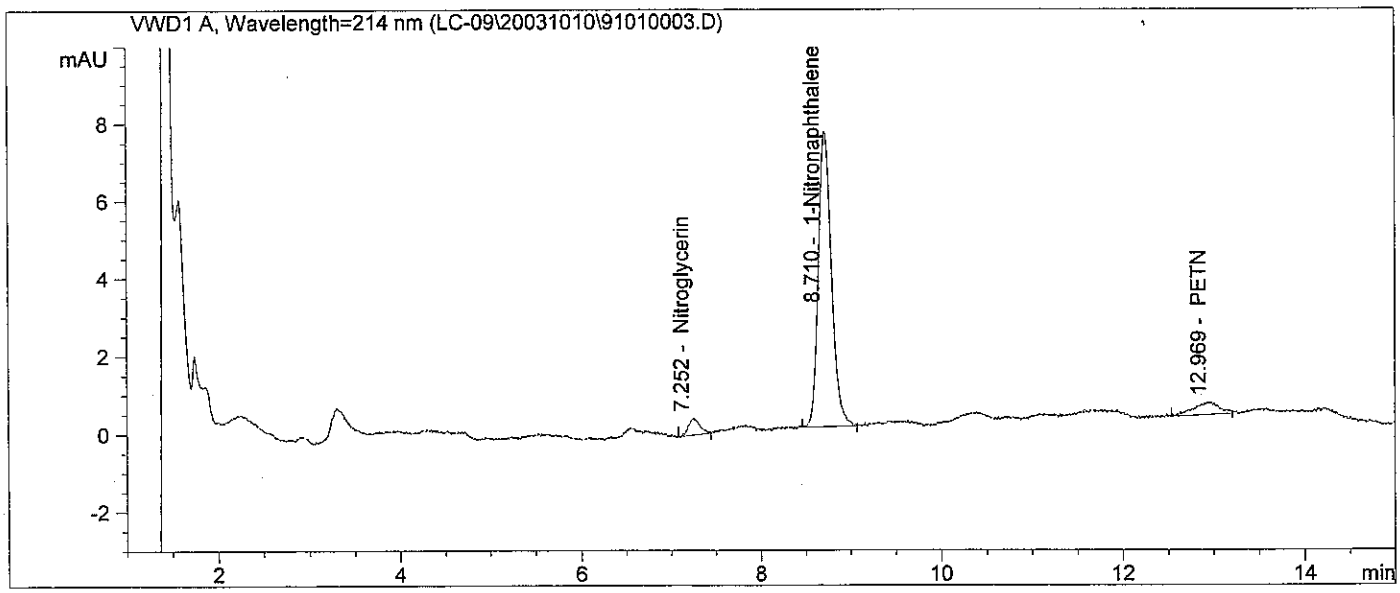
Analyst:_____

Comments:

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031010\91010003.D
Sample Name:CS1 Info:239WS VAYO

Seq Line :3
Injection Date :Fri, 10 Oct. 2003 04:01:01 PM Vial No. :3
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Fri, 10 Oct. 2003, 06:02:21 pm(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Fri, 10 Oct. 2003, 05:10:04 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

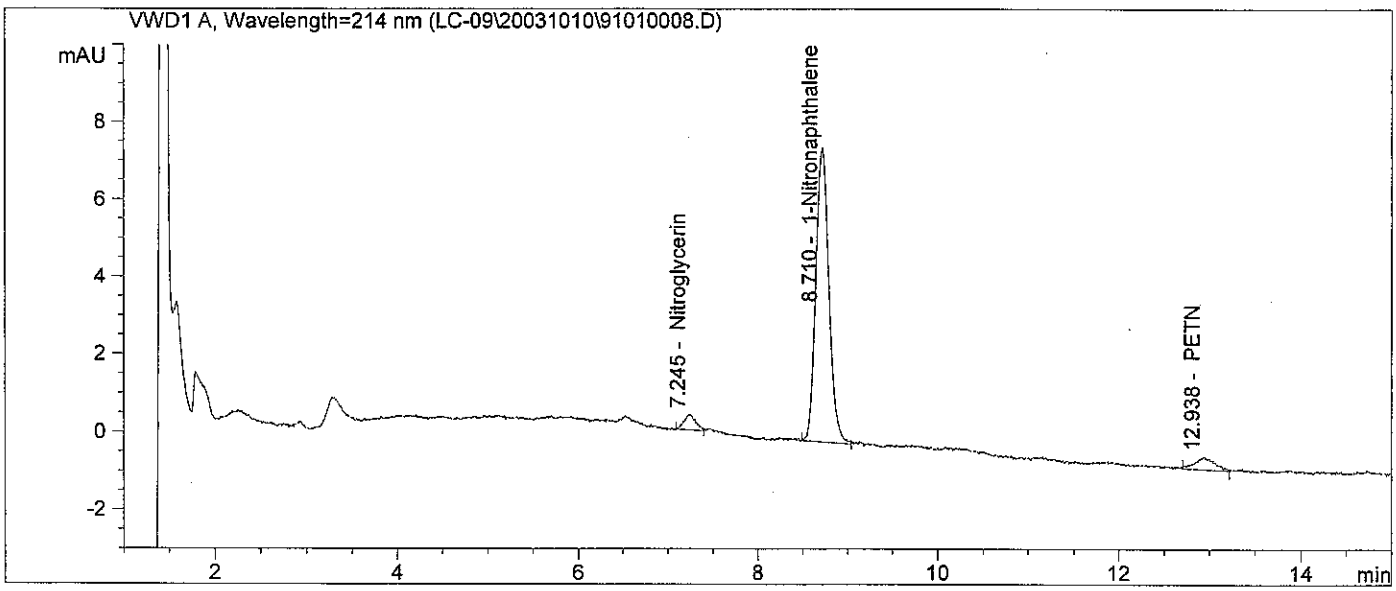
Type	RT [min]	Compound	Amount [ug/mL]	Area
MM	7.252	Nit	0.15261	3.999
MM	8.710	1-N	0.13557	78.190
MM	12.969	PET	0.19477	6.459
Totals:			0.48295	

Analyst:_____

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031010\91010008.D
Sample Name:CS2 Info:239WS VAYO

Seq Line :8
Injection Date :Fri, 10 Oct. 2003 05:19:23 PM Vial No. :3
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Fri, 10 Oct. 2003, 06:02:21 pm(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Fri, 10 Oct. 2003, 05:10:04 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	RT [min]	Compound	Amount [ug/mL]	Area
MM	7.245	Nit	0.13088	3.527
MM	8.710	1-N	0.13068	76.045
MM	12.938	PET	0.14158	5.116
Totals:			0.40314	

Analyst:_____

*** End of Report ***

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

RECEIVED
BY AS DATE 10/22/03

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Water
Analysis SOP#:	OL-SW-8332		
DCL Set ID's:	03E-0429-01		
	03E-0432-01		

General Set Information: This lot consisted of two water samples, a method blank, a laboratory control sample (LCS), and a laboratory control sample duplicate.

Method Summary: The samples were extracted using the double salting out procedure prescribed in EPA method 8330. An aliquot of 770 mL of each sample was saturated with salt and extracted twice with acetonitrile by stirring at timed intervals. The acetonitrile extracts were combined and re-extracted with fresh salt water. The final volume of the extract was adjusted to 5 mL for each sample and filtered through a 0.45 um PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, and then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial Calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis and after each ten samples and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/L.

Sample Preparation: No anomalies were observed during the preparation of the sample set.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None

This report contains
25 pages

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries and RPDs were within method limits.

Surrogate Recovery: Surrogate recoveries were all acceptable.

MS/MSD: Matrix spiking was not performed.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that the value reported was between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. When a positive result is confirmed, the quantitative result from the primary column is reported.

Rodney R. Lemon 10/13/03

Rodney R. Lemon Date

03E-0429

Radford Army Ammunition Plant
Chain Of Custody Record

No 1157

Project Number	Project Name
97604-317	FFRAP

Project Contact (Name and Phone Number): Darren Rennie (804) 765-9003

Samplers: Brett Fiala, John Spangler

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN only	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB1	10/2/03 1670	5		X	5	F	U	2						X									03E04123

ANALYSES

LAB:

AIRBILL No:

Courier:

Box #1			Box #2			Box #3	Box #4	
1.	Surface Water	6. Trip Blank	A.	HCl + Ice	F. Ice Only	F. Filtered	R.	Rush - 3 Day
2.	Ground Water	7. Oil	B.	HNO3 + Ice	G. Other _____	U. Unfiltered	S.	Standard 28 Day
3.	Leachate	8. Waste	C.	NaOH + Ice	H. NaHSO4 + Ice		T.	Timely 14 Day
4.	Rinsate	9. Other _____	D.	H2SO4 + Ice	I. ZnAc + NaOH + Ice		O.	Other _____
5.	Soil Sediment/Sludge		E.	Unpreserved				

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/2/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/3/03 0900	Received by: (for lab) [signature]	Date/Time 1033	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 2-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 17-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0429*	Reporting Group	01									#
Client: URS		Account: 08001	Analysis	PETN/NG in Water by EPA 8332									Bottles
Comments:													
Verified: JW 10/6/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2																
2-Oct-2003	EQB1	03E04123			WATER						X											2

LCSR ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 DR	10/06/03 1230	Dil Bil	Ext. 8332
Dil Bil			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/3/2003 12:57

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0429

Date/Time of Receipt: 10/3/03 0900

Number of Coolers Received: 1

Condition of Coolers:	(Acceptable)/Unacceptable	Temperature Control:	(Present)/Not Included
Custody Seals:	(Present)/Absent/NA	Location Temp Taken:	(Cooler)/Between Samples
	(Intact)/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/(No)/NA	project specific guidelines?	(Yes)/No/NA
Ice Present:	(Yes)/No/NA	Are all applicable pHs within	
	(Frozen)/Melted/NA	specific guidelines?	Yes/No/(NA)

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0429	5 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) _____ (Printed Name) _____ (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Chain of Custody Problems
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Other:
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Head Space in Bottles	EPA Custody Seal:
☐ Missing/Incorrect Bottle labels	☐ Cooler Temperatures Out of range	☐ Insufficient Sample Volume	

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Faxed to Client? YES ☐ NO ☐

Response Req

PROJE

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

FedEx Tracking Number 832942539024

Date 10/3/03

Sender's Name Brett Fidler Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Your Internal Billing Reference 07604 317

03E-0432

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1155

Project Number	Project Name
07604 317	RFAAP

Project Contact (Name and Phone Number): Darren Reams (501) 965-7002

Samplers: Brett Fisher / John Spangler

LAB: DataChem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332), 2,4DNT/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
38SB2A	10/3/03 350	5		X	S	F	/	1						X									03E04150
38SB2B	10/3/03 700	5		X	S	F	/	1						X									51
38SB4	10/3/03 —	5		X	S	F	/	1						X									52
38SB2C	10/3/03 910	5		X	S	F	/	1						X									53
38SB1A	10/3/03 1045	5		X	S	F	/	1						X									54
38SB1B	10/3/03 1100	5		X	S	F	/	1						X									55
38SB1C	10/3/03 1120	5		X	S	F	/	1						X									56
38SB3A	10/3/03 1200	5		X	S	F	/	1						X									57
38SB3B	10/3/03 1215	5		X	S	F	/	1						X									58
38SB3C	10/3/03 1230	5		X	S	F	/	1						X									59
EQB2	10/3/03 1500	5		X	W	E	/	2						X									60

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/3/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/4/03 0930	Received by: (for lab) [signature]	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 3-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 17-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0432 * | **Reporting Group** 01

Client: URS | **Account:** 08001

Comments:

Verified: JW 10/6/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: PETN/NG in Water by EPA 8332	# Bottles
3-Oct-2003	EQB2	03E04160			WATER		X	2

16B

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 DB	10/06/03 1230	D-l B-l	Ext. 8332
D-l B-l			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/6/2003 11:02

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0432

Date/Time of Receipt: 10/4/03 0930

Number of Coolers Received: 1

Condition of Coolers: (Acceptable)/Unacceptable

Custody Seals: (Present)/Absent/NA

(Intact)/Broken/NA

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA

(Frozen)/Melted/NA

Temperature Control: (Present)/Not Included

Location Temp Taken: (Control)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/No/(NA)

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0431	3 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/4/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/3/03 FedEx Tracking Number 832942539080

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

Faxed to Client? YES ☐ NO ☐

City RICHMOND State VA ZIP 23230

Response Requi

PROJECT Your Internal Billing Reference 09604-317

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0429-04 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10090317511626
Page 1

G039200T

DCL Report Group..: **03E-0429-04**

Date Printed.....: 09-OCT-03 17:51

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: 09604-317

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
37SB1C	03E04125	02-OCT-03	03-OCT-03
37SB2B	03E04127	02-OCT-03	03-OCT-03
37SB2C	03E04128	02-OCT-03	03-OCT-03
37SB3A	03E04129	02-OCT-03	03-OCT-03
37SB3B	03E04130	02-OCT-03	03-OCT-03
37SB3BMS	03E04130MS	02-OCT-03	03-OCT-03
37SB3BMSD	03E04130MSD	02-OCT-03	03-OCT-03
37SB3C	03E04131	02-OCT-03	03-OCT-03
QSB1A	03E04132	02-OCT-03	03-OCT-03
SBD3	03E04133	02-OCT-03	03-OCT-03
QSB1B	03E04134	02-OCT-03	03-OCT-03
QSB1C	03E04135	02-OCT-03	03-OCT-03
QSB3A	03E04136	02-OCT-03	03-OCT-03
QSB3B	03E04137	02-OCT-03	03-OCT-03
QSB3C	03E04138	02-OCT-03	03-OCT-03
QSB2A	03E04139	02-OCT-03	03-OCT-03
QSB2B	03E04140	02-OCT-03	03-OCT-03
QSB2C	03E04141	02-OCT-03	03-OCT-03
Method Blank	BL-211309-1	NA	NA
LCS	QC-211309-1	NA	NA

Analyst: Gloria W. Heung — 10-9-03 Date

Reviewer: Thomas T McKay — 10/10/03 Date

Lab Supervisor: Richard W. Wade — 10/10/03 Date

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0392014

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB1C**
DCL Sample Name...: **03E04125**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 08:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 14.3

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 14:24	0.260	ND		U	1	1.17
Nitroglycerin	07-OCT-03 14:24	0.189	ND		U	1	0.583

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0392015

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB2B**
DCL Sample Name...: **03E04127**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 09:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 18.4

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 14:47	0.273	ND		U	1	1.23
Nitroglycerin	07-OCT-03 14:47	0.199	ND		U	1	0.613

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0392016

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB2C**
DCL Sample Name...: **03E04128**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 10:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 21.2

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 15:10	0.283	ND		U	1	1.27
Nitroglycerin	07-OCT-03 15:10	0.206	ND		U	1	0.635

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

S0392017

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB3A**
DCL Sample Name...: **03E04129**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 10:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 11.7

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 15:33	0.253	ND		U	1	1.13
Nitroglycerin	07-OCT-03 15:33	0.183	ND		U	1	0.566

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

Form RLIMS63A-V1.4
10090317511626

S0392018

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB3B**
DCL Sample Name...: **03E04130**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 10:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.1

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 17:13	0.294	ND		U	1	1.32
Nitroglycerin	07-OCT-03 17:13	0.213	ND		U	1	0.659

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201C

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **37SB3C**
DCL Sample Name...: **03E04131**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 10:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 19.2

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 18:20	0.276	ND		U	1	1.24
Nitroglycerin	07-OCT-03 18:20	0.200	ND		U	1	0.619

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201D

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB1A**
DCL Sample Name...: **03E04132**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 13:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 22.4

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 18:42	0.287	ND		U	1	1.29
Nitroglycerin	07-OCT-03 18:42	0.209	ND		U	1	0.644

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

S039201F

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD3**
DCL Sample Name...: **03E04133**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.9

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 19:04	0.268	ND		U	1	1.20
Nitroglycerin	07-OCT-03 19:04	0.195	ND		U	1	0.602

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201G

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB1B**
DCL Sample Name...: **03E04134**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 13:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.0

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 19:25	0.265	ND		U	1	1.19
Nitroglycerin	07-OCT-03 19:25	0.193	ND		U	1	0.595

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201H

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB1C**
DCL Sample Name...: **03E04135**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 13:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 8.0

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 20:09	0.242	ND		U	1	1.09
Nitroglycerin	07-OCT-03 20:09	0.176	ND		U	1	0.543

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201J

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB3A**
DCL Sample Name...: **03E04136**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 14:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 25.0

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 20:31	0.297	ND		U	1	1.33
Nitroglycerin	07-OCT-03 20:31	0.216	ND		U	1	0.667

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DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201K

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB3B**
DCL Sample Name...: **03E04137**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 14:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 14.5

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 20:53	0.261	ND		U	1	1.17
Nitroglycerin	07-OCT-03 20:53	0.189	ND		U	1	0.585

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Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB3C**
DCL Sample Name...: **03E04138**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 15:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 7.7

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 21:15	0.242	ND		U	1	1.08
Nitroglycerin	07-OCT-03 21:15	0.176	ND		U	1	0.542

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201M

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB2A**
DCL Sample Name...: **03E04139**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 15:10
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 14.2

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 21:38	0.260	ND		U	1	1.17
Nitroglycerin	07-OCT-03 21:38	0.189	ND		U	1	0.583

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201N

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB2B**
DCL Sample Name...: **03E04140**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 15:20
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 15.4

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 22:00	0.264	ND		U	1	1.18
Nitroglycerin	07-OCT-03 22:00	0.191	ND		U	1	0.591

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039201P

Date Printed.....: 09-OCT-03 17:51

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: 09604-317

Date Received.....: 03-OCT-03 00:00

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **QSB2C**
DCL Sample Name...: **03E04141**
DCL Report Group..: **03E-0429-04**

Matrix.....: SOIL
Date Sampled.....: 02-OCT-03 15:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 8.2

DCL Analysis Group: G0395017
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	07-OCT-03 22:23	0.243	ND		U	1	1.09
Nitroglycerin	07-OCT-03 22:23	0.176	ND		U	1	0.545

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
X Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
X Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0429-04
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

	SBD3	QSB1A
PETN	ND	ND
nitroglycerin	ND	ND

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	16			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

Client Name.....: URS Group, Inc.
Release Number.....: 09604-317

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G0395017
Date Prepared.....: 06-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04130MS**
Date Printed.....: 09-OCT-03 17:51

DCL Analysis Group: G0395017
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: LC03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	07-OCT-03 17:36	ND	16.1	20.0	80.6	65.0/125.	
Nitroglycerin	07-OCT-03 17:36	ND	15.7	20.0	78.3	65.0/125.	

DCL Sample Name...: **03E04130MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	07-OCT-03 17:58	16.4	81.8	16.2	0.243	1.5	0.00/35.0	
Nitroglycerin	07-OCT-03 17:58	15.8	79.1	15.7	0.163	1.0	0.00/35.0	

10/6/03

Date of Extraction:	OCT 6, 2003	**DataChem** Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0429-04		Matrix: SOIL
Group/Lot ID:	G0395017 10/6/03		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211309-1	BL-211309-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211309-1	QC-211309-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04124	37SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04125	37SB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04127	37SB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04128	37SB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04129	37SB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04130	37SB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04130MS	37SB3BMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
10	03E04130MSD	37SB3BMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
11	03E04131	37SB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04132	QSB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04133	SBD3	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04134	QSB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04135	QSB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04136	QSB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
17	03E04137	QSB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18	03E04138	QSB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
19	03E04139	QSB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
20	03E04140	QSB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
21	03E04141	QSB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
22										
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10/5/03

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239ws3	1/30/04 By:	
Matrix Spike:	239ws2	1/30/04 By:	
Matrix Spike:	----------	---------- By:	
Extractionist:		10/6/03	
Checker:		10/7/03	Sonicators tunned by:

*=Entry Error

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

37, Q

Case Narrative

RECEIVED
BY
DATE 10/15/03

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Soil
Analysis SOP#:	OL-SW-8332		
DCL Set ID's:	03E-0429-04		

General Set Information: This set contained sixteen soil samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/g.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

This report contains
39 pages

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04130. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low level sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10-9-03
Gloria W. Heung Date

Radford Army Ammunition Plant
Chain Of Custody Record

Nº 1067

Project Number	Project Name
07604-317	RFAAP

Project Contact (Name and Phone Number): Darren Renne (804) 965-9000

Samplers: Brad Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330) Pesticides/PCBs	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
375B1B	10/2/03 930	5		X	S	F	/	1						X		03E04		124					375B2A base
375B1C	10/2/03 845	5		X	S	F	/	1						X				25					MS/MSD sandy silty. Collected
375B2A	10/2/03 930	5		X	S	F	/	1						X				26					MS/MSD because 2
375B2B	10/2/03 945	5		X	S	F	/	1						X				27					of matrix difference
375B2C	10/2/03 1000	5		X	S	F	/	1						X				28					soil vs sludge
375B3A	10/2/03 1015	5		X	S	F	/	1						X				29					
375B3B	10/2/03 1030	5		X	S	F	/	1						X				30					
375B3BMS	10/2/03 1030	5		X	S	F	/	1						X				30ms					
375B3BMSD	10/2/03 1030	5		X	S	F	/	1						X				30msd					
375B3C	10/2/03 1045	5		X	S	F	/	1						X				31					
375B2AMS	10/2/03 930	5		X	S	F	/	1						X				26ms					
375B2AMSD	10/2/03 930	5		X	S	F	/	1						X				26msd					
05B1A	10/2/03 1300	5		X	S	F	/	1						X				32					
5BD3	10/2/03 —	5		X	S	F	/	1						X				33					

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brad Fisher	10/2/03 1800	FedEx			
FedEx	10/3/03 0900	(for lab) R-33-1			

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

DataChem Laboratories
CHAIN-OF-CUSTODY

Earliest Sampling Date: 2-Oct-2003

Results due by: 17-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0429 * | **Reporting Group**

Account: 08001

Client: URS

Comments:

Verified: JW 10/16/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: 04 Nitroglycin/PETN by 8332	Analysis: 05 Moisture	# Bottles
2-Oct-2003	37SB1B	03E04124			SOIL		X	X	1
2-Oct-2003	37SB1C	03E04125			SOIL		X	X	1
2-Oct-2003	37SB2B	03E04127			SOIL		X	X	1
2-Oct-2003	37SB2C	03E04128			SOIL		X	X	1
2-Oct-2003	37SB3A	03E04129			SOIL		X	X	1
2-Oct-2003	37SB3B	03E04130			SOIL		X	X	1
2-Oct-2003	37SB3BMS	03E04130MS		MS	SOIL		X		1
2-Oct-2003	37SB3BMSD	03E04130MSD		MSD	SOIL		X		1
2-Oct-2003	37SB3C	03E04131			SOIL		X	X	1
2-Oct-2003	QSB1A	03E04132			SOIL		X	X	1

IC JR

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 VTS	10/06/03 12:00	Norman Bruce	%moistures
Norman Bruce	10/06/03 15:33		

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/3/2003 12:57

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

Radford Army Ammunition Plant
Chain Of Custody Record

Nº 1068

Project Number	Project Name
076045 17	RFAAP

Project Contact (Name and Phone Number): Darren Fenne (804) 731 7000

Samplers: Brad Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) 8270 NG's	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
QSB1B	10/2/03 1315	5		X	SO	P	/	1						X									03E04134
QSB1C	10/2/03 1330	5		X	SO	P	/	1						X									35
QSB3A	10/2/03 1430	5		X	SO	P	/	1						X									36
QSB3B	10/2/03 1445	5		X	SO	P	/	1						X									37
QSB3C	10/2/03 1500	5		X	SO	P	/	1						X									38
QSB2A	10/2/03 1510	5		X	SO	P	/	1						X									39
QSB2B	10/2/03 1520	5		X	SO	P	/	1						X									40
QSB2C	10/2/03 1530	5		X	SO	P	/	1						X									41

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature] 10/2/03	1700	FedEx			
Relinquished by: FedEx 10/3/03	Date/time 0900	Received by: (for lab) R-331	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 2-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 17-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0429 * | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: JW 10/6/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: 04 Nitroglycerin/PETN by 8332	Analysis: 05 Moisture	# Bottles
2-Oct-2003	SBD3	03E04133			SOIL		X	X	1
2-Oct-2003	QSB1B	03E04134			SOIL		X	X	1
2-Oct-2003	QSB1C	03E04135			SOIL		X	X	1
2-Oct-2003	QSB3A	03E04136			SOIL		X	X	1
2-Oct-2003	QSB3B	03E04137			SOIL		X	X	1
2-Oct-2003	QSB3C	03E04138			SOIL		X	X	1
2-Oct-2003	QSB2A	03E04139			SOIL		X	X	1
2-Oct-2003	QSB2B	03E04140			SOIL		X	X	1
2-Oct-2003	QSB2C	03E04141			SOIL		X	X	1
2-Oct-2003	37SB3BMD	03E04130MD		MD	SOIL			X	0

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

ICSP

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 AB	10/06/03 13:00	Norman Brese	Moisture ces
Norman Brese	10/06/03 15:33		

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/3/2003 12:58

Check box if there is a continuation page ☐

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0429

Date/Time of Receipt: 10/3/03 0900

Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable	Temperature Control:	Present/Not Included
Custody Seals:	Present/Absent/NA	Location Temp Taken:	Control/Between Samples
	Intact/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/No/NA	project specific guidelines?	Yes/No/NA
Ice Present:	Yes/No/NA	Are all applicable pHs within	
	Frozen/Melted/NA	specific guidelines?	Yes/No/NA

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0429	5 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) _____ (Printed Name) _____ (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Chain of Custody Problems
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Other:
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Head Space in Bottles	EPA Custody Seal:
☐ Missing/Incorrect Bottle labels	☐ Cooler Temperatures Out of range	☐ Insufficient Sample Volume	

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/3/03 FedEx Tracking Number 832942539024

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

Response Req

PROJE Your Internal Billing Reference 09604 317

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0433-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
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COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10160317392028
Page 1

G039600N

DCL Report Group..: **03E-0433-01**

Date Printed.....: 16-OCT-03 17:39

Project Protocol #: P021C002
Client Ref Number.: subcontract DCL-09
Release Number....: URS#01

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211379-1	NA	NA
LCS	QC-211379-1	NA	NA
68SB2A	03E04161	06-OCT-03	07-OCT-03
68SB2AMS	03E04161MS	06-OCT-03	07-OCT-03
68SB2AMSD	03E04161MSD	06-OCT-03	07-OCT-03
68SB2B	03E04162	06-OCT-03	07-OCT-03
68SB2C	03E04163	06-OCT-03	07-OCT-03
SBD5	03E04164	06-OCT-03	07-OCT-03
68SB1A	03E04165	06-OCT-03	07-OCT-03
68SB1B	03E04166	06-OCT-03	07-OCT-03
68SB1C	03E04167	06-OCT-03	07-OCT-03

Analyst: Gloria W. Heung — Date: 10/16/03

Reviewer: Thomas T McKay — Date: 10/20/03

Lab Supervisor: Richard W. Wade — Date: 10/20/03

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB2A**
DCL Sample Name...: **03E04161**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 13:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 28.8

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 18:45	0.313	ND		U	1	1.40
Nitroglycerin	15-OCT-03 18:45	0.228	ND		U	1	0.702

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB2B**
DCL Sample Name...: **03E04162**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 18:30
Reporting Units...: mg/kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 25.3

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 19:50	0.299	ND		U	1	1.34
Nitroglycerin	15-OCT-03 19:50	0.217	ND		U	1	0.669

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB2C**
DCL Sample Name...: **03E04163**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 13:45
Reporting Units...: mg/kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 23.9

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 20:34	0.293	ND		U	1	1.31
Nitroglycerin	15-OCT-03 20:34	0.213	ND		U	1	0.657

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039601B

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD5**
DCL Sample Name...: **03E04164**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 31.3

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 20:56	0.325	ND		U	1	1.46
Nitroglycerin	15-OCT-03 20:56	0.236	ND		U	1	0.728

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB1A**
DCL Sample Name...: **03E04165**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 22.8

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 21:18	0.289	ND		U	1	1.30
Nitroglycerin	15-OCT-03 21:18	0.210	ND		U	1	0.648

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB1B**
DCL Sample Name...: **03E04166**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.2

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 21:39	0.306	ND		U	1	1.37
Nitroglycerin	15-OCT-03 21:39	0.223	ND		U	1	0.687

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 16-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: subcontract DCL-09292003
Sampling Site.....: RFAAP 09604-317
Release Number.....: URS#01

Date Received.....: 07-OCT-03 00:00

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB1C**
DCL Sample Name...: **03E04167**
DCL Report Group..: **03E-0433-01**

Matrix.....: SOIL
Date Sampled.....: 06-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.5

DCL Analysis Group: G039701D
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	15-OCT-03 22:01	0.308	ND		U	1	1.38
Nitroglycerin	15-OCT-03 22:01	0.223	ND		U	1	0.690

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0433-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%? Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD5	68SB2C	RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND			1.31	6.55	5.24
nitroglycerin	ND	ND			0.657	3.285	2.628

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	7			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S0396016

Client Name.....: URS Group, Inc.
Release Number.....: URS#01

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039701D
Date Prepared.....: 08-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04161MS**
Date Printed.....: 16-OCT-03 17:58

DCL Analysis Group: G039701D
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	15-OCT-03 19:07	ND	13.1	20.0	65.3	65.0/125.	
Nitroglycerin	15-OCT-03 19:07	ND	13.1	20.0	65.3	65.0/125.	

S0396017

DCL Sample Name...: **03E04161MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	15-OCT-03 19:29	15.3	76.5	14.2	2.26	17.	0.00/35.0	
Nitroglycerin	15-OCT-03 19:29	14.1	70.6	13.6	1.05	7.7	0.00/35.0	

10/8/03

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Date of Extraction:	OCT 8, 2003
Account #(s):	8001
DCL Set ID(s):	03E-0433-01
Group/Lot ID:	G039701D 10/8/03

DataChem Laboratories Extraction Notebook

Book #	Ext 246	Page#
Matrix:	SOIL	
Method:	8332	

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH			Surr. Added	Matrix Spike		Final Volume
1	BL-211379-1	BL-211379-1	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
2	QC-211379-1	QC-211379-1	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
3	03E04161	68SB2A	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
4	03E04161MS	68SB2AMS	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
5	03E04161MSD	68SB2AMSD	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
6	03E04162	68SB2B	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
7	03E04163	68SB2C	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
8	03E04164	SBD5	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
9	03E04165	68SB1A	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
10	03E04166	68SB1B	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
11	03E04167	68SB1C	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
12											
13											
14											
15											
16											
17											
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35											
36											
37											
38											
39											
40											

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By:	
Matrix Spike:	239 ws 2	1/30/04 By:	
Matrix Spike:	----------	---------- By:	
Extractionist:	Boming Yan	10/8/03	
Checker:	Wen Y	10/08/03	Sonicators tunned by:

*=Entry Error

10/8/03

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

10090311585339X

Date _____
Laboratory Group Name 03E-0433-02
Account No. 08001 URSO1

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site RFAAP 09604-317 Date of Collection October 06, 2003

Date Samples Received at Laboratory October 07, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 09, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
68SB2A	03E04161	SOIL	28.8							
68SB2AMD	03E04161MD	SOIL	24.3							
68SB2B	03E04162	SOIL	25.3							
68SB2C	03E04163	SOIL	23.9							
SBD5	03E04164	SOIL	31.3							
68SB1A	03E04165	SOIL	22.8							
68SB1B	03E04166	SOIL	27.2							
68SB1C	03E04167	SOIL	27.5							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

10090312271813X

Date _____
Laboratory Group Name 03E-0435-03
Account No. 08001

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site RFAAP/09292003 Date of Collection October 07, 2003

Date Samples Received at Laboratory October 08, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 09, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %								
68SB3A	03E04173	SOIL	13.4								
68SB3B	03E04174	SOIL	27.1								
68SB3C	03E04175	SOIL	42.2								
57SB1A	03E04176	SOIL	13.9								
57SB1B	03E04177	SOIL	29.1								
57SB1C	03E04178	SOIL	35.7								
57SB3A	03E04179	SOIL	30.3								
SBD6	03E04180	SOIL	24.8								
57SB3B	03E04181	SOIL	37.5								
57SB3C	03E04182	SOIL	29.6								
57SB2A	03E04183	SOIL	10.4								
57SB2B	03E04184	SOIL	20.0								
57SB2BMD	03E04184MD	SOIL	19.6								

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

10090312271813X

Date _____

Laboratory Group Name 03E-0435-03

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
57SB2C	03E04185	SOIL	3.0							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

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Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Project No. X

TITLE Data Chem Laboratories % moisture & solids Book No. 4146

From Page No. X

Insert of preparatory report for sets: 03E-0433-02, 0435-03 & 0436-02
RB 10/09/03

%Moistures & Solids

Start Time: 21:54 08-Oct-03
Finish Time: 11:29 09-Oct-03

Set ID #	Dish #	Sample #	Dish (g)	Dish + Soil (g)	Soil weight(g)	Dish + Dry Soil (g)	Dry Soil (g)	% Solids	% Moistures
03E-0433-02	1	03E04161	1.47	6.72	5.25	5.21	3.74	71.2%	28.8%
03E-0433-02	2	03E04161MD	1.24	6.02	4.78	4.86	3.62	75.7%	24.3%
03E-0433-02	3	03E04162	1.45	5.08	3.63	4.16	2.71	74.7%	25.3%
03E-0433-02	4	03E04163	1.45	5.71	4.26	4.69	3.24	76.1%	23.9%
03E-0433-02	5	03E04164	1.46	5.68	4.22	4.36	2.90	68.7%	31.3%
03E-0433-02	6	03E04165	1.24	5.10	3.86	4.22	2.98	77.2%	22.8%
03E-0433-02	7	03E04166	1.25	5.26	4.01	4.17	2.92	72.8%	27.2%
03E-0433-02	8	03E04167	1.25	5.22	3.97	4.13	2.88	72.5%	27.5%
03E-0435-03	9	03E04173	1.25	5.29	4.04	4.75	3.50	86.6%	13.4%
03E-0435-03	10	03E04174	1.24	5.15	3.91	4.09	2.85	72.9%	27.1%
03E-0435-03	11	03E04175	1.26	5.19	3.93	3.53	2.27	57.8%	42.2%
03E-0435-03	12	03E04176	1.24	5.13	3.89	4.59	3.35	86.1%	13.9%
03E-0435-03	13	03E04177	1.24	5.30	4.06	4.12	2.88	70.9%	29.1%
03E-0435-03	14	03E04178	1.26	5.21	3.95	3.80	2.54	64.3%	35.7%
03E-0435-03	15	03E04179	1.25	6.80	5.55	5.12	3.87	69.7%	30.3%
03E-0435-03	16	03E04180	1.25	5.57	4.32	4.50	3.25	75.2%	24.8%
03E-0435-03	17	03E04181	1.25	5.41	4.16	3.85	2.60	62.5%	37.5%
03E-0435-03	18	03E04182	1.26	5.45	4.19	4.21	2.95	70.4%	29.6%
03E-0435-03	19	03E04183	1.25	5.01	3.76	4.62	3.37	89.6%	10.4%
03E-0435-03	20	03E04184	1.24	6.30	5.06	5.29	4.05	80.0%	20.0%
03E-0435-03	21	03E04184MD	1.24	6.29	5.05	5.30	4.06	80.4%	19.6%
03E-0435-03	22	03E04185	1.24	5.23	3.99	5.11	3.87	97.0%	3.0%
03E-0436-02	23	03E04187	1.25	7.97	6.72	7.16	5.91	87.9%	12.1%
03E-0436-02	24	03E04187MD	1.24	7.05	5.81	6.26	5.02	86.4%	13.6%
03E-0436-02	25	03E04188	1.24	6.34	5.10	6.13	4.89	95.9%	4.1%
03E-0436-02	26	03E04189	1.24	6.01	4.77	5.89	4.65	97.5%	2.5%
03E-0436-02	27	03E04190	1.25	5.05	3.80	4.96	3.71	97.6%	2.4%

RB 10/09/03

RB 10/09/03

To Page No. X

Witnessed & Understood by me,	Date	Invented by NA	Date
Lon York	10/9/03	Recorded by Norman Braque	10/09/03

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332		
DCL Set ID's:	03E-0433-01		

General Set Information: This lot contained seven solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04161. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/17/03

Gloria W. Heung Date

SDG# URS#01 03E-0433

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1106

Project Number	Project Name
07604517	RFRAP

Project Contact (Name and Phone Number): Darren Rowe (804) 765 7060

Samplers: Brett Fisher / John Sparacino

LAB: Datachem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
685B24	10/6/03 1315	5		X	S	F	/	4						X									03E04161
685B24MS	10/6/03 1315	5		X	S	F	/	1						X									6/MS
685B24MSD	10/6/03 1315	5		X	S	F	/	1						X									6/MSD
685B25	10/6/03 1330	5		X	S	F	/	1						X									62
685B26	10/6/03 1345	5		X	S	F	/	1						X									63
5BD5	10/6/03	5		X	S	F	/	1						X									64
685B1A	10/6/03	5		X	S	F	/	1						X									65
685B1B	10/6/03	5		X	S	F	/	1						X									66
685B1C	10/6/03	5		X	S	F	/	1						X									67

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/6/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/7/03 0930	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 6-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 21-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0433 * | **Reporting Group** | 01 | 02 | # Bottles

Client: URS | **Account:** 08001

Comments:

Verified: JW 10/7/03

Analysis

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	01 Nitroglycein/PETN by 8332	02 Moisture	# Bottles
6-Oct-2003	68SB2A	03E04161			SOIL		X	X	1
6-Oct-2003	68SB2AMS	03E04161MS		MS	SOIL		X		1
6-Oct-2003	68SB2AMSD	03E04161MSD		MSD	SOIL		X		1
6-Oct-2003	68SB2B	03E04162			SOIL		X	X	1
6-Oct-2003	68SB2C	03E04163			SOIL		X	X	1
6-Oct-2003	SBD5	03E04164			SOIL		X	X	1
6-Oct-2003	68SB1A	03E04165			SOIL		X	X	1
6-Oct-2003	68SB1B	03E04166			SOIL		X	X	1
6-Oct-2003	68SB1C	03E04167			SOIL		X	X	1
6-Oct-2003	68SB2AMD	03E04161MD		MD	SOIL			X	0

16B JP

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in Room/Shelf/Fridge R-319-1	10/8/03		
	10/08/03 9:00	Norman Beene	Moisture
Norman Beene	10/08/03 20:27	R-319-1 NB	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

255

Check box if there is a continuation page ☐

Printed 10/7/2003 12:30

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0433

Date/Time of Receipt: 10/7/03 0930

Number of Coolers Received: 1

Condition of Coolers:	(Acceptable)/Unacceptable	Temperature Control:	(Present)/Not Included
Custody Seals:	(Present)/Absent/NA	Location Temp Taken:	(Control)/Between Samples
	(Intact)/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/(No)/NA	project specific guidelines?	(Yes)/No/NA
Ice Present:	(Yes)/No/NA	Are all applicable pHs within	
	(Frozen)/Melted/NA	specific guidelines?	Yes/No/(NA)

PH Check:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 6433	2°C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: [signature] (Signature) J. Pate (Printed Name) 10/7/03 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Chain of Custody Problems
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Other:
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Head Space in Bottles	EPA Custody Seal:
☐ Missing/Incorrect Bottle labels	☐ Cooler Temperatures Out of range	☐ Insufficient Sample Volume	

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/6/03 FedEx Tracking Number 832942539057

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ No ☐

Response Requi

PROJECT Your Internal Billing Reference 09604 317

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc Revised 6/28/01

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0435-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

Form COVER-V1.4
10170315471281
Page 1

G0397006

DCL Report Group..: **03E-0435-01**

Date Printed.....: 17-OCT-03 15:47

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#01

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211423-1	NA	NA
LCS	QC-211423-1	NA	NA
LCS Dup	QD-211423-1	NA	NA
EQB3	03E04186	07-OCT-03	08-OCT-03

Analyst: Gloria W. Heung — 10/17/03 Date

Reviewer: Thomas T McKay — 10/20/03 Date

Lab Supervisor: Richard W. Wade — 10/21/03 Date

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

Client Sample Name: **EQB3**
DCL Sample Name...: **03E04186**
DCL Report Group..: **03E-0435-01**

Matrix.....: WATER
Date Sampled.....: 07-OCT-03 16:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G039D01R
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039D01R
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 20:32	0.311	ND		U	1	0.970
Nitroglycerin	16-OCT-03 20:32	0.213	ND		U	1	0.970

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0435-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	1			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

LB 10/13/03

Date of Extraction:	10/13/03	**DataChem Laboratories Extraction Notebook**	Book # Ext 007 Page# 55
Account #(s):	8001		
DCL Set ID(s):	03E-0435-01		Matrix: WATER
Group/Lot ID:	G039D01R		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211423-1	BL-211423-1	770mL	N/A	N/A	N/A	1mL	----	----	5mL
2	QC-211423-1	QC-211423-1	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
3	QD-211423-1	QD-211423-1	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
4	03E04186	EQB3	770mL	N/A	N/A	N/A	1mL	----	----	5mL
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
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37										
38										
39										
40										

Solvents:	MeCN	C1946	Comments: Not enough Sample for MS/MSD LB 10/13/03
Surrogate Spike:	239WS3 #2	01/30/2004 By: LB	
Matrix Spike:	239WS99	04/12/2004 By: LB	
Matrix Spike:	----------	---------- By: NA	
Extractionist:	DJB	10/13/03	
Checker:		10/13/03	Sonicators tunned by: NA

*=Entry Error

LB 10/13/03

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Water
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#01
DCL Set ID's:	03E-0435-01		

General Set Information: This set consisted of one water sample, a method blank, a laboratory control sample (LCS), and a laboratory control sample duplicate.

Method Summary: The samples were extracted using the double salting out procedure prescribed in EPA method 8332. An aliquot of 770 mL of each sample was saturated with salt and extracted twice with acetonitrile by stirring at timed intervals. The acetonitrile extracts were combined and re-extracted with fresh salt water. The final volume of the extract was adjusted to 5 mL for each sample and filtered through a 0.45 um PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, and then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial Calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis and after each ten samples and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/L.

Sample Preparation: No anomalies were observed during the preparation of the sample set.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries and RPDs were within method limits.

Surrogate Recovery: Surrogate recoveries were all acceptable.

MS/MSD: Matrix spiking was not performed due to insufficient amount of sample.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that the value reported was between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. When a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10-20-03

Gloria W. Heung Date

SDG# 01 03E-0435
URS# 98 09 10/8/03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1108

Project Number	Project Name
97604317	RFAAP

Project Contact (Name and Phone Number): Darren Rowe (804) 765 7000

Samplers: Brad Fiehler / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB3	10/6/03 1600	5		X	4	F	/	2						X									03E04186

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/6/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/8/03 0845	Received by: (for lab) R-331	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

3

Earliest Sampling Date: 7-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 22-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0435 *	Reporting Group	01									#
Client: URS		Account: 08001	Analysis	PETN/NG in Water by EPA 8332									Bottles
Comments:													
Verified: JW 10/8/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2															
7-Oct-2003	EQB3	03E04186			WATER						X										2

15 SR ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 dlb	10/13/03 1030	D-L B-L	Ext. 8332
D-L B-L			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/8/2003 11:43

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0435

Date/Time of Receipt: 10/8/03 0845

Number of Coolers Received: 1

Condition of Coolers: (Acceptable)/Unacceptable

Custody Seals: (Present)/Absent/NA

(Intact)/Broken/NA

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA

(Frozen)/Melted/NA

Temperature Control: (Present)/Not Included

Location Temp Taken: (Control)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/No/(NA)

pH Check Performed:						
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/(NA)
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03-0434	3°C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: [signature] (Signature) J. Pate (Printed Name) 10/8/03 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Insufficient Sample Volume
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Chain of Custody Problems
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Residual Chlorine Present	☐ Other:
☐ Missing/Incorrect Bottle Labels	☐ Cooler Temperatures Out of Range	☐ Head Space in Bottles	EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

Date 10/7/03 FedEx Tracking Number 832942539079

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

Your Internal Billing Reference 09604 317

Response Requir

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc Revised 1/01/03

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0435-02 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

G0397007

DCL Report Group..: **03E-0435-02**

Date Printed.....: 17-OCT-03 15:47

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#01

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211424-1	NA	NA
LCS	QC-211424-1	NA	NA
68SB3A	03E04173	07-OCT-03	08-OCT-03
68SB3B	03E04174	07-OCT-03	08-OCT-03
68SB3C	03E04175	07-OCT-03	08-OCT-03
57SB1A	03E04176	07-OCT-03	08-OCT-03
57SB1B	03E04177	07-OCT-03	08-OCT-03
57SB1C	03E04178	07-OCT-03	08-OCT-03
57SB3A	03E04179	07-OCT-03	08-OCT-03
SBD6	03E04180	07-OCT-03	08-OCT-03
57SB3B	03E04181	07-OCT-03	08-OCT-03
57SB3C	03E04182	07-OCT-03	08-OCT-03
57SB2A	03E04183	07-OCT-03	08-OCT-03
57SB2B	03E04184	07-OCT-03	08-OCT-03
57SB2BMS	03E04184MS	07-OCT-03	08-OCT-03
57SB2BMSD	03E04184MSD	07-OCT-03	08-OCT-03
57SB2C	03E04185	07-OCT-03	08-OCT-03

Analyst: Gloria W. Heung — Date 10/17/03

Reviewer: Thomas T McKay — Date 10/21/03

Lab Supervisor: Richard W. Wade — Date 10/24/03

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0397018

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB3A**
DCL Sample Name...: **03E04173**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 08:10
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 13.4

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 21:38	0.258	ND		U	1	1.15
Nitroglycerin	16-OCT-03 21:38	0.187	ND		U	1	0.577

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0397019

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB3B**
DCL Sample Name...: **03E04174**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 08:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.1

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 22:21	0.306	ND		U	1	1.37
Nitroglycerin	16-OCT-03 22:21	0.222	ND		U	1	0.686

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701B

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **68SB3C**
DCL Sample Name...: **03E04175**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 08:50
Reporting Units...: mg/kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 42.2

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 22:43	0.386	ND		U	1	1.73
Nitroglycerin	16-OCT-03 22:43	0.280	ND		U	1	0.865

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB1A**
DCL Sample Name...: **03E04176**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 10:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 13.9

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 23:05	0.259	ND		U	1	1.16
Nitroglycerin	16-OCT-03 23:05	0.188	ND		U	1	0.581

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701D

Date Printed.....: 17-OCT-03 16:14

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB1B**
DCL Sample Name...: **03E04177**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 10:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 29.1

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 23:27	0.315	ND		U	1	1.41
Nitroglycerin	16-OCT-03 23:27	0.228	ND		U	1	0.705

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701F

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB1C**
DCL Sample Name...: **03E04178**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 10:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 35.7

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	16-OCT-03 23:48	0.347	ND		U	1	1.56
Nitroglycerin	16-OCT-03 23:48	0.252	ND		U	1	0.778

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB3A**
DCL Sample Name...: **03E04179**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 11:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 30.3

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 00:10	0.320	ND		U	1	1.43
Nitroglycerin	17-OCT-03 00:10	0.232	ND		U	1	0.717

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701H

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD6**
DCL Sample Name...: **03E04180**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.8

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 00:32	0.297	ND		U	1	1.33
Nitroglycerin	17-OCT-03 00:32	0.215	ND		U	1	0.665

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701J

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB3B**
DCL Sample Name...: **03E04181**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 11:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 37.5

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 01:16	0.357	ND		U	1	1.60
Nitroglycerin	17-OCT-03 01:16	0.259	ND		U	1	0.800

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Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB3C**
DCL Sample Name...: **03E04182**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 11:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 29.6

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 01:38	0.317	ND		U	1	1.42
Nitroglycerin	17-OCT-03 01:38	0.230	ND		U	1	0.710

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10170315473321
Page 13

S039701L

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB2A**
DCL Sample Name...: **03E04183**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 14:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 10.4

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 01:59	0.249	ND		U	1	1.12
Nitroglycerin	17-OCT-03 01:59	0.181	ND		U	1	0.558

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039701M

Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB2B**
DCL Sample Name...: **03E04184**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 14:20
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.0

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 02:22	0.279	ND		U	1	1.25
Nitroglycerin	17-OCT-03 02:22	0.203	ND		U	1	0.625

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Date Printed.....: 17-OCT-03 15:47

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09292003
Release Number.....: URS#01

Date Received.....: 08-OCT-03 00:00

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB2C**
DCL Sample Name...: **03E04185**
DCL Report Group..: **03E-0435-02**

Matrix.....: SOIL
Date Sampled.....: 07-OCT-03 14:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 3.0

DCL Analysis Group: G039B001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	17-OCT-03 03:29	0.230	ND		U	1	1.03
Nitroglycerin	17-OCT-03 03:29	0.167	ND		U	1	0.515

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0435-02
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD6	57SB3A
PETN	ND	ND
nitroglycerin	ND	ND

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	13			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S039701N

Client Name.....: URS Group, Inc.
Release Number.....: URS#01

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039B001
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04184MS**
Date Printed.....: 17-OCT-03 15:47

DCL Analysis Group: G039B001
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	17-OCT-03 02:44	ND	17.8	20.0	89.0	65.0/125.	
Nitroglycerin	17-OCT-03 02:44	ND	16.9	20.0	84.5	65.0/125.	

S039701P

DCL Sample Name...: **03E04184MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	17-OCT-03 03:07	18.0	90.1	17.9	0.218	1.2	0.00/35.0	
Nitroglycerin	17-OCT-03 03:07	16.2	81.0	16.6	0.696	4.2	0.00/35.0	

BMM 10/12/03

Date of Extraction:	OCT 12, 2003	DataChem Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0435-02		Matrix: SOIL
Group/Lot ID:	G039B001		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211424-1	BL-211424-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211424-1	QC-211424-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04173	68SB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04174	68SB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04175	68SB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04176	57SB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04177	57SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04178	57SB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04179	57SB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04180	SBD6	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04181	57SB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04182	57SB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04183	57SB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04184	57SB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04184MS	57SB2BMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
16	03E04184MSD	57SB2BMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
17	03E04185	57SB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18										
19										
20										
21										
22										
23										
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31										
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33										
34										
35										
36										
37										
38										
39										
40										

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: BMM	
Matrix Spike:	239 ws 2	1/30/04 By: BMM	
Matrix Spike:	+------	----------By:	
Extractionist:	Bonnie Mann	10/12/03	
Checker:	Vicki Hsieh	10/12/03	Sonicators tunned by:

*=Entry Error

BMM 10/12/03

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#01
DCL Set ID's:	03E-0435-02		

General Set Information: This lot contained thirteen solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04184. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/20/03
Gloria W. Heung Date

SDG# 01 03E-0435
URS#02 JP 10/8/03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1153

Project Number	Project Name
89604 317	RFAAP

Project Contact (Name and Phone Number): Darren Tarina (804) 765 7000

Samplers: Brent Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) RDX/HMX	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
0563 A	10/7/03 810	5		X	S	F	/	1						X									03E04173
0563 B	10/7/03 830	5		X	S	F	/	1						X									74
0563 C	10/7/03 850	5		X	S	F	/	1						X									75
575B1A	10/7/03 1000	5		X	S	F	/	1						X									76
575B1B	10/7/03 1015	5		X	S	F	/	1						X									77
5756 1 C	10/7/03 1030	5		X	S	F	/	1						X									78
5755 A	10/7/03 1100	5		X	S	F	/	1						X									79
5606	10/7/03 —	5		X	S	F	/	1						X									80
575B3 B	10/7/03 1115	5		X	S	F	/	1						X									81
575B3 C	10/7/03 1130	5		X	S	F	/	1						X									82
575B2A	10/7/03 1400	5		X	S	F	/	1						X									83
575B2B	10/7/03 1420	5		X	S	F	/	1						X									84
575B2B MS/MSD	10/7/03 1420	5		X	S	F	/	2						X									84 ms/msd
575B2C	10/7/03 1430	5		X	S	F	/	1						X									85

Box #1			Box #2			Box #3	Box #4	
1. Surface Water	6. Trip Blank		A. HCl + Ice	F. Ice Only		F. Filtered	R. Rush - 3 Day	
2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other _____		U. Unfiltered	S. Standard 28 Day	
3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice			T. Timely 14 Day	
4. Rinsate	9. Other _____		D. H2SO4 + Ice	I. ZnAc + NaOH + Ice			O. Other _____	
5. Soil Sediment/Sludge			E. Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/7/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/8/03 0845	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 7-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 22-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0435 *	Reporting Group	02	03								#
Client: URS		Account: 08001	Analysis	Nitroglycerin/PETN by 8332	Moisture								Bottles
Comments:													
Verified: KW 10/8/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2														
7-Oct-2003	68SB3A	03E04173			SOIL						X	X								1
7-Oct-2003	68SB3B	03E04174			SOIL						X	X								1
7-Oct-2003	68SB3C	03E04175			SOIL						X	X								1
7-Oct-2003	57SB1A	03E04176			SOIL						X	X								1
7-Oct-2003	57SB1B	03E04177			SOIL						X	X								1
7-Oct-2003	57SB1C	03E04178			SOIL						X	X								1
7-Oct-2003	57SB3A	03E04179			SOIL						X	X								1
7-Oct-2003	SBD6	03E04180			SOIL						X	X								1
7-Oct-2003	57SB3B	03E04181			SOIL						X	X								1
7-Oct-2003	57SB3C	03E04182			SOIL						X	X								1

15C SQ ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 NB	10/8/03 20:00	Norman Burpe	D/O moisture
Norman Burpe R-33-1 NB	10/8/03 22:00	R-33-1 NB	%storage
	10/9/03 12:11		

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/8/2003 11:44

Form: COPC1.01-SWV2.30

Earliest Sampling Date: 7-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 22-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0435 *	Reporting Group
Client: URS		Account: 08001	
Comments:			
Verified: JW 10/8/03			

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 02 Nitroglycerin/PETN by 8332	Analysis 03 Moisture	# Bottles
7-Oct-2003	57SB2A	03E04183			SOIL		X	X	1
7-Oct-2003	57SB2B	03E04184			SOIL		X	X	1
7-Oct-2003	57SB2BMS	03E04184MS		MS	SOIL		X		1
7-Oct-2003	57SB2BMSD	03E04184MSD		MSD	SOIL		X		1
7-Oct-2003	57SB2C	03E04185			SOIL		X	X	1
7-Oct-2003	57SB2BMD	03E04184MD		MD	SOIL			X	0

15C JP ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 NB	10/8/03 20:00	Norman Bruce	% moisture
Norman Bruce R-33-1 NB	10/8/03 22:00 10/9/03 12:00	R-33-1 NB	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/8/2003 11:44

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0435

Date/Time of Receipt: 10/8/03 0845

Number of Coolers Received: 1

Condition of Coolers: Acceptable/Unacceptable
Custody Seals: Present/Absent/NA
Intact/Broken/NA
Tamper Evident: Yes/No/NA
Ice Present: Yes/No/NA
Frozen/Melted/NA

Temperature Control: Present/Not Included
Location Temp Taken: Cooler/Between Samples
Are all temperatures within project specific guidelines? Yes/No/NA
Are all applicable pHs within specific guidelines? Yes/No/NA

pH Check Performed:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03-0434	3°C	4	C03-	°C	7	C03 -	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/8/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

ite 10/9/03 FedEx Tracking Number 832942539079

nder's ime Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept./Floor/Suite/Room

y RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

ur Internal Billing Reference 09604 317

Response Requir

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0441-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: The matrix spike pair for sample 57SB4A displayed recoveries less than the lower control limit (i.e., 65.0%) for nitroglycerin (60.7%/62.3%). The associated parent sample result was non-detect and was flagged "UJ,m".

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

Form COVER-V1.4
10210316414163
Page 1

G039801B

DCL Report Group..: **03E-0441-01**

Date Printed.....: 21-OCT-03 16:41

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#02

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211483-1	NA	NA
LCS	QC-211483-1	NA	NA
57SB4A	03E04239	08-OCT-03	09-OCT-03
57SB4A	03E04239MS	08-OCT-03	09-OCT-03
57SB4A	03E04239MSD	08-OCT-03	09-OCT-03
69SB1A	03E04240	08-OCT-03	09-OCT-03
69SB1B	03E04241	08-OCT-03	09-OCT-03
69SB1C	03E04242	08-OCT-03	09-OCT-03
69SB3A	03E04243	08-OCT-03	09-OCT-03
SBD7	03E04244	08-OCT-03	09-OCT-03
69SB3B	03E04245	08-OCT-03	09-OCT-03
69SB3C	03E04246	08-OCT-03	09-OCT-03
69SB2A	03E04247	08-OCT-03	09-OCT-03
69SB2B	03E04248	08-OCT-03	09-OCT-03
69SB2C	03E04249	08-OCT-03	09-OCT-03
57SB4B	03E04250	08-OCT-03	09-OCT-03

Gloria W. Heung — 10/21/03
Analyst: Gloria W. Heung — Date

Thomas T McKay — 10/22/03
Reviewer: Thomas T McKay — Date

Richard W. Wade — 10/22/03
Lab Supervisor: Richard W. Wade — Date

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039804Q

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB4A**
DCL Sample Name...: **03E04239**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 09:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 34.3

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 16:04	0.339	ND		U	1	1.52
Nitroglycerin	20-OCT-03 16:04	0.247	ND		U	1	0.761

UJ/M

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10210316414163

S039804R

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB1A**
DCL Sample Name...: **03E04240**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 11:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.2

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 17:09	0.306	ND		U	1	1.37
Nitroglycerin	20-OCT-03 17:09	0.223	ND		U	1	0.687

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039804S

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB1B**
DCL Sample Name...: **03E04241**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 11:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.5

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 17:31	0.281	ND		U	1	1.26
Nitroglycerin	20-OCT-03 17:31	0.204	ND		U	1	0.629

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039804T

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB1C**
DCL Sample Name...: **03E04242**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 12:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 23.7

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 17:53	0.292	ND		U	1	1.31
Nitroglycerin	20-OCT-03 17:53	0.212	ND		U	1	0.655

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039804V

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB3A**
DCL Sample Name...: **03E04243**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 14:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.1

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 18:15	0.294	ND		U	1	1.32
Nitroglycerin	20-OCT-03 18:15	0.213	ND		U	1	0.659

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD7**
DCL Sample Name...: **03E04244**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.2

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 18:37	0.266	ND		U	1	1.19
Nitroglycerin	20-OCT-03 18:37	0.193	ND		U	1	0.597

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB3B**
DCL Sample Name...: **03E04245**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 14:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 16.3

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 19:20	0.266	ND		U	1	1.19
Nitroglycerin	20-OCT-03 19:20	0.194	ND		U	1	0.597

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB3C**
DCL Sample Name...: **03E04246**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 14:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 7.9

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 19:42	0.242	ND		U	1	1.09
Nitroglycerin	20-OCT-03 19:42	0.176	ND		U	1	0.543

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039804Z

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB2A**
DCL Sample Name...: **03E04247**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 15:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.0

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 20:04	0.301	ND		U	1	1.35
Nitroglycerin	20-OCT-03 20:04	0.219	ND		U	1	0.676

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
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FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0398050

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB2B**
DCL Sample Name...: **03E04248**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 15:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.9

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 20:26	0.309	ND		U	1	1.39
Nitroglycerin	20-OCT-03 20:26	0.225	ND		U	1	0.693

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0398051

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **69SB2C**
DCL Sample Name...: **03E04249**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 15:30
Reporting Units...: mg/kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 31.1

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 20:48	0.324	ND		U	1	1.45
Nitroglycerin	20-OCT-03 20:48	0.235	ND		U	1	0.726

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S0398052

Date Printed.....: 21-OCT-03 16:41

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 09-OCT-03 00:00

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **57SB4B**
DCL Sample Name...: **03E04250**
DCL Report Group..: **03E-0441-01**

Matrix.....: SOIL
Date Sampled.....: 08-OCT-03 16:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.6

DCL Analysis Group: G039B002
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	20-OCT-03 21:09	0.304	ND		U	1	1.36
Nitroglycerin	20-OCT-03 21:09	0.221	ND		U	1	0.681

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0441-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?	x		
6.4	Are there any RPDs outside the QC limits not to exceed 60%? Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD7	69SB3A	RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND			1.32	6.6	5.28
nitroglycerin	ND	ND			0.659	3.295	2.636

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	14			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA CHEM LABORATORIES
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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S039B005

Client Name.....: URS Group, Inc.
Release Number.....: URS#02

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039B002
Date Prepared.....: 11-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04239MS**
Date Printed.....: 21-OCT-03 16:41

DCL Analysis Group: G039B002
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	20-OCT-03 16:26	ND	13.4	20.0	67.1	65.0/125.	
Nitroglycerin	20-OCT-03 16:26	ND	12.1	20.0	60.7	65.0/125.	*

S039B006

DCL Sample Name...: **03E04239MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	20-OCT-03 16:47	13.1	65.3	13.2	0.355	2.7	0.00/35.0	
Nitroglycerin	20-OCT-03 16:47	12.5	62.3	12.3	0.331	2.7	0.00/35.0	

within QAPP limits of 40-150%

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Date of Extraction:	OCT 12, 2003	**DataChem** Laboratories Extraction Notebook				Book #	Ext 246	Page#				
Account #(s):	8001											
DCL Set ID(s):	03E-0441-01					Matrix:	SOIL					
Group/Lot ID:	G039B002					Method:	8332					

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211483-1	BL-211483-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211483-1	QC-211483-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04239	57SB4A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04239MS	57SB4A	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
5	03E04239MSD	57SB4A	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
6	03E04240	69SB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04241	69SB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04242	69SB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04243	69SB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04244	SBD7	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04245	69SB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04246	69SB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04247	69SB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04248	69SB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04249	69SB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04250	57SB4B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
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39										
40										

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By:	
Matrix Spike:	239 ws 2	1/30/04 By:	
Matrix Spike:	----------	---------- By:	
Extractionist:		10/12/03	
Checker:		10/12/03	Sonicators tunned by:

*=Entry Error

From Page No. — Insert of preparatory report for sets: 03U-0098-02 & 03E-0441-02
IB 10/10/03

%Moistures & Solids

Start Time: 14:40 09-Oct-03
Finish Time: 8:37 10-Oct-03

Set ID #	Dish #	Sample #	Dish (g)	Dish + Soil (g)	Soil weight(g)	Dish + Dry Soil (g)	Dry Soil (g)	% Solids	% Moistures
03U-0098-02	1	03U00891	1.24	5.50	4.26	5.09	3.85	90.4%	9.6%
03U-0098-02	2	03U00891MD	1.25	5.24	3.99	4.85	3.60	90.2%	9.8%
03U-0098-02	3	03U00892	1.25	5.01	3.76	4.77	3.52	93.6%	6.4%
03U-0098-02	4	03U00893	1.25	6.12	4.87	5.81	4.56	93.6%	6.4%
03U-0098-02	5	03U00894	1.25	5.13	3.88	4.92	3.67	94.6%	5.4%
03U-0098-02	6	03U00895	1.23	5.51	4.28	5.08	3.85	90.0%	10.0%
03U-0098-02	7	03U00896	1.24	5.28	4.04	4.99	3.75	92.8%	7.2%
03E-0441-02	8	03E04239	1.23	5.23	4.00	3.86	2.63	65.8%	34.3%
03E-0441-02	9	03E04239MD	1.24	5.44	4.20	4.00	2.76	65.7%	34.3%
03E-0441-02	10	03E04240	1.24	5.43	4.19	4.29	3.05	72.8%	27.2%
03E-0441-02	11	03E04241	1.24	5.19	3.95	4.38	3.14	79.5%	20.5%
03E-0441-02	12	03E04242	1.24	5.20	3.96	4.26	3.02	76.3%	23.7%
03E-0441-02	13	03E04243	1.24	5.14	3.90	4.20	2.96	75.9%	24.1%
03E-0441-02	14	03E04244	1.24	5.94	4.70	5.18	3.94	83.8%	16.2%
03E-0441-02	15	03E04245	1.23	5.23	4.00	4.58	3.35	83.8%	16.3%
03E-0441-02	16	03E04246	1.23	5.16	3.93	4.85	3.62	92.1%	7.9%
03E-0441-02	17	03E04247	1.24	5.62	4.38	4.48	3.24	74.0%	26.0%
03E-0441-02	18	03E04248	1.23	7.14	5.91	5.49	4.26	72.1%	27.9%
03E-0441-02	19	03E04249	1.25	6.17	4.92	4.64	3.39	68.9%	31.1%
03E-0441-02	20	03E04250	1.25	5.61	4.36	4.45	3.20	73.4%	26.6%

IB 10/10/03

IB 10/10/03

To Page No. X

Witnessed & Understood by me,	Date	Invented by	Date
Jon Yonke	10/10/03	NA	10/10/03
		Recorded by Norman Brooke	

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

10100309171481X

Date _____
Laboratory Group Name 03E-0441-02
Account No. 08001 URSD2

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site RFAAP/09604-317 Date of Collection October 08, 2003

Date Samples Received at Laboratory October 09, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 10, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
57SB4A	03E04239	SOIL	34.3							
57SB4A	03E04239MD	SOIL	34.3							
69SB1A	03E04240	SOIL	27.2							
69SB1B	03E04241	SOIL	20.5							
69SB1C	03E04242	SOIL	23.7							
69SB3A	03E04243	SOIL	24.1							
SBD7	03E04244	SOIL	16.2							
69SB3B	03E04245	SOIL	16.3							
69SB3C	03E04246	SOIL	7.9							
69SB2A	03E04247	SOIL	26.0							
69SB2B	03E04248	SOIL	27.9							
69SB2C	03E04249	SOIL	31.1							
57SB4B	03E04250	SOIL	26.6							

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

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DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#02
DCL Set ID's:	03E-0441-01		

General Set Information: This lot contained twelve solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04239. All percent recoveries and RPDs were within method limits with one exception. The percent recovery for Nitroglycerin in 03E04239MS was outside of method limits, this could be the result of matrix effects.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 9/24/03

Gloria W. Heung Date

SDG# URS#02 03E-0441 SDG# URS#02

Radford Army Ammunition Plant
Chain Of Custody Record

No 1151

Project Number	Project Name
02604317	RFAAP

Project Contact (Name and Phone Number): Dorrai Renne (804) 765-9002

Samplers: Brett Eisler / John Spagley

LAB: Datachem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) RDX/HMX	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
575B4A	10/8/03 915	5		X	5	F	/	1						X									03E04239
695B1A	10/8/03 1130	5		X	5	F	/	1						X									40
695B1B	10/8/03 1145	5		X	5	F	/	1						X									41
695B1C	10/8/03 1200	5		X	5	F	/	1						X									42
695B3A	10/8/03 1415	5		X	5	F	/	1						X									43
5BD7	10/8/03 —	5		X	5	F	/	1						X									44
695B3B	10/8/03 1430	5		X	5	F	/	1						X									45
695B3C	10/8/03 1445	5		X	5	F	/	1						X									46
695B2A	10/8/03 1500	5		X	5	F	/	1						X									47
695B2B	10/8/03 1515	5		X	5	F	/	1						X									48
695B2C	10/8/03 1530	5		X	5	F	/	1						X									49
575B4B	10/8/03 1600	5		X	5	F	/	1						X									50

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Eisler	10/8/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/9/03 0830	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

03E-0443
SDG# URS#02

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1143

Project Number	Project Name
09604 317	RFAAP

Project Contact (Name and Phone Number): Darren Rowan (804) 965 7000

Samplers: Brett Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) RETAINING	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135B10C	10/9/03 1350	5		X	S	F	/	1						X				03E0425		53			
135B9A	10/9/03 1400	5		X	S	F	/	1						X						54			
SBD9	10/9/03 —	5		X	S	F	/	1						X						55			
135B9B	10/9/03 1415	5		X	S	F	/	1						X						56			
135B9C	10/9/03 1430	5		X	S	F	/	1						X						57			
135B8A	10/9/03 1515	5		X	S	F	/	1						X						58			
135B8B	10/9/03 1530	5		X	S	F	/	1						X						59			
~~135B8C~~	~~10/9/03 1545~~	~~5~~		~~X~~	~~S~~	~~F~~	~~/~~	~~1~~						~~X~~									NO C for 135B8
															BF								

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[illegible] 10/9/03	1800	FedEx			
Relinquished by: FedEx 10/10/03	0900	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

2

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0443-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: The relative percent difference between the two analytical column concentrations for nitroglycerin was greater than the control limit (i.e., 40%) for samples 13SB10C at 58.4% and 13SB9B at 52.0%. The higher of the two concentrations was reported from the primary calibrated column. These results were flagged "J,g".

Correctable Anomalies: None.

Comments: Positive field sample results from the primary column were analyzed to confirm on an alternate column. Mid-point standards and standards at levels approximate to the method detection limit were analyzed concurrently to qualitatively identify positive detections by retention time responses only.

All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

G039900Z

DCL Report Group..: **03E-0443-01**

Date Printed.....: 22-OCT-03 17:39

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#02

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211507-1	NA	NA
LCS	QC-211507-1	NA	NA
13SB10C	03E04253	09-OCT-03	10-OCT-03
13SB9A	03E04254	09-OCT-03	10-OCT-03
SBD9	03E04255	09-OCT-03	10-OCT-03
13SB9B	03E04256	09-OCT-03	10-OCT-03
13SB9C	03E04257	09-OCT-03	10-OCT-03
13SB8A	03E04258	09-OCT-03	10-OCT-03
13SB8B	03E04259	09-OCT-03	10-OCT-03

Analyst: Gloria W. Heung — Date 10/23/03

Reviewer: Thomas T McKay — Date 10/23/03

Lab Supervisor: Richard W. Wade — Date 10/23/03

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039902Q

Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB10C**
DCL Sample Name...: **03E04253**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 13:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.9

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 19:58	0.309	ND		U	1	1.39
Nitroglycerin	21-OCT-03 19:58	0.225	2.46			1	0.693

JG

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039902R

Date Printed.....: 23-OCT-03 15:57

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB9A**
DCL Sample Name...: **03E04254**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 14:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.7

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 20:20	0.304	ND		U	1	1.36
Nitroglycerin	21-OCT-03 20:20	0.221	ND		U	1	0.682

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
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FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039902S

Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD9**
DCL Sample Name...: **03E04255**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 31.8

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 20:42	0.327	ND		U	1	1.47
Nitroglycerin	21-OCT-03 20:42	0.238	0.793			1	0.733

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039902T

Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB9B**
DCL Sample Name...: **03E04256**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 14:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.2

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 21:03	0.294	ND		U	1	1.32
Nitroglycerin	21-OCT-03 21:03	0.214	0.954			1	0.660

JG

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

Form RLIMS63A-V1.4
10220317394875

SAMPLE ANALYSIS DATA SHEET

S039902V

Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB9C**
DCL Sample Name...: **03E04257**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 14:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.8

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 21:25	0.297	ND		U	1	1.33
Nitroglycerin	21-OCT-03 21:25	0.215	ND		U	1	0.665

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SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB8A**
DCL Sample Name...: **03E04258**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 15:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 26.7

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 21:47	0.304	ND		U	1	1.36
Nitroglycerin	21-OCT-03 21:47	0.221	ND		U	1	0.682

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 22-OCT-03 17:39

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#02

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB8B**
DCL Sample Name...: **03E04259**
DCL Report Group..: **03E-0443-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 15:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 22.2

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 22:32	0.287	ND		U	1	1.29
Nitroglycerin	21-OCT-03 22:32	0.208	ND		U	1	0.643

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0443-01
Test Name: Explosives
Method No.: 8332-HPLC

Review Document:

_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

Second column was used to not confirm primary column low level hits. The second column does not have an initial calibration or bracketing continuing calibrations. The one points provided are for retention time purposes only.

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD9	13SB9A		RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND				1.58	7.9	6.32
nitroglycerin	0.793	0.682	U	15%	0.111	0.79	3.95	3.16

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.		x	
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	7			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S039903D

Client Name.....: URS Group, Inc.
Release Number.....: URS#02

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04262MS**
Date Printed.....: 22-OCT-03 17:39

DCL Analysis Group: G039C001
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	22-OCT-03 00:01	ND	16.7	20.0	83.4	65.0/125.	
Nitroglycerin	22-OCT-03 00:01	ND	19.8	20.0	99.0	65.0/125.	

S039903F

DCL Sample Name...: **03E04262MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	22-OCT-03 00:24	17.5	87.6	17.1	0.839	4.9	0.00/35.0	
Nitroglycerin	22-OCT-03 00:24	18.6	92.8	19.2	1.24	6.5	0.00/35.0	

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Sample No.		Primary Column Result (mg/Kg)	Secondary Column Result (mg/Kg)	RPD
03E04253	13SB10C	1.77	3.23	58.4%
03E04255	SB09	0.541	0.716	27.8%
03E04256	13SB9B	0.724	0.425	52.6%

Results were not moisture corrected.

Gloria W. Heung 10/23/03

Gloria W. Heung

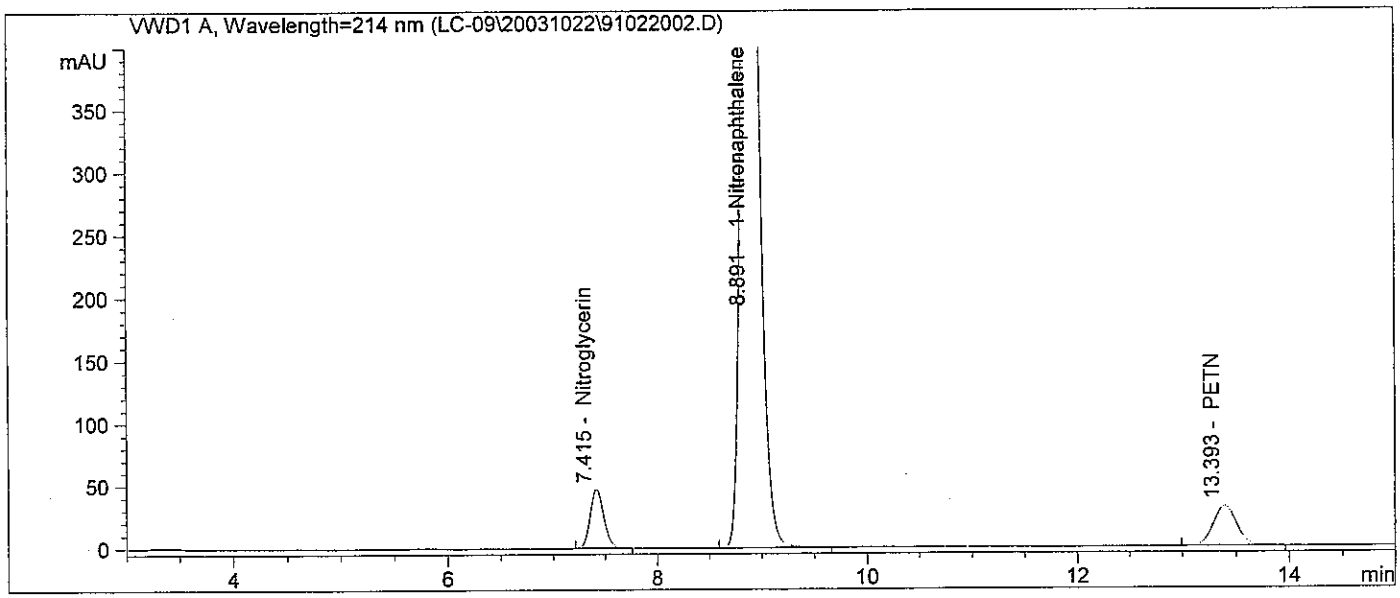
Thomas T. McKay 10/23/07

Thomas T. McKay

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022002.D
Sample Name:CCV1 Info:239WS VAYO

Injection Date :Wed, 22 Oct. 2003 01:14:05 PM
Acq. Method :8330CNEW.M
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Wed, 22 Oct. 2003, 02:31:04 pm
Confirm for 8332 on LC-9, 214nm.

Seq Line :2
Vial No. :2
Inj. No. :1



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L]	Area
MM	7.415	7.415	Nitroglycerin	19.81958	431.079
MM	8.891	8.891	1-Nitronaphthalene	20.77540	9.139e3
PV	13.393	13.393	PETN	19.51716	494.135
		Totals:		60.11214	

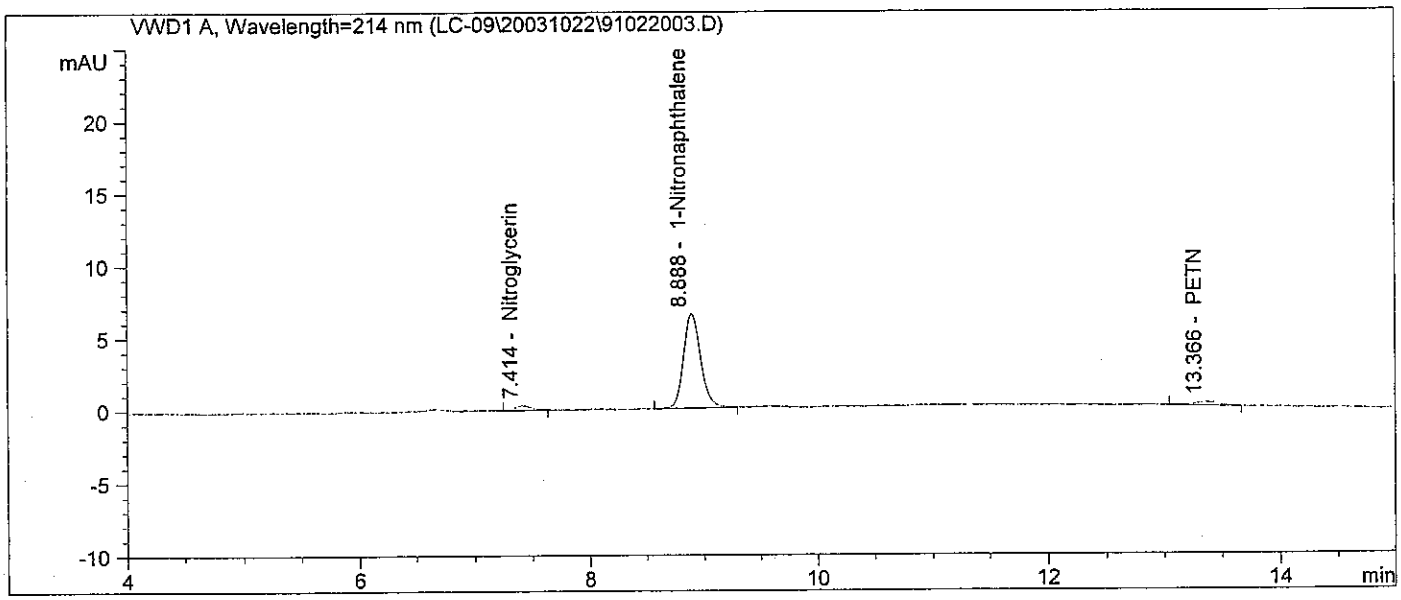
Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022003.D
Sample Name:CS1 Info:239WS VAYO

Seq Line :3
Vial No. :3
Inj. No. :1

Injection Date :Wed, 22 Oct. 2003 01:29:45 PM
Acq. Method :8330CNEW.M
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:36:26 am
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	RT [min]	Compound	Amount [ug/ml]	Area
MM	7.414	Nitroglycerin	0.13104	3.531
MM	8.888	1-Nitronaphthalene	0.11352	68.513
MM	13.366	PETN	0.10794	4.267
Totals:			0.35249	

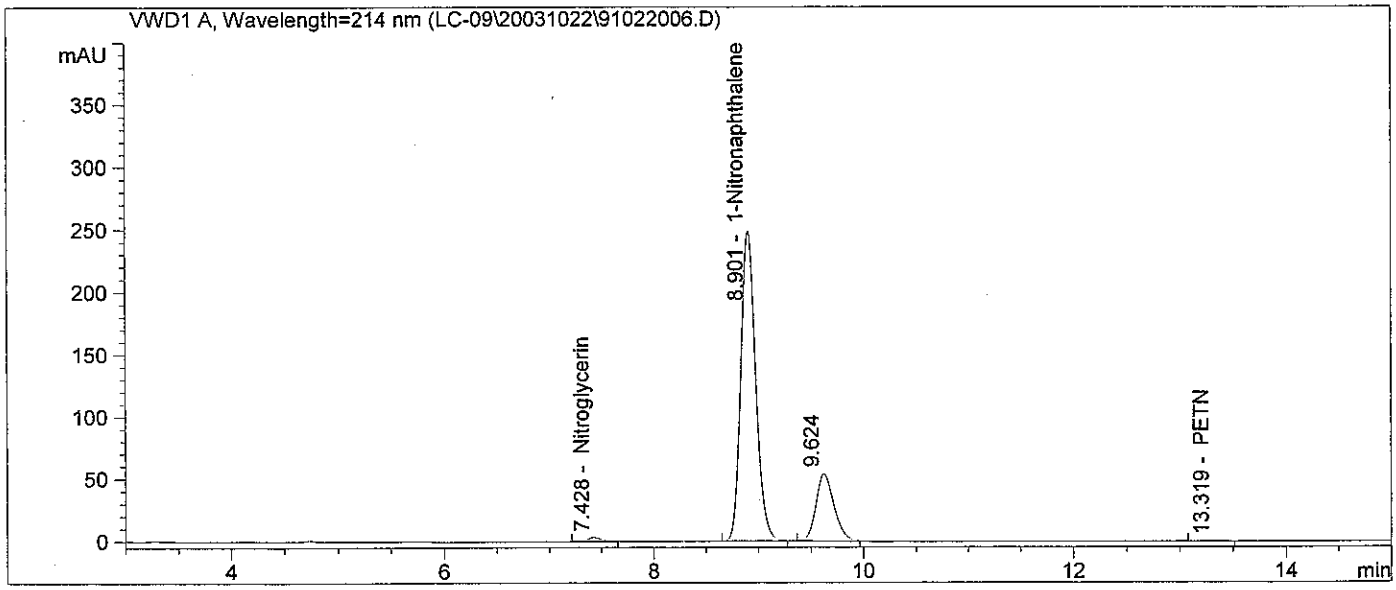
Analyst:_____

Comments:

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022006.D
Sample Name:03E04253 Info: VAYO

Seq Line :6
Injection Date :Wed, 22 Oct. 2003 02:16:46 PM Vial No. :6
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:38:17 am(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

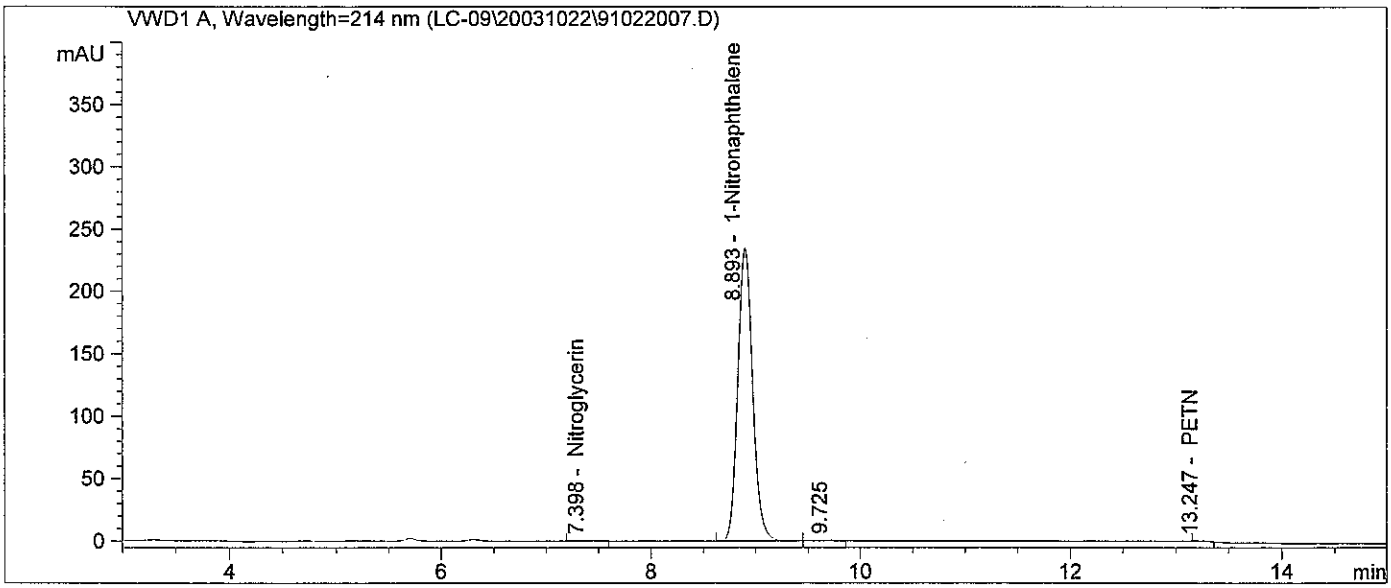
Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L] mg/kg ext 10/23/03	Area
MM	7.415	7.428	Nitroglycerin	3.22913	35.747
MM	8.891	8.901	1-Nitronaphthalene	11.10198	2.455e3
MM	0.000	9.624		0.00000	658.244
MM	13.393	13.319	PETN	0.25988	4.823
		Totals:		14.59098	

Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022007.D
Sample Name:03E04254 Info: VAYO

Seq Line :7
Injection Date :Wed, 22 Oct. 2003 02:32:26 PM Vial No. :7
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:38:17 am(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L] mg/kg dat 10/23/03	Area
MM	7.415	7.398	Nitroglycerin	0.33090	4.278
MF	8.891	8.893	1-Nitronaphthalene	10.48940	2.321e3
FM	0.000	9.725		0.00000	8.575
MM	13.393	13.247	PETN	0.25674	4.783

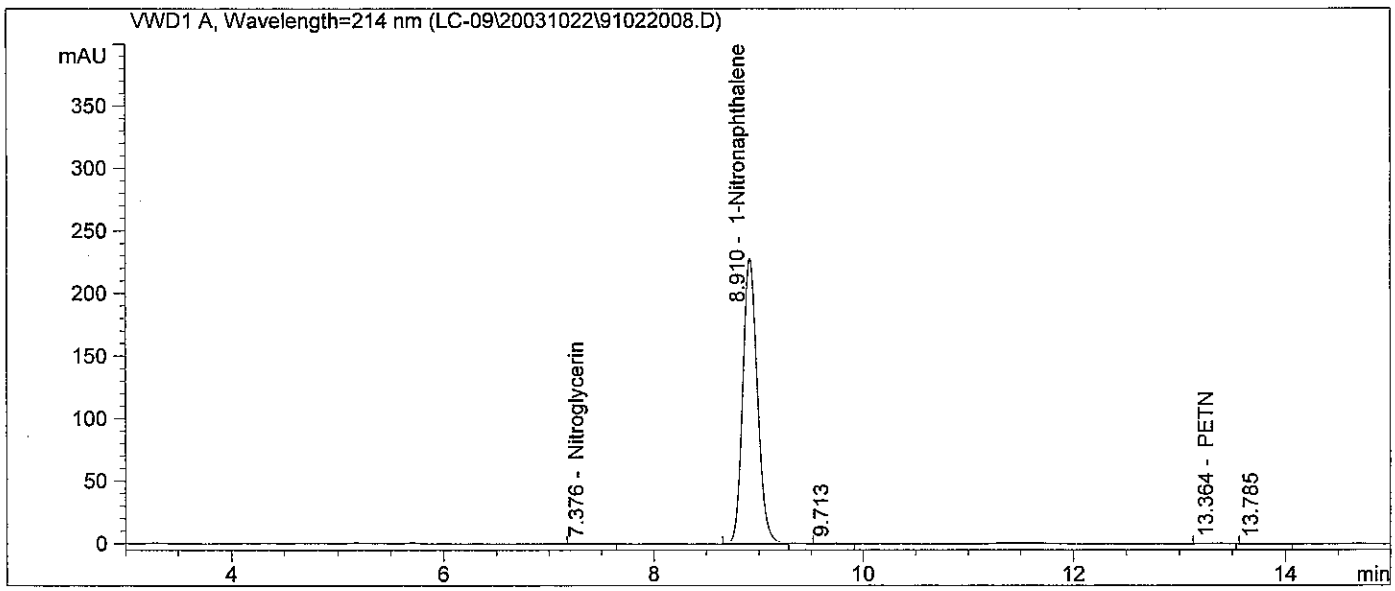
Totals: 11.07703

Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022008.D
Sample Name:03E04255 Info: VAYO

Seq Line :8
Injection Date :Wed, 22 Oct. 2003 02:48:07 PM Vial No. :8
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:38:17 am(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

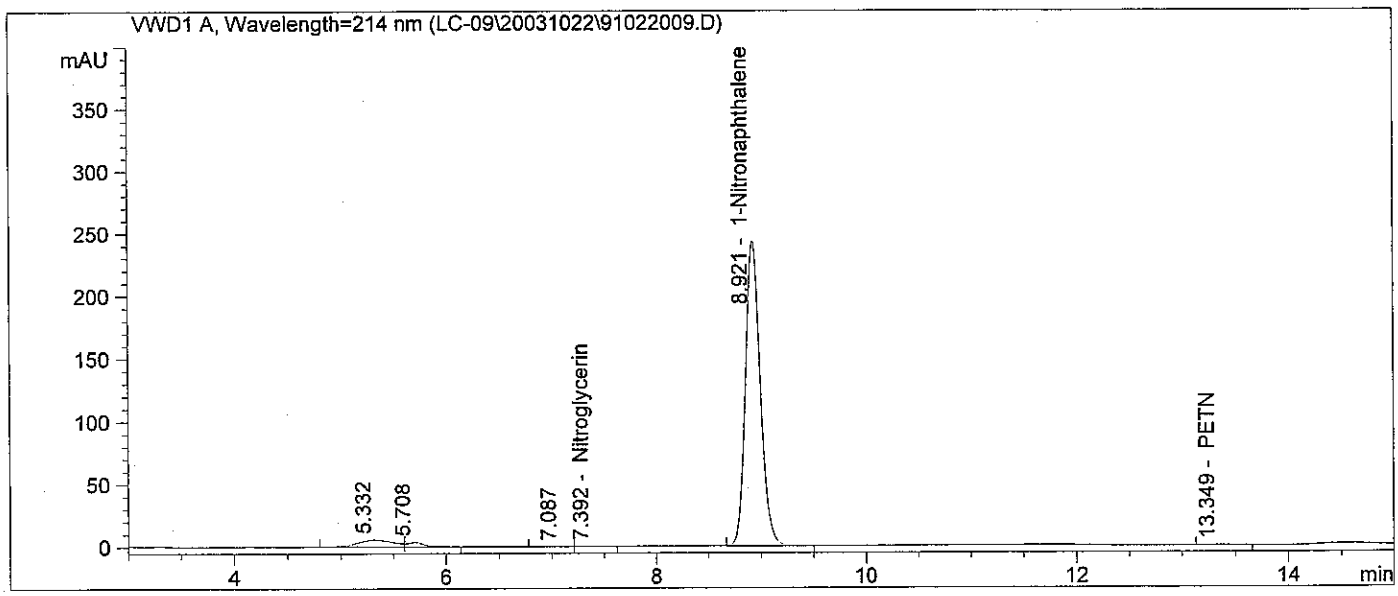
Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L]	Area
MM	7.415	7.376	Nitroglycerin	0.71604	8.460
MF	8.891	8.910	1-Nitronaphthalene	10.17398	2.252e3
FM	0.000	9.713		0.00000	10.004
MM	13.393	13.364	PETN	0.68784	10.223
VV	0.000	13.785		0.00000	7.568
		Totals:		11.57786	

Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022009.D
Sample Name:03E04256 Info: VAYO

Seq Line :9
Injection Date :Wed, 22 Oct. 2003 03:03:48 PM Vial No. :9
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:38:17 am(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

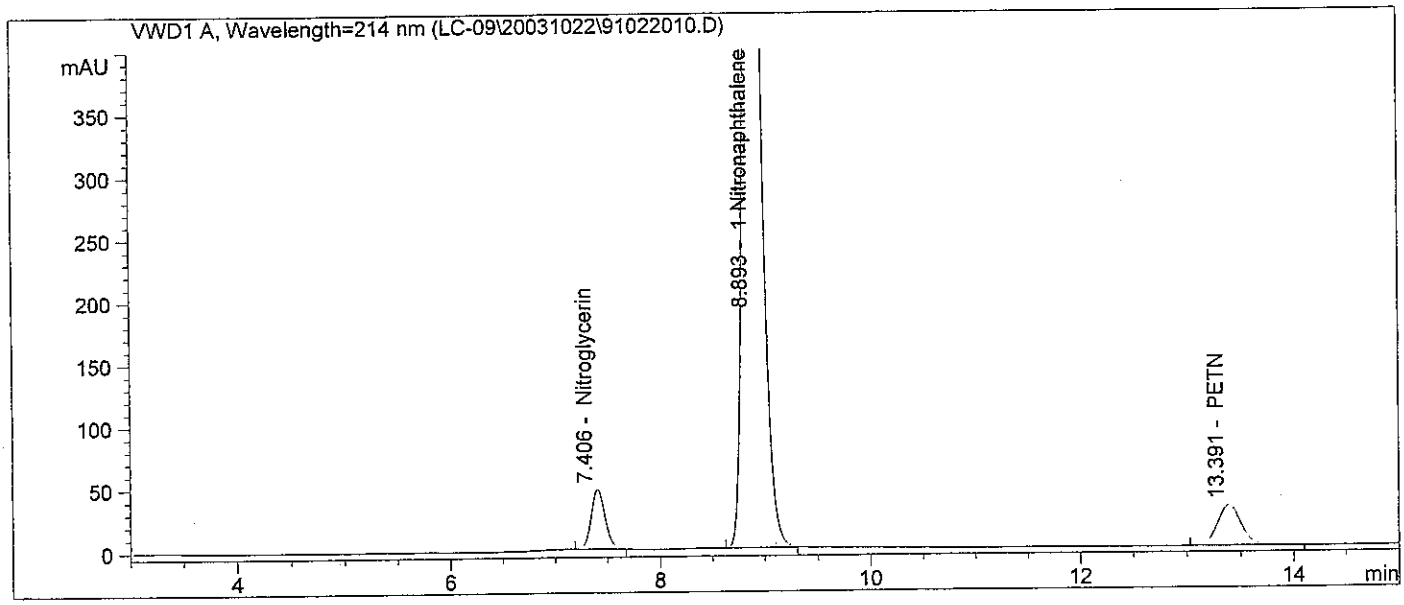
Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L]	Area
MF	0.000	5.332		0.00000	137.720
FM	0.000	5.708		0.00000	42.540
MF	0.000	7.087		0.00000	3.963
FM	7.415	7.392	Nitroglycerin	0.42505	5.301
MF	8.891	8.921	1-Nitronaphthalene	10.85451	2.401e3
MM	13.393	13.349	PETN	0.31034	5.459
		Totals:		11.58991	

Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022010.D
Sample Name:CCV2 Info:239WS VAYO

Seq Line :10
Injection Date :Wed, 22 Oct. 2003 03:19:28 PM Vial No. :2
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:38:17 am(modified after loading)
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

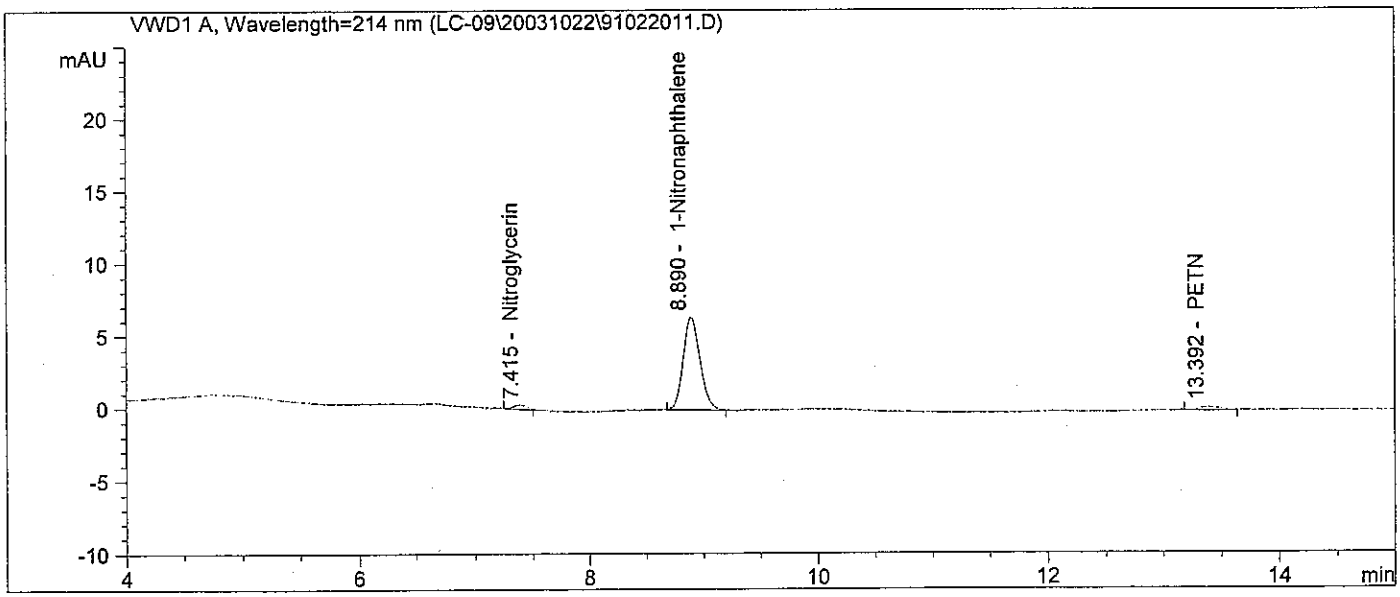
Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/L]	Area
MM	7.415	7.406	Nitroglycerin	20.34765	442.547
MM	8.891	8.893	1-Nitronaphthalene	20.65281	9.085e3
BP	13.393	13.391	PETN	19.56939	495.453
		Totals:		60.56985	

Analyst:_____
SurrTarget=12.98, Range=8.44-16.22ug/L
MDL/CRDLs:
NG=0.198/0.970ug/L
PETN=0.259/0.970ug/L

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-09\20031022\91022011.D
Sample Name:CS2 Info:239WS VAYO

Seq Line :11
Injection Date :Wed, 22 Oct. 2003 03:35:08 PM Vial No. :3
Acq. Method :8330CNEW.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\8332CPR9.M
Last Changed->Thu, 23 Oct. 2003, 11:36:26 am
Confirm for 8332 on LC-9, 214nm.



Sorted By Signal
Calib. Data Modified :Wed, 22 Oct. 2003, 02:24:25 pm
Multiplier :1.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	RT [min]	Compound	Amount [ug/ml]	Area
MM	7.415	Nitroglycerin	0.09726	2.797
MM	8.890	1-Nitronaphthalene	0.10841	66.269
MM	13.392	PETN	0.08370	3.656
Totals:			0.28937	

Analyst:_____

Comments:

*** End of Report ***

Method 8332

RT Windows For Analytical Sequence From 72 Hr RT Study

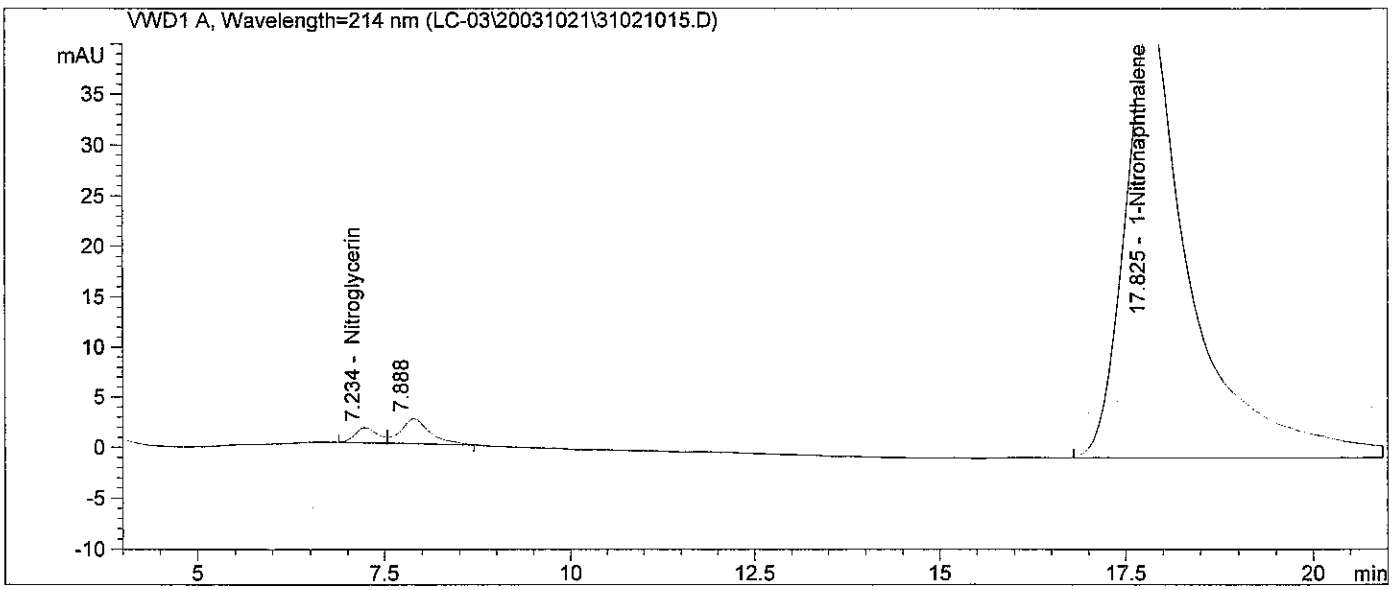
Sequence: **1021LC3** Sample Info: **239WS106**

Analyte	RT Low	RT High	CCV RT	0 Hr RT	Mid Hr RT	72 Hr RT	3xStDv
Datafile:			**31021012.D**	30525-06	30527-01	03528-01	
Nitroglycerin	**7.110**	**7.318**	7.214	7.267	7.314	7.246	0.104
PETN	**13.737**	**14.249**	13.993	14.009	14.179	14.081	0.256
1-Nitronaphthalene	**17.413**	**17.959**	17.686	17.595	17.776	17.702	0.273

Default Minimum Window=+/- 0.030 minutes

Data file :C:\HPCHEM\1\DATA\LC-03\20031021\31021015.D
Sample Name:03E04253 Info: VAYO

Seq Line :15
Injection Date :Tue, 21 Oct. 2003 07:58:27 PM Vial No. :14
Acq. Method :N0527LC3.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\N0527PR3.M
Last Changed->Wed, 22 Oct. 2003, 11:38:56 am(modified after loading)
SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By Signal
Calib. Data Modified :Thu, 16 Oct. 2003, 04:50:02 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/g]	Area
MF	7.041	7.234	Nitroglycerin	1.77416	33.900
FM	0.000	7.888		0.00000	68.028
	13.567	0.000	PETN	0.00000	0.000
BBA	17.364	17.825	1-Nitronaphthalene	10.79375	2.695e3
		Totals:		12.56791	

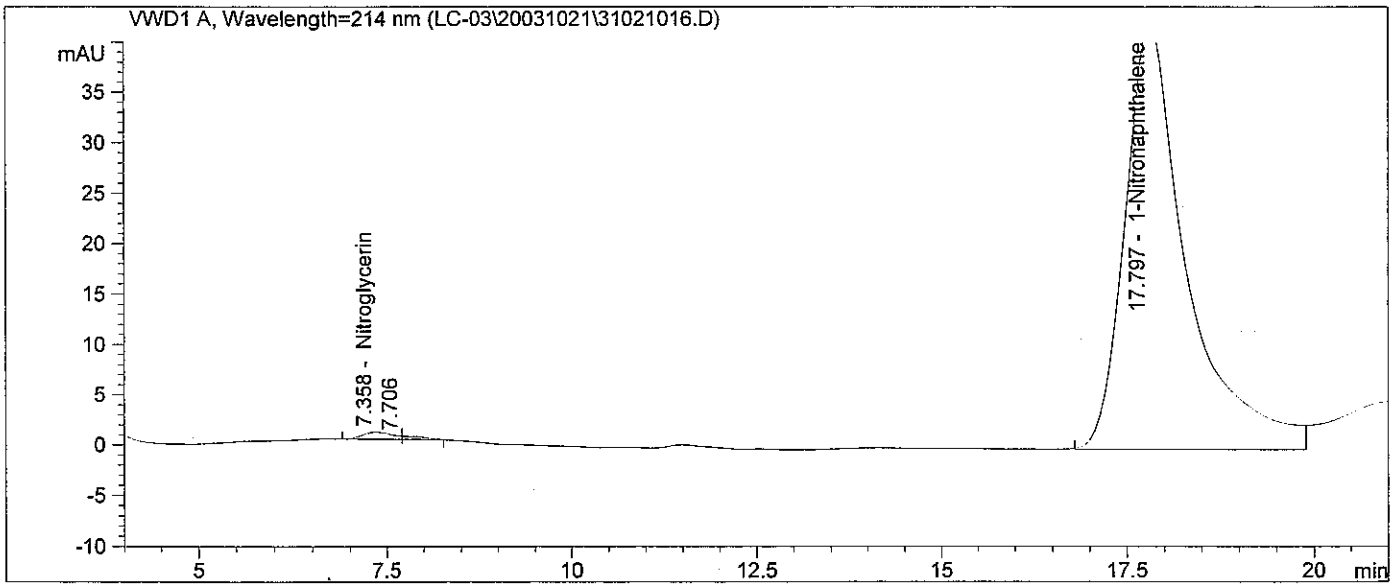
RTN 7.174 - 7.318 ✓

Analyst: _____
Surr Target=10.ug/g, Range=6.5-12.5ug/g
MDL/CRDLs:
NG:0.180/0.300ug/g
PETN:0.250/0.300ug/g

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-03\20031021\31021016.D
Sample Name:03E04254 Info: VAYO

Seq Line :16
Injection Date :Tue, 21 Oct. 2003 08:20:17 PM Vial No. :17
Acq. Method :N0527LC3.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\N0527PR3.M
Last Changed->Wed, 22 Oct. 2003, 11:38:56 am(modified after loading)
SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By Signal
Calib. Data Modified :Thu, 16 Oct. 2003, 04:50:02 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/g]	Area
MF	7.041	7.358	Nitroglycerin	~~1.10643~~ EXTW C	21.142
FM	0.000	7.706		0.00000	6.491
	13.567	0.000	PETN	0.00000	0.000
BV	17.364	17.797	1-Nitronaphthalene	9.70293	2.423e3

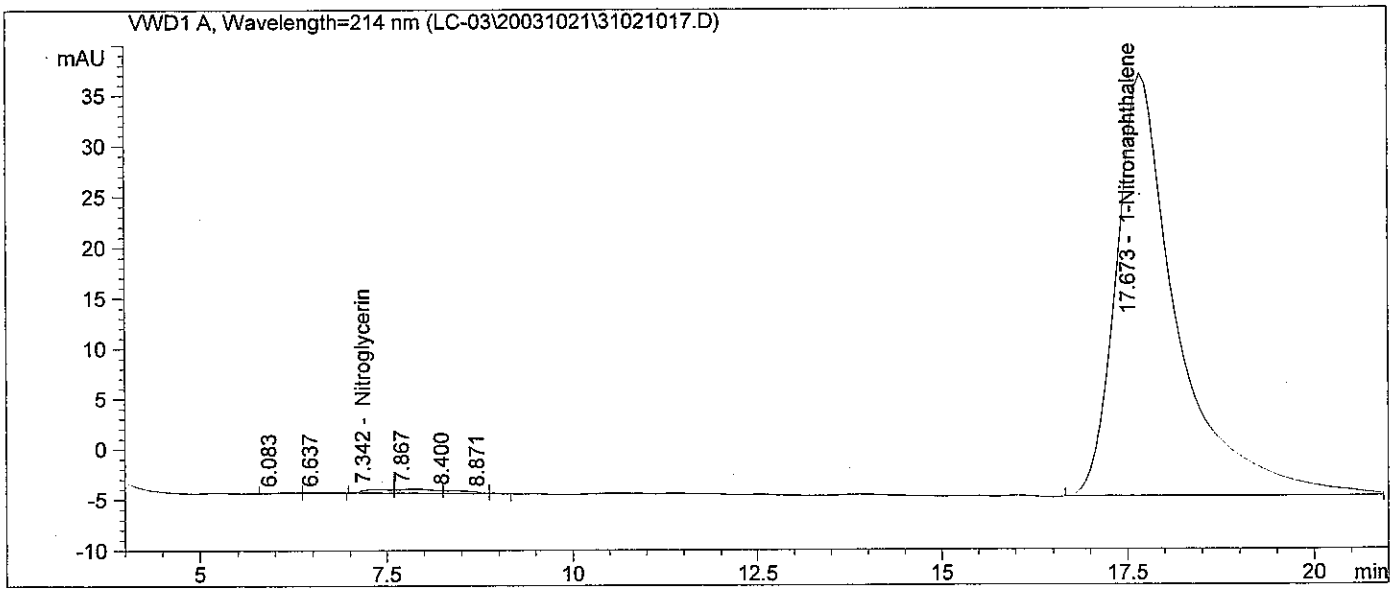
RTW 7.174 - 7.318 OUT

Totals: 10.80936
Analyst: GH
Surr Target=10.ug/g, Range=6.5-12.5ug/g
MDL/CRDLs:
NG:0.180/0.300ug/g
PETN:0.250/0.300ug/g

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-03\20031021\31021017.D
Sample Name:03E04255 Info: VAYO

Seq Line :17
Injection Date :Tue, 21 Oct. 2003 08:42:08 PM Vial No. :18
Acq. Method :N0527LC3.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\N0527PR3.M
Last Changed->Wed, 22 Oct. 2003, 11:38:56 am(modified after loading)
SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By Signal
Calib. Data Modified :Thu, 16 Oct. 2003, 04:50:02 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/g]	Area
MF	0.000	6.083		0.00000	2.252
FM	0.000	6.637		0.00000	2.237
MF	7.041	7.342	Nitroglycerin	0.54070	10.332
MF	0.000	7.867		0.00000	14.172
MF	0.000	8.400		0.00000	7.875
FM	0.000	8.871		0.00000	0.874
	13.567	0.000	PETN	0.00000	0.000
PBA	17.364	17.673	1-Nitronaphthalene	9.47405	2.366e3
		Totals:		10.01475	

RTW

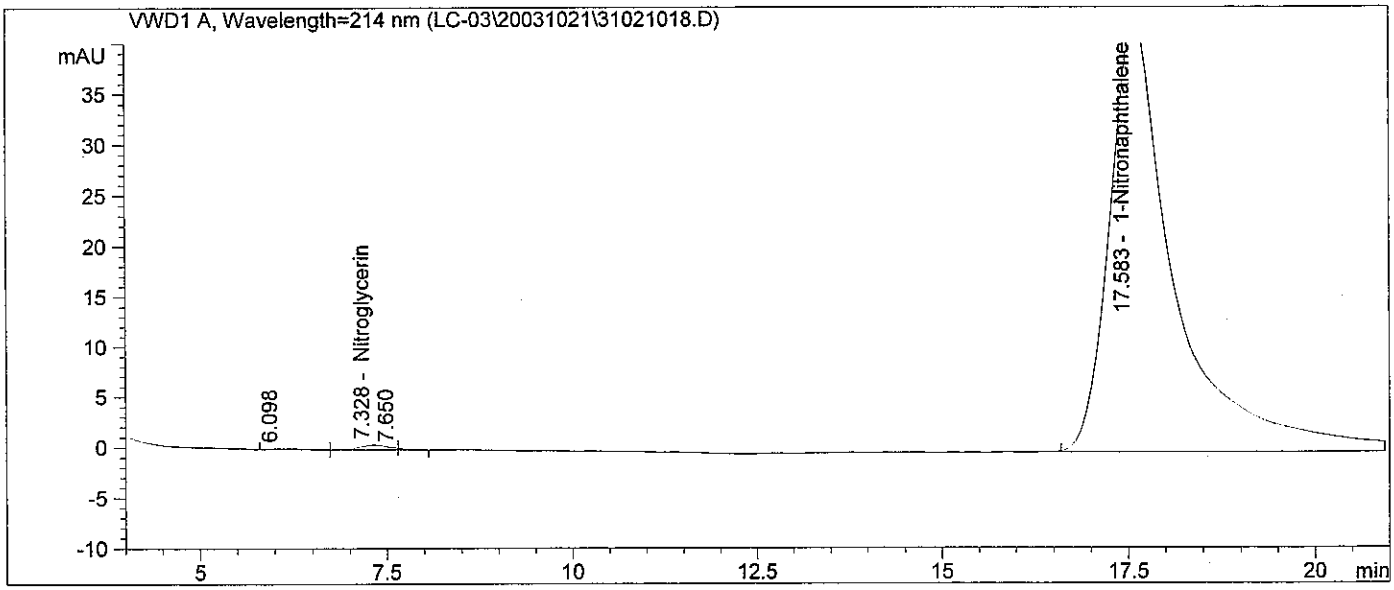
7.174 - 7.318 out

Analyst: ____
Surr Target=10.ug/g, Range=6.5-12.5ug/g
MDL/CRDLs:
NG:0.180/0.300ug/g
PETN:0.250/0.300ug/g

*** End of Report ***

Data file :C:\HPCHEM\1\DATA\LC-03\20031021\31021018.D
Sample Name:03E04256 Info: VAYO

Seq Line :18
Injection Date :Tue, 21 Oct. 2003 09:03:59 PM Vial No. :19
Acq. Method :N0527LC3.M Inj. No. :1
Acq Operator :HEUNG
Analysis Method :C:\HPCHEM\1\METHODS\N0527PR3.M
Last Changed->Wed, 22 Oct. 2003, 11:38:56 am(modified after loading)
SOIL/WATER BY SW-846 8332 ON LC-3. Init Cal ID:092100LC3



Sorted By Signal
Calib. Data Modified :Thu, 16 Oct. 2003, 04:50:02 pm
Multiplier :2.000000
Dilution :1.000000
Uncalibrated Peaks :not reported
Signal Description :VWD1 A, Wavelength=214 nm

Type	Exp. RT [min]	RT [min]	Compound	Amount [ug/g]	Area
BP	0.000	6.098		0.00000	4.432
MF	7.041	7.328	Nitroglycerin	0.72353	13.825
FM	0.000	7.650		0.00000	1.547
	13.567	0.000	PETN	0.00000	0.000
BBA	17.364	17.583	1-Nitronaphthalene	10.43881	2.607e3
		Totals:		11.16234	

RTW
7.174-7.38 out

Analyst: _____
Surr Target=10.ug/g, Range=6.5-12.5ug/g
MDL/CRDLs:
NG:0.180/0.300ug/g
PETN:0.250/0.300ug/g

*** End of Report ***

Project No. X

TITLE: Data Chem Laboratories % Moisture Book No. 4146

From Page No. X

Insert of preparatory report for sets: 03E-0443-02 & 0444-02

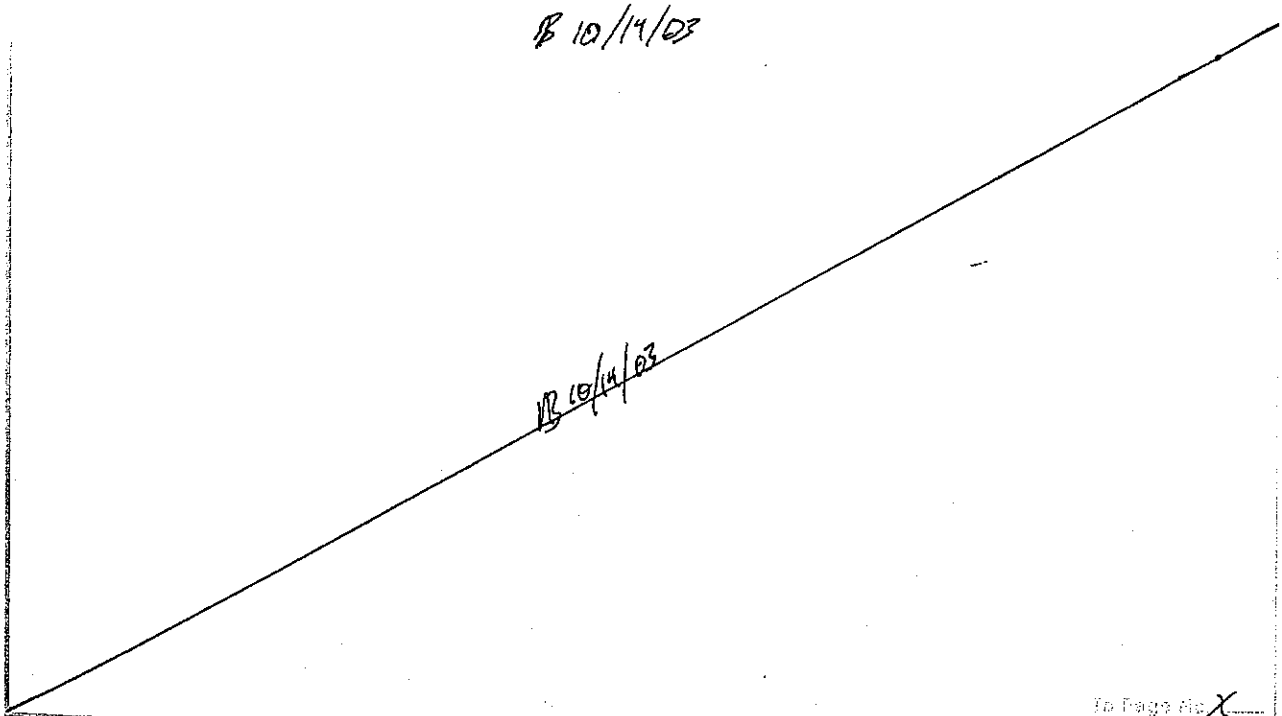
JB 10/14/03

%Moistures & Solids

Start Time: 16:31 13-Oct-03
Finish Time: 9:24 14-Oct-03

Set ID #	Dish #	Sample #	Dish (g)	Dish + Soil (g)	Soil weight(g)	Dish + Dry Soil (g)	Dry Soil (g)	% Solids	% Moistures
03E-0444-02	1	03E04260	1.23	5.22	3.99	4.54	3.31	83.0%	17.0%
03E-0444-02	2	03E04261	1.24	5.23	3.99	4.47	3.23	81.0%	19.0%
03E-0444-02	3	03E04262	1.25	5.74	4.49	4.67	3.42	76.2%	23.8%
03E-0444-02	4	03E04262MD	1.25	5.38	4.13	4.27	3.02	73.1%	26.9%
03E-0444-02	5	03E04263	1.23	8.66	7.43	6.81	5.58	75.1%	24.9%
03E-0444-02	6	03E04264	1.23	5.37	4.14	3.85	2.62	63.3%	36.7%
03E-0444-02	7	03E04265	1.23	5.13	3.90	3.96	2.73	70.0%	30.0%
03E-0444-02	8	03E04266	1.25	5.52	4.27	3.86	2.61	61.1%	38.9%
03E-0444-02	9	03E04267	1.23	5.84	4.61	4.58	3.35	72.7%	27.3%
03E-0444-02	10	03E04268	1.25	5.03	3.78	4.14	2.89	76.5%	23.5%
03E-0444-02	11	03E04269	1.25	5.88	4.63	4.58	3.33	71.9%	28.1%
03E-0444-02	12	03E04270	1.24	5.20	3.96	3.56	2.32	58.6%	41.4%
03E-0444-02	13	03E04271	1.23	5.68	4.45	4.57	3.34	75.1%	24.9%
03E-0443-02	15	03E04253	1.24	6.62	5.38	5.12	3.88	72.1%	27.9%
03E-0443-02	16	03E04253MD	1.23	5.13	3.90	3.97	2.74	70.3%	29.7%
03E-0443-02	17	03E04254	1.24	6.03	4.79	4.75	3.51	73.3%	26.7%
03E-0443-02	18	03E04255	1.24	5.61	4.37	4.22	2.98	68.2%	31.8%
03E-0443-02	19	03E04256	1.24	6.15	4.91	4.96	3.72	75.8%	24.2%
03E-0443-02	20	03E04257	1.24	5.80	4.56	4.67	3.43	75.2%	24.8%
03E-0443-02	21	03E04258	1.23	5.31	4.08	4.22	2.99	73.3%	26.7%
03E-0443-02	22	03E04259	1.24	5.16	3.92	4.29	3.05	77.8%	22.2%

JB 10/14/03



JB 10/14/03

To Page No. X

Witnessed & Understood by me,	Date	Invented by	Date
Jose G. Rocha	10/14/03	N/A	10/14/03
		Recorded by Norman Breaux	

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1
10140309553246X

Date _____
Laboratory Group Name 03E-0443-02
Account No. 08001 URS02

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site RFAAP/09604-317 Date of Collection October 09, 2003

Date Samples Received at Laboratory October 10, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 14, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %								
13SB10C	03E04253	SOIL	27.9								
13SB10C	03E04253MD	SOIL	29.7								
13SB9A	03E04254	SOIL	26.7								
SBD9	03E04255	SOIL	31.8								
13SB9B	03E04256	SOIL	24.2								
13SB9C	03E04257	SOIL	24.8								
13SB8A	03E04258	SOIL	26.7								
13SB8B	03E04259	SOIL	22.2								
Limit of Detection											

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Bmy 10/12/03

Date of Extraction:	OCT 12, 2003	**DataChem** Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0443-01, 0444-01		Matrix: SOIL
Group/Lot ID:	G039C001/2 10/12/03		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211507-1	BL-211507-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211507-1	QC-211507-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04253	13SB10C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04254	13SB9A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04255	SBD9	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04256	13SB9B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04257	13SB9C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04258	13SB8A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04259	13SB8B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04260	13SB7A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04261	13SB7B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04262	13SB7C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04262MS	13SB7CMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
14	03E04262MSD	13SB7CMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
15	03E04263	13SB12A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04264	13SB12B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
17	03E04265	SBD8	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18	03E04266	13SB12C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
19	03E04267	13SB11A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
20	03E04268	13SB11B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
21	03E04269	13SB11C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
22	03E04270	13SB10A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
23	03E04271	13SB10B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
24										
25										
26										
27										
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29										
30										
31										
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33										
34										
35										
36										
37										
38										
39										
40										

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bmy	
Matrix Spike:	239 ws 2	1/30/04 6/10/2000 By: Bmy	
Matrix Spike:	----------	---------- By:	
Extractionist:	Benjing Yang	10/12/03	
Checker:	Wenjing	10/13/03	Sonicators tunned by:

*=Entry Error

Bmy 10/12/03

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#02
DCL Set ID's:	03E-0443-01		

General Set Information: This set contained seven solid samples, a method blank, and a laboratory control sample (LCS). This set was batched with another set, which contained twelve samples, a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04262 which belonged to set# 03E-0444-01. All percent recoveries and RPDs were within method limits. does not match 2/2/04

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/23/03

Gloria W. Heung Date

Earliest Sampling Date: 8-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 23-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0441 * | **Reporting Group** 01 02

Account: 08001

Client: URS

Comments:

Verified: W 10/9/03

Analysis

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Nitroglycerin/PETN by 8332	Moisture	# Bottles
8-Oct-2003	57SB4A	03E04239			SOIL		X	X	1
8-Oct-2003	69SB1A	03E04240			SOIL		X	X	1
8-Oct-2003	69SB1B	03E04241			SOIL		X	X	1
8-Oct-2003	69SB1C	03E04242			SOIL		X	X	1
8-Oct-2003	69SB3A	03E04243			SOIL		X	X	1
8-Oct-2003	SBD7	03E04244			SOIL		X	X	1
8-Oct-2003	69SB3B	03E04245			SOIL		X	X	1
8-Oct-2003	69SB3C	03E04246			SOIL		X	X	1
8-Oct-2003	69SB2A	03E04247			SOIL		X	X	1
8-Oct-2003	69SB2B	03E04248			SOIL		X	X	1

6 SR

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 MB	10/10/03 13:30	Norman Breese	%Moisture
Norman Breese R-33-1 MB	10/10/03 14:40 (10/11/03 12:..)	R-319-1 MB	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Printed 10/9/2003 13:2

Check box if there is a continuation page ☐

Form: COPC1.01-SWV2.30

Earliest Sampling Date: 8-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 23-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0441 *	Reporting Group
Client: URS		Account: 08001	Analysis
Comments:			
Verified: JW 10/9/03			

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	01 Nitroglycerin/PETN by 8332	02 Moisture	# Bottles
8-Oct-2003	69SB2C	03E04249			SOIL		X	X	1
8-Oct-2003	57SB4B	03E04250			SOIL		X	X	1

6C SP ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 JB	10/10/03 13:30	Norman Brent	% Moisture
Norman Brent	10/10/03 14:40	R-31B-1 JB	storage
R-33-1 [illegible]	10/10/03 12:11	[illegible]	[illegible]

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/9/2003 13:29

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 9-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 24-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0443 * | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: JW 10/10/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 01 Nitroglycein/PETN by 8332	Analysis 02 Moisture	# Bottles
9-Oct-2003	13SB10C	03E04253			SOIL		X	X	1
9-Oct-2003	13SB9A	03E04254			SOIL		X	X	1
9-Oct-2003	SBD9	03E04255			SOIL		X	X	1
9-Oct-2003	13SB9B	03E04256			SOIL		X	X	1
9-Oct-2003	13SB9C	03E04257			SOIL		X	X	1
9-Oct-2003	13SB8A	03E04258			SOIL		X	X	1
9-Oct-2003	13SB8B	03E04259			SOIL		X	X	1

SC 38

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk in/ Room/(Shelf/ Fridge R-33-1 Ms	10/12/03 11:20		
	10/13/03 14:30	Norman Breese	to Moisture
Norman Breese	10/13/03 16:34	R-319-1 BB	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/10/2003 12:06

Form: COFCL.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0441

Date/Time of Receipt: 10/9/03 0830

Number of Coolers Received: 1

Condition of Coolers:	~~Acceptable~~/Unacceptable	Temperature Control:	Present/~~Not Included~~
Custody Seals:	~~Present~~/Absent/NA	Location Temp Taken:	Control/~~Between Samples~~
	~~Intact~~/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/~~No~~/NA	project specific guidelines?	~~Yes~~/No/NA
Ice Present:	~~Yes~~/No/NA	Are all applicable pHs within	
	~~Frozen~~/Melted/NA	specific guidelines?	Yes/No/~~NA~~

pH Check Performed:	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0437	4 °C	4	C03-	°C	7	C03 -	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03 -	°C	6	C03-	°C	9	C03-	°C

Taken By: R (Signature) J. Pate (Printed Name) 10/9/03 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Insufficient Sample Volume
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Chain of Custody Problems
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Residual Chlorine Present	☐ Other:
☐ Missing/Incorrect Bottle Labels	☐ Cooler Temperatures Out of Range	☐ Head Space in Bottles	EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKE

Date 10/8/03 FedEx Tracking Number 832942539697

ender's ame Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201

Dept/Floor/Suite/Room

ty RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

our Internal Billing Reference 09604 317

Response Req

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0443

Date/Time of Receipt: 10/10/03 0900

Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable	Temperature Control:	Present/Not Included
Custody Seals:	Present/Absent/NA	Location Temp Taken:	Control/Between Samples
	Intact/Broken/NA	Are all temperatures within	
Tamper Evident:	Yes/No/NA	project specific guidelines?	Yes/No/NA
Ice Present:	Yes/No/NA	Are all applicable pHs within	
	Frozen/Melted/NA	specific guidelines?	Yes/No/NA

pH Check Performed:	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0441	5 °C	4	C03-	°C	7	C03 -	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/10/03 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Insufficient Sample Volume
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Chain of Custody Problems
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Residual Chlorine Present	☐ Other:
☐ Missing/Incorrect Bottle Labels	☐ Cooler Temperatures Out of Range	☐ Head Space in Bottles	EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN: Date 10/9/03 FedEx Tracking Number 832942539675

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐ Your Internal Billing Reference 09604 317

Response Requ...

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc Revised 1/01/03

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0444-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: The relative percent difference between the two analytical column concentrations for nitroglycerin was greater than the control limit (i.e., 40%) for samples 13SB11A at 71% and 13SB11B at 54%. The higher of the two concentrations was reported from the primary calibrated column. These results were flagged "J,g".

The field duplicate pair (13SB12B/SBD8) displayed a relative percent difference greater than the control limit (i.e., 35%) for nitroglycerin at 185%. The data user should be made aware of the possibility for replicate sampling error.

Correctable Anomalies: None.

Comments: Positive field sample results from the primary column were analyzed to confirm on an alternate column. Mid-point standards and standards at levels approximate to the method detection limit were analyzed concurrently to qualitatively identify positive detections by retention time responses only.

Sample SBD8 was analyzed at dilution factor of two to report a positive detection within the linear range of the instrument.

All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

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COVER PAGE

ANALYTICAL REPORT FOR URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

G0399013

DCL Report Group..: **03E-0444-01**

Date Printed.....: 22-OCT-03 17:40

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#03

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
13SB7A	03E04260	09-OCT-03	10-OCT-03
13SB7B	03E04261	09-OCT-03	10-OCT-03
13SB7C	03E04262	09-OCT-03	10-OCT-03
13SB7CMS	03E04262MS	09-OCT-03	10-OCT-03
13SB7CMSD	03E04262MSD	09-OCT-03	10-OCT-03
13SB12A	03E04263	09-OCT-03	10-OCT-03
13SB12B	03E04264	09-OCT-03	10-OCT-03
SBD8	03E04265	09-OCT-03	10-OCT-03
13SB12C	03E04266	09-OCT-03	10-OCT-03
13SB11A	03E04267	09-OCT-03	10-OCT-03
13SB11B	03E04268	09-OCT-03	10-OCT-03
13SB11C	03E04269	09-OCT-03	10-OCT-03
13SB10A	03E04270	09-OCT-03	10-OCT-03
13SB10B	03E04271	09-OCT-03	10-OCT-03
Method Blank	BL-211507-1	NA	NA
LCS	QC-211507-1	NA	NA

Gloria W. Heung — Analyst: Gloria W. Heung — 10/23/03 Date

Thomas T. McKay — Reviewer: Thomas T McKay — 10/23/03 Date

Richard W. Wade — Lab Supervisor: Richard W. Wade — 10/23/03 Date

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10230314295239

S0399039

Date Printed.....: 23-OCT-03 14:29

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB7A**
DCL Sample Name...: **03E04260**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 09:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 17.0

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 22:54	0.269	ND		U	1	1.20
Nitroglycerin	21-OCT-03 22:54	0.195	ND		U	1	0.602

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10220317400326
Page 4

S039903B

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB7B**
DCL Sample Name...: **03E04261**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 10:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 19.0

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 23:16	0.275	ND		U	1	1.23
Nitroglycerin	21-OCT-03 23:16	0.200	ND		U	1	0.617

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903C

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB7C**
DCL Sample Name...: **03E04262**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 10:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 23.8

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 23:39	0.293	ND		U	1	1.31
Nitroglycerin	21-OCT-03 23:39	0.213	ND		U	1	0.656

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903G

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB12A**
DCL Sample Name...: **03E04263**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 10:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.9

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 00:46	0.297	ND		U	1	1.33
Nitroglycerin	22-OCT-03 00:46	0.216	8.48			1	0.666

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903H

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB12B**
DCL Sample Name...: **03E04264**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 11:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 36.7

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 01:09	0.352	ND		U	1	1.58
Nitroglycerin	22-OCT-03 01:09	0.256	4.05			1	0.790

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A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903J

Date Printed.....: 23-OCT-03 14:29

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SBD8**
DCL Sample Name...: **03E04265**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 30.0

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 01:53	0.319	ND		U	1	1.43
Nitroglycerin	23-OCT-03 12:20	0.462	67.4			2	1.43

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903K

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB12C**
DCL Sample Name...: **03E04266**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 11:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 38.9

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 02:16	0.365	ND		U	1	1.64
Nitroglycerin	22-OCT-03 02:16	0.265	2.54			1	0.818

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903L

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB11A**
DCL Sample Name...: **03E04267**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 12:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 27.3

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 02:38	0.307	ND		U	1	1.38
Nitroglycerin	22-OCT-03 02:38	0.223	2.11			1	0.688

J,g

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903M

Date Printed.....: 22-OCT-03 18:01

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB11B**
DCL Sample Name...: **03E04268**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 12:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 23.5

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 03:01	0.292	ND		U	1	1.31
Nitroglycerin	22-OCT-03 03:01	0.212	2.55			1	0.654

JJg

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903N

Date Printed.....: 22-OCT-03 18:01

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB11C**
DCL Sample Name...: **03E04269**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 12:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 28.1

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 03:23	0.310	ND		U	1	1.39
Nitroglycerin	22-OCT-03 03:23	0.225	ND		U	1	0.695

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903P

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB10A**
DCL Sample Name...: **03E04270**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 13:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 41.4

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 03:46	0.381	ND		U	1	1.71
Nitroglycerin	22-OCT-03 03:46	0.276	ND		U	1	0.853

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A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039903Q

Date Printed.....: 22-OCT-03 17:40

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#03

Date Received.....: 10-OCT-03 00:00

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SB10B**
DCL Sample Name...: **03E04271**
DCL Report Group..: **03E-0444-01**

Matrix.....: SOIL
Date Sampled.....: 09-OCT-03 13:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 24.9

DCL Analysis Group: G039C001
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	22-OCT-03 04:08	0.297	ND		U	1	1.33
Nitroglycerin	22-OCT-03 04:08	0.216	ND		U	1	0.666

DATA VALIDATION WORKSHEET

Explosives

Reviewer: AS
Date: January-04
DV Level: II III IV

Review Document:

_X_ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0444-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes: Second column was used to not confirm primary column low level hits. The second column does not have an initial calibration or bracketing continuing calibrations. The one points provided are for retention time purposes only.

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%? Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		x	

Notes:

	SBD8	13SB12B	RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND			1.58	7.9	6.32
nitroglycerin	67.4	2.54	185%	64.86	0.79	3.95	3.16

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.		x	
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness

			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	12			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

Nitroglycerin Results

Sample No.	Primary Column Result (mg/Kg)	Secondary Column Result (mg/Kg)	RPD
03E04263	6.37	7.38	14.7%
03E04264	2.57	3.81	38.9%
03E04265	47.2*	53.3	12.%
03E04266	1.55	1.82	16.%
03E04267	1.53	0.725	71%
03E04268	1.95	1.12	54%

Results were not moisture corrected.
*This result was from the dilution run, sequence 1023LC3.

Gloria W. Heung 10/23/03

Thomas T. McKay 10/23/03

DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S039903D

Client Name.....: URS Group, Inc.
Release Number.....: URS#03

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039C001
Date Prepared.....: 13-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04262MS**
Date Printed.....: 22-OCT-03 17:40

DCL Analysis Group: G039C001
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	22-OCT-03 00:01	ND	16.7	20.0	83.4	65.0/125.	
Nitroglycerin	22-OCT-03 00:01	ND	19.8	20.0	99.0	65.0/125.	

S039903F

DCL Sample Name...: **03E04262MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	22-OCT-03 00:24	17.5	87.6	17.1	0.839	4.9	0.00/35.0	
Nitroglycerin	22-OCT-03 00:24	18.6	92.8	19.2	1.24	6.5	0.00/35.0	

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Bmy 10/12/03

Date of Extraction:	OCT 12, 2003	**DataChem** Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0443-01, 0444-01		Matrix: SOIL
Group/Lot ID:	G039C001 10/12/03		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211507-1	BL-211507-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211507-1	QC-211507-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04253	13SB10C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04254	13SB9A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04255	SBD9	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04256	13SB9B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
7	03E04257	13SB9C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
8	03E04258	13SB8A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04259	13SB8B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04260	13SB7A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04261	13SB7B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04262	13SB7C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04262MS	13SB7CMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
14	03E04262MSD	13SB7CMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
15	03E04263	13SB12A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
16	03E04264	13SB12B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
17	03E04265	SBD8	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18	03E04266	13SB12C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
19	03E04267	13SB11A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
20	03E04268	13SB11B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
21	03E04269	13SB11C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
22	03E04270	13SB10A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
23	03E04271	13SB10B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
24										
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40										

Bmy 10/12/03

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bmy	
Matrix Spike:	239 ws 2	1/30/04 6/10/2000 By: Bmy	
Matrix Spike:	----------	---------- By:	
Extractionist:	Bmy Yang	10/12/03	
Checker:	Wenjy Yang	10/13/03	Sonicators tunned by:

*=Entry Error

Project No. X

TITLE Data Chem Laboratories % Moisture Book No. 4146

From Page No. X

Insert of preparatory report for sets: 03E-0443-02 & 0444-02

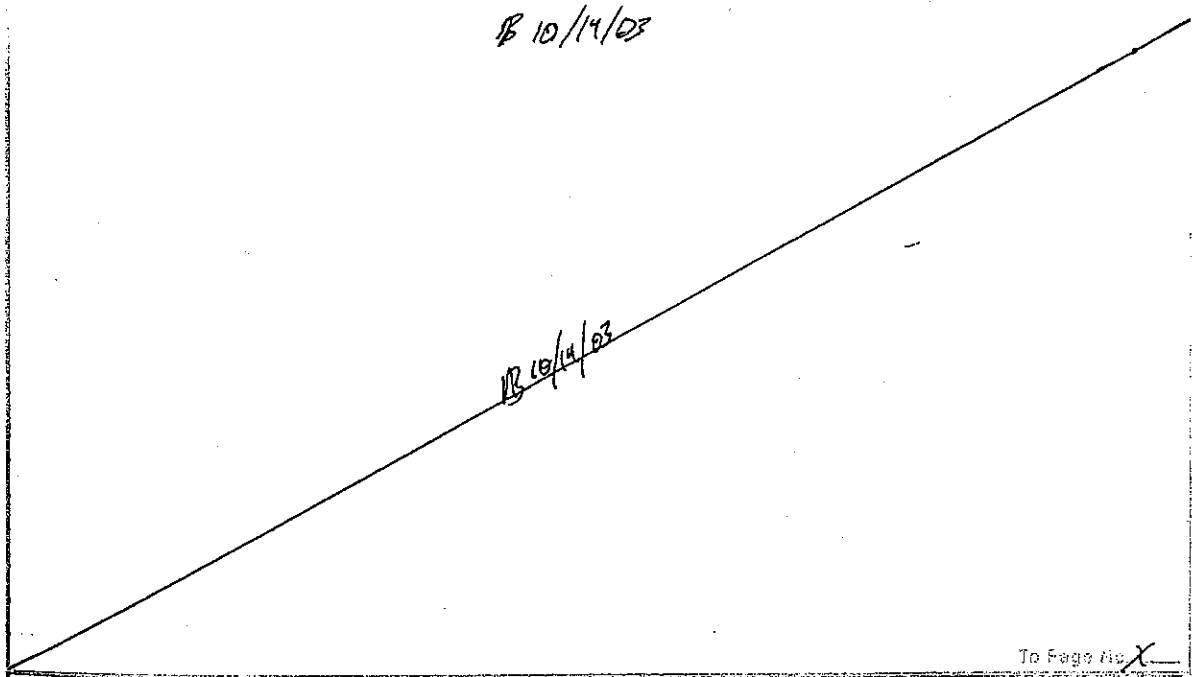
VB 10/14/03

%Moistures & Solids

Start Time: 16:31 13-Oct-03
Finish Time: 9:24 14-Oct-03

Set ID #	Dish #	Sample #	Dish (g)	Dish + Soil (g)	Soil weight(g)	Dish + Dry Soil (g)	Dry Soil (g)	% Solids	% Moistures
03E-0444-02	1	03E04260	1.23	5.22	3.99	4.54	3.31	83.0%	17.0%
03E-0444-02	2	03E04261	1.24	5.23	3.99	4.47	3.23	81.0%	19.0%
03E-0444-02	3	03E04262	1.25	5.74	4.49	4.67	3.42	76.2%	23.8%
03E-0444-02	4	03E04262MD	1.25	5.38	4.13	4.27	3.02	73.1%	26.9%
03E-0444-02	5	03E04263	1.23	8.66	7.43	6.81	5.58	75.1%	24.9%
03E-0444-02	6	03E04264	1.23	5.37	4.14	3.85	2.62	63.3%	36.7%
03E-0444-02	7	03E04265	1.23	5.13	3.90	3.96	2.73	70.0%	30.0%
03E-0444-02	8	03E04266	1.25	5.52	4.27	3.86	2.61	61.1%	38.9%
03E-0444-02	9	03E04267	1.23	5.84	4.61	4.58	3.35	72.7%	27.3%
03E-0444-02	10	03E04268	1.25	5.03	3.78	4.14	2.89	76.5%	23.5%
03E-0444-02	11	03E04269	1.25	5.88	4.63	4.58	3.33	71.9%	28.1%
03E-0444-02	12	03E04270	1.24	5.20	3.96	3.56	2.32	58.6%	41.4%
03E-0444-02	13	03E04271	1.23	5.68	4.45	4.57	3.34	75.1%	24.9%
03E-0443-02	15	03E04253	1.24	6.62	5.38	5.12	3.88	72.1%	27.9%
03E-0443-02	16	03E04253MD	1.23	5.13	3.90	3.97	2.74	70.3%	29.7%
03E-0443-02	17	03E04254	1.24	6.03	4.79	4.75	3.51	73.3%	26.7%
03E-0443-02	18	03E04255	1.24	5.61	4.37	4.22	2.98	68.2%	31.8%
03E-0443-02	19	03E04256	1.24	6.15	4.91	4.96	3.72	75.8%	24.2%
03E-0443-02	20	03E04257	1.24	5.80	4.56	4.67	3.43	75.2%	24.8%
03E-0443-02	21	03E04258	1.23	5.31	4.08	4.22	2.99	73.3%	26.7%
03E-0443-02	22	03E04259	1.24	5.16	3.92	4.29	3.05	77.8%	22.2%

VB 10/14/03



VB 10/14/03

To Page No. X

Witnessed & Understood by me,	Date	Invented by	Date
Jose G. Rocha	10/14/03	N/A	10/14/03
		Recorded by Norman Bleagle	

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 3
Part 1 of 1
10140309510797X

Date _____
Laboratory Group Name 03E-0444-02
Account No. 08001 URS03

URS
Attention: Andrea Sansom
849 Intermountain Dr.
Sutie 320
Linthicum, MD 21090

FAX (410) 859-5202
Telephone (410) 859-5049
E-mail Andrea_Sansom@URScorp.com

Sampling Collection and Shipment

Sampling Site RFAAP/09604-317 Date of Collection October 09, 2003

Date Samples Received at Laboratory October 10, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 14, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %								
13SB7A	03E04260	SOIL	17.0								
13SB7B	03E04261	SOIL	19.0								
13SB7C	03E04262	SOIL	23.8								
13SB7CMD	03E04262MD	SOIL	26.9								
13SB12A	03E04263	SOIL	24.9								
13SB12B	03E04264	SOIL	36.7								
SBD8	03E04265	SOIL	30.0								
13SB12C	03E04266	SOIL	38.9								
13SB11A	03E04267	SOIL	27.3								
13SB11B	03E04268	SOIL	23.5								
13SB11C	03E04269	SOIL	28.1								
13SB10A	03E04270	SOIL	41.4								
13SB10B	03E04271	SOIL	24.9								

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#03
DCL Set ID's:	03E-0444-01		

General Set Information: This set contained twelve samples, a matrix spiked sample (MS) and a matrix spike duplicate. This set was batched with another set, which contained seven solid samples, a method blank, and a laboratory control sample (LCS).

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): Sample 03E04265 was diluted at a ratio of 1 to 2.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL. The method blank belonged to set# 03E-0443-01.

Laboratory Control Samples: All recoveries met the method limits. The LCS belonged to set# 03E-0443-01.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04262. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/23/03

Gloria W. Heung / Date

03E-0444
SDG#URS#03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1145

Project Number	Project Name
07604317	RFAAP

Project Contact (Name and Phone Number): Darren Ferns (804) 765-9000

Samplers: Brad Fields / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135B7A	10/9/03 945	5		X	S	F	/	1						X									03E04266
135B7B	10/9/03 1000	5		X	S	F	/	1						X									61
135B7C	10/9/03 1015	5		X	S	F	/	1						X									62
135B7C MS	10/9/03 1015	5		X	S	F	/	1						X									62 MS
135B7C MSD	10/9/03 1015	5		X	S	F	/	1						X									62 MSD
135B12A	10/9/03 1045	5		X	S	F	/	1						X									63
135B12B	10/9/03 1100	5		X	S	F	/	1						X									64
SBD8	10/9/03 —	5		X	S	F	/	1						X									65
135B12C	10/9/03 1115	5		X	S	F	/	1						X									66
135B11A	10/9/03 1215	5		X	S	F	/	1						X									67
135B11B	10/9/03 1230	5		X	S	F	/	1						X									68
135B11C	10/9/03 1245	5		X	S	F	/	1						X									69
135B10A	10/9/03 1300	5		X	S	F	/	1						X									70
135B10B	10/9/03 1315	5		X	S	F	/	1						X									71

Box #1			Box #2			Box #3	Box #4	
1. Surface Water	6. Trip Blank		A. HCl + Ice	F. Ice Only		F. Filtered	R. Rush - 3 Day	
2. Ground Water	7. Oil		B. HNO3 + Ice	G. Other _____		U. Unfiltered	S. Standard 28 Day	
3. Leachate	8. Waste		C. NaOH + Ice	H. NaHSO4 + Ice			T. Timely 14 Day	
4. Rinsate	9. Other _____		D. H2SO4 + Ice	I. ZnAc + NaOH + Ice			O. Other _____	
5. Soil Sediment/Sludge			E. Unpreserved					

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brad Fields 10/9/03	1800	FedEx			
Relinquished by: FedEx 10/10/03	Date/time 0900	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 9-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 24-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0444 * | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: W 10/10/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis 01 Nitroglycein/PETN by 8332	Analysis 02 Moisture	# Bottles
9-Oct-2003	13SB7A	03E04260			SOIL		X	X	1
9-Oct-2003	13SB7B	03E04261			SOIL		X	X	1
9-Oct-2003	13SB7C	03E04262			SOIL		X	X	1
9-Oct-2003	13SB7CMS	03E04262MS		MS	SOIL		X		1
9-Oct-2003	13SB7CMSD	03E04262MSD		MSD	SOIL		X		1
9-Oct-2003	13SB12A	03E04263			SOIL		X	X	1
9-Oct-2003	13SB12B	03E04264			SOIL		X	X	1
9-Oct-2003	SBD8	03E04265			SOIL		X	X	1
9-Oct-2003	13SB12C	03E04266			SOIL		X	X	1
9-Oct-2003	13SB11A	03E04267			SOIL		X	X	1

1B SP ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in Room/ Shelf/ Fridge	10/12/03 11:		
	10/12/03 14:30	Norman Burns	% Moisture
Norman Burns	10/13/03 16:34	R-329-1 1B	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/10/2003 12:06

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 9-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 24-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0444 * | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: JW 10/10/03

Analysis

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	01 Nitroglycein/PETN by 8332	02 Moisture	# Bottles
9-Oct-2003	13SB11B	03E04268			SOIL		X	X	1
9-Oct-2003	13SB11C	03E04269			SOIL		X	X	1
9-Oct-2003	13SB10A	03E04270			SOIL		X	X	1
9-Oct-2003	13SB10B	03E04271			SOIL		X	X	1
9-Oct-2003	13SB7CMD	03E04262MD		MD	SOIL			X	0

IB JP

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge	10/12/03 11:..		
	10/13/03 14:30	Norman Burns	To Moisture
Norman Burns	10/13/03 16:34	R-309-4 B	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/10/2003 12:06

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0444

Date/Time of Receipt: 10/10/03 0900

Number of Coolers Received: 1

Condition of Coolers:	Acceptable/Unacceptable
Custody Seals:	Present/Absent/NA
	Intact/Broken/NA
Tamper Evident:	Yes/No/NA
Ice Present:	Yes/No/NA
	Frozen/Melted/NA
Temperature Control:	Present/Not Included
Location Temp Taken:	Control/Between Samples
Are all temperatures within project specific guidelines?	Yes/No/NA
Are all applicable pHs within specific guidelines?	Yes/No/NA

pH Check Performed:							
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0441	5 °C	4	C03-	°C	7	C03 -	°C
2	C03-	°C	5	C03-	°C	8	C03 -	°C
3	C03 -	°C	6	C03-	°C	9	C03 -	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/10/03 (Date)

CLIENT-RELATED INFORMATION

☐ Missing Cooler	☐ Missing Samples/Bottles	☐ Incorrect Preservation	☐ Insufficient Sample Volume
☐ Cooler Conditions	☐ Broken/Leaking Samples	☐ pH Criteria Not Met	☐ Chain of Custody Problems
☐ Missing Paperwork	☐ Incorrect Bottle Type	☐ Residual Chlorine Present	☐ Other:
☐ Missing/Incorrect Bottle Labels	☐ Cooler Temperatures Out of Range	☐ Head Space in Bottles	EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN: 10/9/03 FedEx Tracking Number 832942539675

Sender's Name: Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept./Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐ Your Internal Billing Reference 09604 317

Response Requested:

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

SLC/CRIR.doc Revised 1/01/03

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0448-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

Form COVER-V1.4
10230316223606
Page 1

G039D01L

DCL Report Group..: **03E-0448-01**

Date Printed.....: 23-OCT-03 16:22

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#03

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211588-1	NA	NA
LCS	QC-211588-1	NA	NA
13SW3	03E04283	10-OCT-03	11-OCT-03
SWD1	03E04284	10-OCT-03	11-OCT-03
13SW2	03E04285	10-OCT-03	11-OCT-03
13SW2MS	03E04285MS	10-OCT-03	11-OCT-03
13SW2MSD	03E04285MSD	10-OCT-03	11-OCT-03
EQB5	03E04286	10-OCT-03	11-OCT-03
EQB6	03E04287	10-OCT-03	11-OCT-03

Analyst: Gloria W. Heung — Date 10/23/03

Reviewer: Thomas T McKay — Date 10/23/03

Lab Supervisor: Richard W. Wade — Date 10/23/03

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

Form RLIMS63A-V1.4
10230316223606
Page 3

S039D06Q

Date Printed.....: 23-OCT-03 16:22

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

Client Sample Name: **13SW3**
DCL Sample Name...: **03E04283**
DCL Report Group..: **03E-0448-01**

Matrix.....: WATER
Date Sampled.....: 10-OCT-03 13:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F006
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 07:59	0.311	ND		U	1	0.970
Nitroglycerin	21-OCT-03 07:59	0.213	ND		U	1	0.970

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
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FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039D06R

Date Printed.....: 23-OCT-03 16:22

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

Client Sample Name: **SWD1**
DCL Sample Name...: **03E04284**
DCL Report Group..: **03E-0448-01**

Matrix.....: WATER
Date Sampled.....: 10-OCT-03 00:00
Reporting Units...: ug/L
Report Basis.....: [X] As Received [ ] Dried

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F006
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
[X] Primary
[ ] Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 08:21	0.311	ND		U	1	0.970
Nitroglycerin	21-OCT-03 08:21	0.213	ND		U	1	0.970

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039D06S

Date Printed.....: 23-OCT-03 16:22

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

Client Sample Name: **13SW2**
DCL Sample Name...: **03E04285**
DCL Report Group..: **03E-0448-01**

Matrix.....: WATER
Date Sampled.....: 10-OCT-03 14:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F006
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 08:44	0.311	ND		U	1	0.970
Nitroglycerin	21-OCT-03 08:44	0.213	ND		U	1	0.970

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FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039D06T

Date Printed.....: 23-OCT-03 16:22

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

Client Sample Name: **EQB5**
DCL Sample Name...: **03E04286**
DCL Report Group..: **03E-0448-01**

Matrix.....: WATER
Date Sampled.....: 10-OCT-03 09:45
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F006
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 09:51	0.311	ND		U	1	0.970
Nitroglycerin	21-OCT-03 09:51	0.213	ND		U	1	0.970

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Phone (801) 266-7700 Web Page: www.datachem.com
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SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 23-OCT-03 16:22

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

Client Sample Name: **EQB6**
DCL Sample Name...: **03E04287**
DCL Report Group..: **03E-0448-01**

Matrix.....: WATER
Date Sampled.....: 10-OCT-03 11:00
Reporting Units...: ug/L
Report Basis.....: ☒ As Received ☐ Dried

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 770 mL
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F006
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	21-OCT-03 10:13	0.311	ND		U	1	0.970
Nitroglycerin	21-OCT-03 10:13	0.213	ND		U	1	0.970

DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
_X__ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0448-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ℃), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%? Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SWD1	13SW3	RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND			0.97	4.85	3.88
nitroglycerin	ND	ND			0.97	4.85	3.88

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	5			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

DATA CHEM LABORATORIES
A Sorenson Company

FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S039D07M

Client Name.....: URS Group, Inc.
Release Number.....: URS#03

Matrix.....: WATER
Reporting Units.....: ug/L

DCL Preparation Group: G039F006
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04285MS**
Date Printed.....: 23-OCT-03 16:22

DCL Analysis Group: G039F006
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	21-OCT-03 09:06	ND	21.1	26.0	81.3	65.0/125.	
Nitroglycerin	21-OCT-03 09:06	ND	19.5	26.0	74.9	65.0/125.	

S039D07N

DCL Sample Name...: **03E04285MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	21-OCT-03 09:28	19.4	74.6	20.2	1.74	8.6	0.00/35.0	
Nitroglycerin	21-OCT-03 09:28	20.2	77.6	19.8	0.697	3.5	0.00/35.0	

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DB 10/15/03

Date of Extraction:	10/15/03
Account #(s):	8001
DCL Set ID(s):	03E-0448-01
Group/Lot ID:	G039F006

DataChem Laboratories Extraction Notebook

Book #	Ext 007	Page# 56
Matrix:	WATER	
Method:	8332	

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211588-1	BL-211588-1	770mL	N/A	N/A	N/A	1mL	----	----	5mL
2	QC-211588-1	QC-211588-1	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
3	03E04283	13SW3	770mL	N/A	N/A	N/A	1mL	----	----	5mL
4	03E04284	SWD1	770mL	N/A	N/A	N/A	1mL	----	----	5mL
5	03E04285	13SW2	770mL	N/A	N/A	N/A	1mL	----	----	5mL
6	03E04285MS	13SW2MS	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
7	03E04285MSD	13SW2MSD	770mL	N/A	N/A	N/A	1mL	1mL	----	5mL
8	03E04286	EQB5	770mL	N/A	N/A	N/A	1mL	----	----	5mL
9	03E04287	EQB6	770mL	N/A	N/A	N/A	1mL	----	----	5mL
10										
11										
12										
13										
14										
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39										
40										

Solvents:	MeCN	C1946	Comments:
Surrogate Spike:	239WS3 #2	01/30/2004 By: DB	
Matrix Spike:	239WS99	04/12/2004 By: DB	
Matrix Spike:	----------	---------- By: NA	
Extractionist:	DB	10/15/03	
Checker:	[illegible]	10/15/03	Sonicators tunned by: NA

*=Entry Error

DB 10/15/03

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Water
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#03
DCL Set ID's:	03E-0448-01		

General Set Information: This set consisted of five water samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS), and a matrix spiked sample duplicate.

Method Summary: The samples were extracted using the double salting out procedure prescribed in EPA method 8332. An aliquot of 770 mL of each sample was saturated with salt and extracted twice with acetonitrile by stirring at timed intervals. The acetonitrile extracts were combined and re-extracted with fresh salt water. The final volume of the extract was adjusted to 5 mL for each sample and filtered through a 0.45 um PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, and then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial Calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis and after each ten samples and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of µg/L.

Sample Preparation: No anomalies were observed during the preparation of the sample set.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries were within method limits.

Surrogate Recovery: Surrogate recoveries were all acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04285. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that the value reported was between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. When a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 09/23/03

Gloria W. Heung Date

03E-0448
SDG# URS#03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1112

Project Number	Project Name
096049317	RFAAP

Project Contact (Name and Phone Number): Dawn Rowe (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332 RDX/TNT/NG)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135W1 X3 10/13	10/10/03 1300	5		X	1	F	U	2						X									03E0448 3
5WD1	10/10/03 —	5		X	1	F	U	2						X									84
135W2	10/10/03 1400	5		X	1	F	U	2						X									85
135W2MS	10/10/03 1400	5		X	1	F	U	2						X									85MS
135W2MSD	10/10/03 1400	5		X	1	F	U	2						X									85MSD
135D3	10/10/03 1300	5		X	5	F	/	1						X									88
135DD1	10/10/03 —	5		X	5	F	/	1						X									89
135D2	10/10/03 1400	5		X	5	F	/	1						X									90
135D2MS	10/10/03 1400	5		X	5	F	/	1						X									90MS
135D2MSD	10/10/03 1400	5		X	5	F	/	1						X									90MSD

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/10/03 1800	FedEx			
FedEx	10/11/03 0900	(for lab) R-33-1			

Date/Time

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

2

03E-0448
SDG# URS#03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1141

Project Number	Project Name
02604 317	RFAAP

Project Contact (Name and Phone Number): Darren Rennie (804) 765 9000

Samplers: Brett Fidler / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQ65	10/10/03 945	5		X	4	F	U	2						X									03E04286
EQ66	10/10/03 1100	5		X	4	F	U	2						X									187

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fidler	10/10/03 1800	FedEx			
Relinquished by: FedEx	Date/time 10/11/03 0900	Received by: (for lab) R-33-1	Date/Time	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

Earliest Sampling Date: 10-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 24-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0448 *	Reporting Group	01									#
Client: URS		Account: 08001	Analysis	PETN/NG in Water by EPA 8332									Bottles
Comments:													
Verified: JW 10/13/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2															
10-Oct-2003	13SW3	03E04283			WATER						X										2
10-Oct-2003	SWD1	03E04284			WATER						X										2
10-Oct-2003	13SW2	03E04285			WATER						X										2
10-Oct-2003	13SW2MS	03E04285MS		MS	WATER						X										2
10-Oct-2003	13SW2MSD	03E04285MSD		MSD	WATER						X										2
10-Oct-2003	EQB5	03E04286			WATER						X										2
10-Oct-2003	EQB6	03E04287			WATER						X										2

15C JP

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/ Room/ Shelf/ Fridge R-33-1 DB	10/15/03 11:40	D-e B-e	Ext. 8332
D-e B-e			

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/13/2003 16:19

Form: COFC1.01-SWV2.30

3C-22

Pate, Justin M.

From: John_Spangler@URSCorp.com
Sent: Monday, October 13, 2003 3:04 PM
To: Andrea_Sansom@URSCorp.com
Cc: Darren_Renne@URSCorp.com; James_O_Spencer@URSCorp.com; Brett_Fisher@URSCorp.com; Pate, Justin M.
Subject: Re: COC/Label Problems

pic10980.pcx

Andrea the sample is 13SW3, not 13SW1. Same for the sediment sample.

The table was incorrect as the samples were identified in the WP as 13SW2 and 13SW3

Andrea Sansom
10/13/2003 02:16 PM

To: John Spangler/Richmond/URSCorp@URSCORP
cc: Darren Renne@URSCorp, James O Spencer/Richmond/URSCorp@URSCORP
Subject: COC/Label Problems

John,

I imagine this should be 13SW1, since there should not have been a 13SW3.

Please confirm.
(Embedded image moved to file: pic10980.pcx)
----- Forwarded by Andrea Sansom/Linthicum/URSCorp on 10/13/2003 02:15 PM -----

"Pate, Justin M." <pate@datachem.com>
10/13/2003 01:33 PM

To: <andrea_sansom@urscorp.com>
cc:
Subject: COC/Label Problems

Andrea,
We received samples from URS for the RFAAP project on Saturday and we had a discrepancy between the COC and the labels on one of the samples. The COC lists 13SW1 as the sample ID but the bottle lists 13SW3. Which one is correct, the bottle or COC? Could you get back to me with the corrections. Paul is out sick today so you can reach me by email or at (801) 904-4296.
Thanks,

Justin Pate
Sample Control Coordinator

USE-0448-

Fax To: URS - Andrea Sansom
(410)859-5202
Date Faxed:_____

Radford SSP

Corrective Action Log

Laboratory: DATACHEM LABORATORIES
Instrument: HPLC
Method: EPA 8332

Sample Date: 10/10/2003
Analysis Date: _____

Project Number/ Batch Number	Affected Samples	Excursions	Criteria Comparison	Corrective Action Proposed
0904317	135W1	incorrect sample#		Sample 135W1 of chain of custody did not match any samples in cooler. 135W1 was changed to 135W3.

Reviewed By: _____ Section Supervisor Date

Reviewed By: _____ QA/QC Officer Date

Reviewed By: _____ Project Supervisor Date

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0448

Date/Time of Receipt: 10/11/03 0900

Number of Coolers Received: 2

Condition of Coolers: (Acceptable)/Unacceptable

Custody Seals: (Present)/Absent/NA

(Intact)/Broken/NA

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA

(Frozen)/Melted/NA

Temperature Control: (Present)/Not Included

Location Temp Taken: (Cooler)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/No/(NA)

pH Check Performed:						
	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0442	5 °C	4	C03-	°C	7	C03 -	°C
2	C03- 0443	6 °C	5	C03-	°C	8	C03 -	°C
3	C03 -	°C	6	C03-	°C	9	C03 -	°C

Taken By: _____ (Signature) J. Pate (Printed Name) 10/11/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☒ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☒ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

COC lists 135W1, bottle lists 135W3.

Date 10/10/03 FedEx Tracking Number 832942539631

Sender's Name Brett Fitler Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept/Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

Your Internal Billing Reference 09604 317

Response Requi

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

135W3 is correct as per JohnSpangler @ URS. See email

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: 10/13/03

SLC/CRIR.doc Revised 1/01/03

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0448-02 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

G039D01M

DCL Report Group..: **03E-0448-02**

Date Printed.....: 24-OCT-03 11:50

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#03

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
Method Blank	BL-211589-1	NA	NA
LCS	QC-211589-1	NA	NA
13SD3	03E04288	10-OCT-03	11-OCT-03
SDD1	03E04289	10-OCT-03	11-OCT-03
13SD2	03E04290	10-OCT-03	11-OCT-03
13SD2MS	03E04290MS	10-OCT-03	11-OCT-03
13SD2MSD	03E04290MSD	10-OCT-03	11-OCT-03

Analyst: Gloria W. Heung — Date 10/24/03

Reviewer: Thomas F McKay — Date 10/27/03

Lab Supervisor: Richard W. Wade for RWW — Date 10.28.03

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 27-OCT-03 14:13

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SD3**
DCL Sample Name...: **03E04288**
DCL Report Group..: **03E-0448-02**

Matrix.....: SOIL
Date Sampled.....: 10-OCT-03 13:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 33.9

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 18:42	0.337	ND		U	1	1.51
Nitroglycerin	23-OCT-03 18:42	0.245	ND		U	1	0.756

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039D06X

Date Printed.....: 27-OCT-03 14:13

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **SDD1**
DCL Sample Name...: **03E04289**
DCL Report Group..: **03E-0448-02**

Matrix.....: SOIL
Date Sampled.....: 10-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 37.4

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 19:03	0.356	ND		U	1	1.60
Nitroglycerin	23-OCT-03 19:03	0.259	ND		U	1	0.799

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DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039D06Y

Date Printed.....: 24-OCT-03 11:50

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: 09604-317
Release Number.....: URS#03

Date Received.....: 11-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **13SD2**
DCL Sample Name...: **03E04290**
DCL Report Group..: **03E-0448-02**

Matrix.....: SOIL
Date Sampled.....: 10-OCT-03 14:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 32.1

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 19:25	0.328	ND		U	1	1.47
Nitroglycerin	23-OCT-03 19:25	0.239	ND		U	1	0.736

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
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DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
___ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0448-02
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%? Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SDD1	13SD3	RPD	Delta	RL	5XRL	4XRL
PETN	ND	ND			1.51	7.55	6.04
nitroglycerin	ND	ND			0.756	3.78	3.024

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.	x		
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.	x		
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	3			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

S039D06Z

Client Name.....: URS Group, Inc.
Release Number.....: URS#03

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04290MS**
Date Printed.....: 28-OCT-03 14:10

DCL Analysis Group: G039F00P
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
[X] Primary
[ ] Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	23-OCT-03 19:47	ND	15.1	20.0	75.6	65.0/125.	
Nitroglycerin	23-OCT-03 19:47	ND	15.3	20.0	76.5	65.0/125.	

S039D070

DCL Sample Name...: **03E04290MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	23-OCT-03 20:09	15.0	74.8	15.0	0.153	1.0	0.00/35.0	
Nitroglycerin	23-OCT-03 20:09	15.0	75.2	15.2	0.243	1.6	0.00/35.0	

Bm 10/15/03

Date of Extraction:	OCT 15, 2003	**DataChem** Laboratories Extraction Notebook	Book # Ext 246	Page#
Account #(s):	8001			
DCL Set ID(s):	03E-0448-02,0450-01		Matrix: SOIL	
Group/Lot ID:	G039F00P		Method: 8332	

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH		Surr. Added	Matrix Spike		Final Volume
1	BL-211589-1	BL-211589-1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
2	QC-211589-1	QC-211589-1	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
3	03E04288	13SD3	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
4	03E04289	SDD1	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
5	03E04290	13SD2	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
6	03E04290MS	13SD2MS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
7	03E04290MSD	13SD2MSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
8	03E04292	ASB1A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
9	03E04293	ASB1B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
10	03E04294	ASB1C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
11	03E04295	ASB2A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
12	03E04296	ASB2B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
13	03E04297	SBD-10	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
14	03E04298	ASB2C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
15	03E04298MS	ASB2CMS	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
16	03E04298MSD	ASB2CMSD	1.0gm	N/A	N/A	N/A	1mL	1mL	----	2mL
17	03E04299	ASB3A	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
18	03E04300	ASB3B	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
19	03E04301	ASB3C	1.0gm	N/A	N/A	N/A	1mL	----	----	2mL
20										
21										
22										
23										
24										
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35										
36										
37										
38										
39										
40										

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bm	
Matrix Spike:	239 ws 99	1/12/04 By: Bm	
Matrix Spike:	----	---- By:	
Extractionist:	Bm 10/15/03		
Checker:	10/15/03		Sonicators tunned by:

*=Entry Error

Bm 10/15/03

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1
10160309150845X

Date _____
Laboratory Group Name 03E-0448-03
Account No. 08001 IRS#03

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

FAX _____
Telephone _____
E-mail _____

Sampling Collection and Shipment

Sampling Site 09604-317 Date of Collection October 10, 2003

Date Samples Received at Laboratory October 11, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 16, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
13SD3	03E04288	SOIL	33.9							
SDD1	03E04289	SOIL	37.4							
13SD2	03E04290	SOIL	32.1							
13SD2MD	03E04290MD	SOIL	31.8							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

Date _____

Laboratory Group Name 03E-0448-03

General Lab Comments

The results provided in this report relate only to the items tested.
This page is the concluding page of the report.

This went through drying twice, because of an error in a spreadsheet cell formula. The formula was corrected returning proper results.

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
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Project No. X

TITLE: 03E-0448-03 OstaChem Laboratories %moisture Book No 4146

From: Page No. X

Insert of preparatory report for set: 03E-0448-03
IB 10/16/03

%Moistures & Solids

Start Time: 10:07 15-Oct-03
Finish Time: 8:56 16-Oct-03

Set ID #	Dish #	Sample #	Dish (g)	Dish + Soil (g)	Soil weight(g)	Dish + Dry Soil (g)	Dry Soil (g)	% Solids	% Moistures
03E-0448-03	1	03E04288	1.24	5.60	4.36	4.12	2.88	66.1%	33.9%
03E-0448-03	2	03E04289	1.23	5.51	4.28	3.91	2.68	62.6%	37.4%
03E-0448-03	3	03E04290	1.23	6.09	4.86	4.53	3.30	67.9%	32.1%
03E-0448-03	4	03E04290MD	1.24	5.73	4.49	4.30	3.06	68.2%	31.8%

IB 10/16/03

IB 10/16/03

To Page No. X

Witnessed & Understood by:	Date	Inventor(s):	Date
Jose G. Rocha	10/16/03	NA	10/16/03
		Recorded by: Norman Bueso	

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#03
DCL Set ID's:	03E-0448-02		

General Set Information: This set contained three solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample and a matrix spiked duplicate. This set was batched with another set, which contained ten samples, a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): None.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL.

Laboratory Control Samples: All recoveries met the method limits.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04290. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 10/27/03

Gloria W. Heung Date

03E-0448
SDG# URS#03

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1112

Project Number	Project Name
096041317	RFAAP

Project Contact (Name and Phone Number): Dawn Reese (804) 765 9000

Samplers: Brett Fisher / John Spangler

LAB: Data Chem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332 PETN/NG)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135W1	10/10/03 1300	S		X	1	F	U	2						X									03E0448 3
5WD1	10/10/03	S		X	1	F	U	2						X									84
135W2	10/10/03 1400	S		X	1	F	U	2						X									85
135W2MS	10/10/03 1400	S		X	1	F	U	2						X									85MS
135W2MSD	10/10/03 1400	S		X	1	F	U	2						X									85MSD
135D3	10/10/03 1300	S		X	5	F		1						X									88
135DD1	10/10/03	S		X	5	F		1						X									89
135D2	10/10/03 1400	S		X	5	F		1						X									90
135D2MS	10/10/03 1400	S		X	5	F		1						X									90MS
135D2MSD	10/10/03 1400	S		X	5	F		1						X									90MSD

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/10/03 1500	FedEx			
Relinquished by: FedEx	Date/time 10/11/03 0900	Received by: (for lab) R-33-1	Date/Time		

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

Earliest Sampling Date: 10-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 24-Oct-2003

Project/Job/Task: P021C002	Split:	Root Set ID: 03E-0448 *	Reporting Group	02	03								#
Client: URS		Account: 08001	Analysis	Nitroglycein/PETN by 8332	Moisture								Bottles
Comments:													
Verified: JW 10/13/03													

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2															
10-Oct-2003	13SD3	03E04288			SOIL						X	X									1
10-Oct-2003	SDD1	03E04289			SOIL						X	X									1
10-Oct-2003	13SD2	03E04290			SOIL						X	X									1
10-Oct-2003	13SD2MS	03E04290MS		MS	SOIL						X										1
10-Oct-2003	13SD2MSD	03E04290MSD		MSD	SOIL						X										1
10-Oct-2003	13SD2MD	03E04290MD		MD	SOIL							X									0

15C JR

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/Room/Shelf/Fridge	10/14/03 10:30		
	10/14/03 16:11	Norman Breese	% Moisture
Norman Breese	10/14/03 17:00	R-319-1 NB	storage
R-319-1 NB	10/15/03 10:00	Norman Breese	% Moisture
Norman Breese	10/15/03 16:30	R-319-1 NB	storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/13/2003 16:19

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0448

Date/Time of Receipt: 10/11/03 0900

Number of Coolers Received: 2

Condition of Coolers: (Acceptable/Unacceptable)

Custody Seals: (Present/Absent/NA) (Intact/Broken/NA)

Tamper Evident: Yes/(No)/NA

Ice Present: (Yes)/No/NA (Frozen/Melted/NA)

Temperature Control: (Present)/Not Included

Location Temp Taken: (Cooler)/Between Samples

Are all temperatures within project specific guidelines? (Yes)/No/NA

Are all applicable pHs within specific guidelines? Yes/No/(NA)

pH Check Performed:	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03- 0442	5 °C	4	C03-	°C	7	C03 -	°C
2	C03- 0443	6 °C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: [signature] (Signature) J. Pate (Printed Name) 10/11/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☒ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☒ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKEN:

COC lists 13SW1, bottle ~~sa~~ lists 13SW3.

Date 10/10/03 FedEx Tracking Number 832942539631

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept./Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ NO ☐

Your Internal Billing Reference 09604 317

Response Requi:

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

13SW3 is correct as per JohnSpangler @ URS. See email

DCL Project Manager: [signature] (Printed Name) Returned to Sample Receipt by: [signature] (Signature) Date: 10/13/03

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

DATA VALIDATION REPORT - Level III Review

SDG No.: 03E-0450-01 **Fraction:** PETN_&_Nitroglycerin

Lab: TriMatrix **Project Name:** Radford_SSP

Reviewer: AS **Date:** February_3,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

DATA CHEM LABORATORIES
A Sorenson Company

COVER PAGE

ANALYTICAL REPORT FOR
URS Group, Inc.

E-mail: Darren_Renne@URScorp.com

Form COVER-V1.4
10240311533488
Page 1

G039F00Q

DCL Report Group..: **03E-0450-01**

Date Printed.....: 24-OCT-03 11:53

Project Protocol #: P021C002
Client Ref Number.: Subcontract DCL-09
Release Number....: URS#04

Analysis Method(s): 8332

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

Client Sample Name	Laboratory Sample Name	Date Sampled	Date Received
ASB1A	03E04292	11-OCT-03	14-OCT-03
ASB1B	03E04293	11-OCT-03	14-OCT-03
ASB1C	03E04294	11-OCT-03	14-OCT-03
ASB2A	03E04295	11-OCT-03	14-OCT-03
ASB2B	03E04296	11-OCT-03	14-OCT-03
SBD-10	03E04297	11-OCT-03	14-OCT-03
ASB2C	03E04298	11-OCT-03	14-OCT-03
ASB2CMS	03E04298MS	11-OCT-03	14-OCT-03
ASB2CMSD	03E04298MSD	11-OCT-03	14-OCT-03
ASB3A	03E04299	11-OCT-03	14-OCT-03
ASB3B	03E04300	11-OCT-03	14-OCT-03
ASB3C	03E04301	11-OCT-03	14-OCT-03
Method Blank	BL-211589-1	NA	NA
LCS	QC-211589-1	NA	NA

Gloria W. Heung — Analyst: Gloria W. Heung — 10/24/03 Date

Thomas T McKay — Reviewer: Thomas T McKay — 10/27/03 Date

Richard W. Wade — Lab Supervisor: Richard W. Wade — 10/27/03 Date

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01H

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB1A**
DCL Sample Name...: **03E04292**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 08:45
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 17.6

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 20:31	0.271	ND		U	1	1.21
Nitroglycerin	23-OCT-03 20:31	0.197	ND		U	1	0.607

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01J

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB1B**
DCL Sample Name...: **03E04293**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 09:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.9

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 20:52	0.282	ND		U	1	1.26
Nitroglycerin	23-OCT-03 20:52	0.205	ND		U	1	0.632

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547
Phone (801) 266-7700 Web Page: www.datachem.com
FAX (801) 268-9992 E-mail: lab@datachem.com

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01K

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB1C**
DCL Sample Name...: **03E04294**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 09:15
Reporting Units...: mg/kg
Report Basis.....: ☐As Received ☒Dried
Percent Moisture..: 27.1

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒Primary
☐Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 21:14	0.306	ND		U	1	1.37
Nitroglycerin	23-OCT-03 21:14	0.222	ND		U	1	0.686

SAMPLE ANALYSIS DATA SHEET

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB2A**
DCL Sample Name...: **03E04295**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 10:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 17.7

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 21:58	0.271	ND		U	1	1.22
Nitroglycerin	23-OCT-03 21:58	0.197	ND		U	1	0.608

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01M

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB2B**
DCL Sample Name...: **03E04296**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 10:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 18.4

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 22:20	0.273	ND		U	1	1.23
Nitroglycerin	23-OCT-03 22:20	0.199	ND		U	1	0.613

DATA CHEM LABORATORIES
A Sorenson Company

FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01N

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

Client Sample Name: **SBD-10**
DCL Sample Name...: **03E04297**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 00:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 19.6

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 22:42	0.277	ND		U	1	1.24
Nitroglycerin	23-OCT-03 22:42	0.201	ND		U	1	0.622

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01P

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB2C**
DCL Sample Name...: **03E04298**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 11:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 33.3

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	23-OCT-03 23:03	0.334	ND		U	1	1.50
Nitroglycerin	23-OCT-03 23:03	0.243	ND		U	1	0.750

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01S

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB3A**
DCL Sample Name...: **03E04299**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 12:00
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 20.3

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: 1c03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	24-OCT-03 00:09	0.280	ND		U	1	1.25
Nitroglycerin	24-OCT-03 00:09	0.203	ND		U	1	0.627

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01T

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB3B**
DCL Sample Name...: **03E04300**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 12:15
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 19.6

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	24-OCT-03 00:31	0.277	ND		U	1	1.24
Nitroglycerin	24-OCT-03 00:31	0.201	ND		U	1	0.622

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FORM A (TYPE I)
SINGLE METHOD ANALYSES

SAMPLE ANALYSIS DATA SHEET

S039F01V

Date Printed.....: 24-OCT-03 11:53

Client Name.....: URS Group, Inc.
Client Ref Number....: Subcontract DCL-09292003
Sampling Site.....: RFAAP/09604-317
Release Number.....: URS#04

Date Received.....: 14-OCT-03 00:00

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332
Aliquot Weight/Volume: 1 gm
Net Weight/Volume....: Not Required

Client Sample Name: **ASB3C**
DCL Sample Name...: **03E04301**
DCL Report Group..: **03E-0450-01**

Matrix.....: SOIL
Date Sampled.....: 11-OCT-03 12:30
Reporting Units...: mg/kg
Report Basis.....: ☐ As Received ☒ Dried
Percent Moisture..: 17.8

DCL Analysis Group: G039F00P
Analysis Method...: 8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

Analytical Results

Analyte	Date Analyzed	MDL	Result	Comment	Qual.	Dilution	CRDL
PETN	24-OCT-03 00:54	0.271	ND		U	1	1.22
Nitroglycerin	24-OCT-03 00:54	0.197	ND		U	1	0.608

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DATA VALIDATION WORKSHEET

Reviewer: AS
Date: January-04
DV Level: II III IV
Review Document:
_X_ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
_X_ Project QAPP/SAP

Explosives

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: DataChem
SDG No.: 03E-0450-01
Test Name: Explosives
Method No.: 8332-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids		x	
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	x		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		x	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		x	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	x		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	x		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	x		
	For initial Calibration: for %RSD > ±20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).			
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	x		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
5.2	Are surrogate recoveries within acceptance criteria not to exceed 30-150% for all samples and method blanks?	x		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			x
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			x
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	x		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
6.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 40-150%?		x	
6.4	Are there any RPDs outside the QC limits not to exceed 60%?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	x		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	x		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 40-150%?		x	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 60%?			x
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes:

	SBD10	ASB2B
PETN	ND	ND
nitroglycerin	ND	ND

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are all positive identifications confirmed on second column or detector? If not, reject or estimate this detection.			x
9.2	For positive sample detections, is RPD <40% between first and second columns. If not, apply J.			x
9.3	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	x		

Notes:

10.0 Data Completeness			Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)		x		
	Number of samples:	10			
	Number of target compounds in each analysis:	2			
	Number of results rejected and not reported:	0			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)				
	% Completeness =	100%			

Notes:

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FORM F (TYPE I)
SINGLE METHOD ANALYSES

QUALITY CONTROL DATA SHEET
MATRIX SPIKE SAMPLE
MATRIX SPIKE DUPLICATE SAMPLE

S039F01Q

Client Name.....: URS Group, Inc.
Release Number.....: URS#04

Matrix.....: SOIL
Reporting Units.....: mg/Kg

DCL Preparation Group: G039F00P
Date Prepared.....: 15-OCT-03 00:00
Preparation Method...: 8332

DCL Sample Name...: **03E04298MS**
Date Printed.....: 24-OCT-03 11:53

DCL Analysis Group: G039F00P
Analysis Method...: OL-SW-8332
Instrument Type...: HPLC
Instrument ID.....: lc03
Column Type.....: ultracarb ods
☒ Primary
☐ Confirmation

QC Limit Type.....: Method

Analytical Results

Analyte	Date Analyzed	Sample Result	Spiked Result	Spike Added	Percent Recovery	QC Limits	QC Flag
PETN	23-OCT-03 23:25	ND	17.7	20.0	88.3	65.0/125.	
Nitroglycerin	23-OCT-03 23:25	ND	18.4	20.0	92.0	65.0/125.	

S039F01R

DCL Sample Name...: **03E04298MSD**

Analytical Results

Analyte	Date Analyzed	Duplicate Result	Percent Recovery	Mean	Range	RPD	QC Limits	QC Flag
PETN	23-OCT-03 23:47	18.7	93.6	18.2	1.06	5.8	0.00/35.0	
Nitroglycerin	23-OCT-03 23:47	18.3	91.6	18.4	0.0814	0.44	0.00/35.0	

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ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1
10160310443945X

Date _____
Laboratory Group Name 03E-0450-02
Account No. 08001 URSAOU

URS Group, Inc.
Attention: Mr. J Darren Renne
5540 Falmouth Street
Suite 201
Richmond, VA 23229

FAX _____
Telephone _____
E-mail _____

Sampling Collection and Shipment

Sampling Site RFAAP/09604-317 Date of Collection October 11, 2003

Date Samples Received at Laboratory October 14, 2003

Analysis

Method of Analysis XX-EP-800

Date(s) of Analysis October 16, 2003

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	MOISTURE %							
ASB1A	03E04292	SOIL	17.6							
ASB1B	03E04293	SOIL	20.9							
ASB1C	03E04294	SOIL	27.1							
ASB2A	03E04295	SOIL	17.7							
ASB2B	03E04296	SOIL	18.4							
SBD-10	03E04297	SOIL	19.6							
ASB2C	03E04298	SOIL	33.3							
ASB2CMD	03E04298MD	SOIL	31.2							
ASB3A	03E04299	SOIL	20.3							
ASB3B	03E04300	SOIL	19.6							
ASB3C	03E04301	SOIL	17.8							
Limit of Detection										

† See comment on last page.
ND Parameter not detected above LOD.
NR Parameter not requested.
NA Parameter not applicable.

** See comment on last page.
( ) Parameter between LOD and LOQ.

Norman Breese
Analyst: Norman Breese

Jon Yonk
Reviewer: Johnathan M. Yonk

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Bm 10/15/03

Date of Extraction:	OCT 15, 2003	DataChem Laboratories Extraction Notebook	Book # Ext 246 Page#
Account #(s):	8001		
DCL Set ID(s):	03E-0448-02,0450-01		Matrix: SOIL
Group/Lot ID:	G039F00P		Method: 8332

	DCL Sample ID	Field ID	Initial Vol. / WT	Initial pH	Adj pH			Surr. Added	Matrix Spike		Final Volume
1	BL-211589-1	BL-211589-1	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
2	QC-211589-1	QC-211589-1	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
3	03E04288	13SD3	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
4	03E04289	SDD1	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
5	03E04290	13SD2	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
6	03E04290MS	13SD2MS	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
7	03E04290MSD	13SD2MSD	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
8	03E04292	ASB1A	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
9	03E04293	ASB1B	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
10	03E04294	ASB1C	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
11	03E04295	ASB2A	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
12	03E04296	ASB2B	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
13	03E04297	SBD-10	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
14	03E04298	ASB2C	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
15	03E04298MS	ASB2CMS	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
16	03E04298MSD	ASB2CMSD	1.0gm	N/A	N/A	N/A		1mL	1mL	----	2mL
17	03E04299	ASB3A	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
18	03E04300	ASB3B	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
19	03E04301	ASB3C	1.0gm	N/A	N/A	N/A		1mL	----	----	2mL
20											
21											
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40											

Solvents:	MeCN	CH016	Comments:
Surrogate Spike:	239 ws 3	1/30/04 By: Bm	
Matrix Spike:	239 ws 99	2/12/04 By: Bm	
Matrix Spike:	---I---	----------By:	
Extractionist:	Bm 10/15/03		
Checker:	10/15/03		Sonicators tunned by:

*=Entry Error

Bm 10/15/03

Bm 10/15/03

DATA CHEM
LABORATORIES, INC.
A SORENSON COMPANY

Case Narrative

Method:	SW-846 8332	**Client:**	URS
Analysis:	Nitroglycerin, PETN	**Account:**	8001
Preparation SOP #:	OL-SW-8332	**Matrix:**	Solid
Analysis SOP#:	OL-SW-8332	**SDG#:**	URS#04
DCL Set ID's:	03E-0450-01		

General Set Information: This set contained ten samples, a matrix spiked sample (MS) and a matrix spike duplicate. This set was batched with another set, which contained three solid samples, a method blank, a laboratory control sample (LCS), a matrix spiked sample (MS) and a matrix spike duplicate.

Method Summary: A 1.0 gram portion of the soil samples was weighed, transferred into a suitable container, and 2 ml of acetonitrile was added. The samples were placed in an ultrasonic bath for a minimum of one hour. The samples were allowed to settle and the supernatant was filtered through a 0.45µ PTFE filter. One part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Ultracarb ODS C18 column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. Initial calibration standards were analyzed and linear calibration curves were generated from the data. A continuing calibration standard was analyzed at the beginning of sample analysis, after each ten samples, and at the end of the analysis. The response of the continuing calibration standard must be within method limits when compared to the initial calibration curve.

Samples and QCs were analyzed under identical conditions as those used for initial and continuing calibration. Quantitation was based on calibration curves using the initial calibration standards. Results were reported in units of mg/Kg.

Sample Preparation: No anomalies were observed during the preparation of the samples.

Holding Times: The samples were prepared and analyzed within method required hold times.

Dilution(s): No dilutions were performed on this set.

Quality Control Data:

Blank: No confirmed method analytes were detected in the method blank above half of the CRDL. The method blank belonged to set# 03E-0448-02.

Laboratory Control Samples: All recoveries met the method limits. The LCS belonged to set# 03E-0448-02.

Surrogate Recovery: Surrogate recoveries were acceptable.

MS/MSD: Matrix spiking was performed on sample 03E04298. All percent recoveries and RPDs were within method limits.

Instrument QC: All initial and continuing calibration verification samples met method criteria.

Flagging Codes: The "U" flag indicates that the analyte was not detected at or above the MDL level. The "J" flag indicates that a value reported between the MDL and CRDL.

NC/CAR: None.

Miscellaneous Comments: None.

Confirmation Analyses: Any sample with a positive result above the MDL was qualitatively analyzed for confirmation on a second column. For samples requiring confirmation, one part acetonitrile extract was mixed with one part of a 1% calcium chloride solution, then injected into an HP1050 HPLC equipped with UV detection and a Phenomenex Synergi Polar-RP column. The instrument was adjusted to the proper operating parameters and allowed to equilibrate until a stable baseline was established. A CCV standard was run to establish retention times and a standard at a level near the reporting limits was run to verify low concentration sensitivity. The second column analyses were used for qualitative confirmation of analytes based on retention time. If a positive result is confirmed, the quantitative result from the primary column is reported.

Gloria W. Heung 9/27/03

Gloria W. Heung Date

03E-0450
SDG# URS#04

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1121

Project Number	Project Name
09604.317	RFAAP 55L

Project Contact (Name and Phone Number): Darren Kerns

Samplers: T. Spangler

LAB: DataChem

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332) PETN/NG	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
ASD1A	10-11-03 8:45	S		X	S	F		1						X									03E04292
ASB1B	9:00	S		X	S	F		1						X									93
ASB1C	9:15	S		X	S	F		1						X									94
ASB2A	10:15	S		X	S	F		1						X									95
ASB2B	10:30	S		X	S	F		1						X									96
SBD-10	-	S		X	S	F		1						X									97
ASB2C	11:05	S		X	S	F		1						X									98
ASD2CMS	11:15	S		X	S	F		1						X									98MS
ASB2CMSD	11:15	S		X	S	F		1						X									98MSD
ASB3A	12:00	S		X	S	F		1						X									99
ASB3B	12:15	S		X	S	F		1						X									300
ASB3C	12:30	S		X	S	F		1						X									301
				X																			

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/13/03 1400	FedEx			
FedEx	10/14/03 0830	(for lab) [signature] R-33-1			

NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

001

Earliest Sampling Date: 11-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 28-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0450 * | **Reporting Group**

Client: URS | **Account:** 08001

Comments:

Verified: JW 10/14/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2	Analysis: Nitroglycein/PETN by 8332	Analysis: Moisture	# Bottles
11-Oct-2003	ASB1A	03E04292			SOIL		X	X	1
11-Oct-2003	ASB1B	03E04293			SOIL		X	X	1
11-Oct-2003	ASB1C	03E04294			SOIL		X	X	1
11-Oct-2003	ASB2A	03E04295			SOIL		X	X	1
11-Oct-2003	ASB2B	03E04296			SOIL		X	X	1
11-Oct-2003	SBD-10	03E04297			SOIL		X	X	1
11-Oct-2003	ASB2C	03E04298			SOIL		X	X	1
11-Oct-2003	ASB2CMS	03E04298MS		MS	SOIL		X		1
11-Oct-2003	ASB2CMSD	03E04298MSD		MSD	SOIL		X		1
11-Oct-2003	ASB3A	03E04299			SOIL		X	X	1

13B 5R

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Walk-in/Room/Shelf/Fridge R-33 B-19	10/15/03 10:00		
	10/15/03 13:30	Norman Bracey	%Moisture
Norman Bracey	10/15/03 15:10	R-319-1 TB 10/15/03 15:40 R-319-1 TB	Storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

Check box if there is a continuation page ☐

Printed 10/14/2003 10:39

Form: COFC1.01-SWV2.30

Earliest Sampling Date: 11-Oct-2003

DataChem Laboratories
CHAIN-OF-CUSTODY

Results due by: 28-Oct-2003

Project/Job/Task: P021C002 | *Split:* | **Root Set ID:** 03E-0450 * | **Reporting Group** | 01 | 02 | | | | | | | | #

Client: URS | **Account:** 08001 | **Analysis** | Nitroglycein/PETN by 8332 | Moisture | | | | | | | | | Bottles

Comments:

Verified: JW 10/14/03

Date Sampled	Field ID Number	DCL Sample Name	DCL Sample ID	QC	Matrix	Customer ID 2																
11-Oct-2003	ASB3B	03E04300			SOIL						X	X										1
11-Oct-2003	ASB3C	03E04301			SOIL						X	X										1
11-Oct-2003	ASB2CMD	03E04298MD		MD	SOIL							X										0

BB JL

ORIGINAL FIELD SAMPLE CHAIN-OF-CUSTODY

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location
Work-in/Room/Shelf/Fridge 12:32 pm	10/15/03 10:...		
	10/15/03 13:30	Norman Beene	w/o Moisture
Norman Beene	10/15/03 15:40	R-319-1 [illegible] R-319-1 [illegible]	Storage

SAMPLE PREPARATION / ANALYSIS CHAIN-OF-CUSTODY

Sample Prep/Analysis for: _____ Lab Notebook No.: _____

Prepared/Analyzed by: _____ Date/Time: _____

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Reason for Transfer/ Storage Location

60
60

Check box if there is a continuation page ☐

Printed 10/14/2003 10:39

Form: COFC1.01-SWV2.30

DATACHEM LABORATORIES CLIENT-RELATED INFORMATION REPORT (CRIR)

COOLER OR CONTAINER INFORMATION CHECKLIST (Fill In or Circle)

Client Name: URS

Project/Task/Site: 03E-0450

Date/Time of Receipt: 10/14/03 0830

Number of Coolers Received: 1

Condition of Coolers: Acceptable/Unacceptable
Custody Seals: Present/Absent/NA
Intact/Broken/NA
Tamper Evident: Yes/No/NA
Ice Present: Yes/No/NA
Frozen/Melted/NA

Temperature Control: Present/Not Included
Location Temp Taken: Cooler/Between Samples
Are all temperatures within project specific guidelines? Yes/No/NA
Are all applicable pHs within specific guidelines? Yes/No/NA

pH Check Performed:	Metals	Yes/No/NA	Total Phenolics	Yes/No/NA	NO3/NO2	Yes/No/NA
	Cyanide	Yes/No/NA	TPH – 418.1	Yes/No/NA	Oil & Grease	Yes/No/NA
	Sulfide	Yes/No/NA	COD	Yes/No/NA	Total Phosphorous	Yes/No/NA
	Ammonia	Yes/No/NA	TKN	Yes/No/NA	Gross A.B, Gamma Spec	Yes/No/NA
Residual Chlorine Check Performed:	8270	Yes/No/NA	8310	Yes/No/NA	8330	Yes/No/NA
	8081	Yes/No/NA	8151	Yes/No/NA		

Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.	Cooler Received	DCL Cooler No.	Temp.
1	C03-6444	5 °C	4	C03-	°C	7	C03-	°C
2	C03-	°C	5	C03-	°C	8	C03-	°C
3	C03-	°C	6	C03-	°C	9	C03-	°C

Taken By: _____ (Signature) S. Pate (Printed Name) 10/14/03 (Date)

CLIENT-RELATED INFORMATION

- ☐ Missing Cooler
- ☐ Cooler Conditions
- ☐ Missing Paperwork
- ☐ Missing/Incorrect Bottle Labels
- ☐ Missing Samples/Bottles
- ☐ Broken/Leaking Samples
- ☐ Incorrect Bottle Type
- ☐ Cooler Temperatures Out of Range
- ☐ Incorrect Preservation
- ☐ pH Criteria Not Met
- ☐ Residual Chlorine Present
- ☐ Head Space in Bottles
- ☐ Insufficient Sample Volume
- ☐ Chain of Custody Problems
- ☐ Other:

EPA Custody Seal:

BRIEFLY DESCRIBE THE PROBLEM AND THE ACTION TAKE

Date 10/13/03 FedEx Tracking Number 832942539767

Sender's Name Brett Fisher Phone 804 965-9000

Company DAMES & MOORE/URS/CRC

Address 5540 FALMOUTH ST STE 201 Dept./Floor/Suite/Room

City RICHMOND State VA ZIP 23230

Faxed to Client? YES ☐ No ☐

Response Req Your Internal Billing Reference 09604 317

PROJECT MANAGEMENT

PROJECT MANAGER COMMENTS:

DCL Project Manager: _____ (Printed Name) Returned to Sample Receipt by: _____ (Signature) Date: _____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

Paradigm Analytical Laboratories, Inc.

Dioxin/Furans

DATA VALIDATION REPORT - Level III Review

SDG No.: G296-180 **Fraction:** Dioxin/Furan

Lab: Paradigm_Analytical **Project Name:** Radford_SSP

Reviewer: Andrea_Sansom **Date:** March_5,_2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic Data Review and National Functional Guidelines for Chlorinated Dioxin/Furan Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: The soil laboratory control spike pair displayed percent recoveries greater than the upper control limit (i.e., 120%) for 1,2,3,6,7,8-HxCDD (124%) and 1,2,3,7,8,9-HxCDD (130%/129%). The associated field sample results were positive for these constituents and were flagged "J,l". The aqueous laboratory control spike duplicate displayed recoveries greater than the upper control limit for several constituents. Since the laboratory control spike displayed acceptable recoveries and the associated equipment blank (EQB-4) was non-detect, no data qualifying action was required.

All the labeled extraction and cleanup standards displayed percent recoveries greater than the upper control limit (i.,e.,135%) for the soil method blank. Since this is a quality control sample, no data qualifying action was required. The equipment blank displayed a positive detection for Total TCDF at 0.00768 ng/L. The associated result less than five times the blank concentration was flagged "B,x" in sample SBD9.

The matrix spike pair performed on sample 13SB9A displayed recoveries greater than the upper control limit (i.e., 120%) for 1,2,3,6,7,8-HxCDD (122%), 1,2,3,7,8,9-HxCDD (125%/135%), 2,3,4,6,7,8-HxCDF (122%/126%), and 1,2,3,7,8,9-HxCDF (138%). Since the recoveries were marginally greater than the control limit and the laboratory control spike displayed similar anomalies, no data qualifying action was taken.

The field duplicate pair (13SB9A and SBD9) displayed a relative percent difference greater than the control limit (i.e., 35%) for OCDD at 62.4%. The positive OCDD result for 13SB9A was flagged "J,f". The concentration of OCDD was greater than the linear range of the initial calibration for sample SBD9. This result was flagged "J,q".

Correctable Anomalies: None.

Comments: The positive 2,3,7,8-TCDF detections for samples 13SB9A and SBD9 on the primary column was re-analyzed on a more suitable column for determination of this congener. The concentration for this congener from the re-analysis should be used for data interpretation.

Signed: Andrea Sansom

Radford SSP
Duplicate Statistics

13SB9A and SBD9

	Units	RL	5xRL	Sample Conc Hits	Duplicate Conc EMPC	Duplicate Conc Hits	Duplicate Conc EMPC	%RPD Hits	Delta Hits	4xRL	Pass/ Fail
Dioxin/Furan											
2,3,7,8-TCDD	pg/g	1.2	6.2	0.12 U		0.13 U		12.0%	0.015	4.96	N/A
1,2,3,7,8-PeCDD	pg/g	6.2	31	0.33 U	0.66 J	0.37 U		11.6%	0.041	24.84	N/A
1,2,3,4,7,8-HxCDD	pg/g	6.2	31	0.74 J		0.30 U	0.48 J	83.8%	0.434	24.84	N/A
1,2,3,6,7,8-HxCDD	pg/g	6.2	31	2.24 J		1.04 J		73.2%	1.20	24.84	N/A
1,2,3,7,8,9-HxCDD	pg/g	6.2	31	2.33 J		0.63 U	1.37 J	115%	1.702	24.84	N/A
1,2,3,4,6,7,8-HpCDD	pg/g	6.2	31	50.0		40.6		20.8%	9.4	24.84	PASS
OCDD	pg/g	12.4	62	1520		2900		**62.4%**	1380	49.6	**FAIL**
2,3,7,8-TCDF	pg/g	1.2	6.2	0.84 J		0.22 J		117%	0.622	4.96	N/A
1,2,3,7,8-PeCDF	pg/g	6.2	31	0.45 J		0.22 U		69.9%	0.233	24.84	N/A
2,3,4,7,8-PeCDF	pg/g	6.2	31	0.57 J		0.26 U		75.0%	0.313	24.84	N/A
1,2,3,4,7,8-HxCDF	pg/g	6.2	31	0.68 J		0.26 U	0.28 J	90.4%	0.424	24.84	N/A
1,2,3,6,7,8-HxCDF	pg/g	6.2	31	0.53 J		0.24 J		74.9%	0.291	24.84	N/A
2,3,4,6,7,8-HxCDF	pg/g	6.2	31	0.49 J		0.51 U		2.6%	0.013	24.84	N/A
1,2,3,7,8,9-HxCDF	pg/g	6.2	31	0.55 U		0.62 U		11.6%	0.068	24.84	N/A
1,2,3,4,6,7,8-HpCDF	pg/g	6.2	31	5.11 J		2.14 J		81.9%	2.97	24.84	N/A
1,2,3,4,7,8,9-HpCDF	pg/g	6.2	31	0.44 U	0.46 J	0.49 U		11.5%	0.053	24.84	N/A
OCDF	pg/g	12.4	62	11.2 J		4.35 J		88.1%	6.85	49.6	N/A
2,3,4,7,8-PeCDF	pg/g	6.2	31	1.08 J	2.24 J	0.13 U	0.40 J	156%	0.948	24.84	N/A
1,2,3,4,7,8-HxCDF	pg/g	6.2	31	3.82 J	6.03 J	2.57 J		39.1%	1.25	24.84	N/A
1,2,3,6,7,8-HxCDF	pg/g	6.2	31	21.6	22.1	10.50	13.10 J	69.2%	11.1	24.84	PASS
2,3,4,6,7,8-HxCDF	pg/g	6.2	31	96.8		93.90		3.0%	2.90	24.84	PASS
1,2,3,7,8,9-HxCDF	pg/g	6.2	31	7.11	8.80	1.07 J	1.94 J	148%	6.04	24.84	N/A
1,2,3,4,6,7,8-HpCDF	pg/g	6.2	31	4.85 J		0.92 J		136%	3.93	24.84	N/A
1,2,3,4,7,8,9-HpCDF	pg/g	6.2	31	8.31		2.18 J	2.93 J	117%	6.13	24.84	N/A
OCDF	pg/g	6.2	31	13.0	13.4	4.88 J		90.8%	8.12	24.84	N/A

Soil Control Limits

[sample] > 5 x RL, use 35%
[sample] < 5 x RL, use 4 x RL

Method 8290

EQB-4

URS Greiner Woodward Clyde

Analytical Data Summary Sheet

Analyte	Adj. MDL (ng/L)	Amount (ng/L)		Adj. RL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.00493	0.00493	U	0.0100				
1,2,3,7,8-PeCDD	0.0221	0.0221	U	0.0500				
1,2,3,4,7,8-HxCDD	0.00986	0.00986	U	0.0500				
1,2,3,6,7,8-HxCDD	0.0142	0.0142	U	0.0500				
1,2,3,7,8,9-HxCDD	0.0132	0.0132	U	0.0500				
1,2,3,4,6,7,8-HpCDD	0.0124	0.0124	U	0.0500				
OCDD	0.0619	0.0619	U	0.100				
2,3,7,8-TCDF	0.00493	0.00493	U	0.0100				
1,2,3,7,8-PeCDF	0.0221	0.0221	U	0.0500				
2,3,4,7,8-PeCDF	0.0201	0.0201	U	0.0500				
1,2,3,4,7,8-HxCDF	0.0115	0.0115	U	0.0500				
1,2,3,6,7,8-HxCDF	0.0122	0.0122	U	0.0500				
2,3,4,6,7,8-HxCDF	0.0107	0.0107	U	0.0500				
1,2,3,7,8,9-HxCDF	0.0131	0.0131	U	0.0500				
1,2,3,4,6,7,8-HpCDF	0.00962	0.00962	U	0.0500				
1,2,3,4,7,8,9-HpCDF	0.00866	0.00866	U	0.0500				
OCDF	0.0165	0.0165	U	0.100				
Total TCDDs	0.00493	0.00493	U	0.0500				
Total PeCDDs	0.0221	0.0221	U	0.0500				
Total HxCDDs	0.00986	0.00986	U	0.0500				
Total HpCDDs	0.0124	0.0124	U	0.0500				
Total TCDFs	0.00493	0.00768	J	0.0500				
Total PeCDFs	0.0201	0.0201	U	0.0500				
Total HxCDFs	0.0107	0.0107	U	0.0500				
Total HpCDFs	0.00866	0.00866	U	0.0500				
ITEF TEQ (ND=0)		0			0			
ITEF TEQ (ND=½)		0.00461			0.00461			

Client Information

Project Name:	Radford Army Ammunition Plant
Sample ID:	EQB-4

Laboratory Information

Project ID:	G296-180	
Sample ID:	G296-180-1A	
Collection Date/Time:	09-Oct-03	16:20
Receipt Date:	10-Oct-03	
Extraction Date:	15-Oct-03	
Analysis Date:	17-Oct-03	

Sample Information

Matrix:	Water	
Weight / Volume:	500	mL
Solids / Lipids:	NA	%
Original pH :	6	
Batch ID:	WG10010	
Filename:	a15oct03a_5-11	
Retchk:	a15oct03a_4-14	
Begin ConCal:	a15oct03a_4-14	
End ConCal:	a15oct03a_5-14	
Initial Cal:	m8290-100103b	

Method 8290

13SB9A

URS Greiner Woodward Clyde

Analytical Data Summary Sheet

Analyte	Adj. MDL (pg/g)	Amount (pg/g)		Adj. RL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.117	0.117	U	1.24				
1,2,3,7,8-PeCDD	0.332	EMPC	J	6.21	0.656	33:28	1.31	
1,2,3,4,7,8-HxCDD	0.268	0.735	J	6.21		35:56	1.11	
1,2,3,6,7,8-HxCDD	0.456	2.24	J	6.21		36:01	1.16	
1,2,3,7,8,9-HxCDD	0.559	2.33	J	6.21		36:14	1.17	
1,2,3,4,6,7,8-HpCDD	0.423	50.0		6.21		39:07	1.00	
OCDD	1.12	1520		12.4		43:05	0.90	
~~2,3,7,8-TCDF~~	~~0.153~~	~~0.842~~	~~J~~	~~1.24~~		~~29:07~~	~~0.85~~	
1,2,3,7,8-PeCDF	0.193	0.450	J	6.21		32:41	1.61	
2,3,4,7,8-PeCDF	0.232	0.574	J	6.21		33:16	1.72	
1,2,3,4,7,8-HxCDF	0.229	0.681	J	6.21		35:15	1.41	
1,2,3,6,7,8-HxCDF	0.116	0.534	J	6.21		35:21	1.17	
2,3,4,6,7,8-HxCDF	0.451	0.494	J	6.21		35:49	1.16	
1,2,3,7,8,9-HxCDF	0.554	0.554	U	6.21				
1,2,3,4,6,7,8-HpCDF	0.489	5.11	J	6.21		37:57	1.00	
1,2,3,4,7,8,9-HpCDF	0.436	EMPC	J	6.21	0.460	39:43	1.49	
OCDF	0.709	11.2	J	12.4		43:18	0.88	
Total TCDDs	0.117	1.08	J	6.21	2.24			
Total PeCDDs	0.332	3.82	J	6.21	6.03			
Total HxCDDs	0.268	21.6		6.21	22.1			
Total HpCDDs	0.423	96.8		6.21				
Total TCDFs	0.153	7.11		6.21	8.80			
Total PeCDFs	0.193	4.85	J	6.21				
Total HxCDFs	0.116	8.31		6.21				
Total HpCDFs	0.436	13.0		6.21	13.4			
ITEF TEQ (ND=0)		3.18			3.51			
ITEF TEQ (ND=½)		3.43			3.69			

J, 1
J, 1
4, f

see next page. *b 3/5/04

Client Information

Project Name:	Radford Army Ammunition Plant
Sample ID:	13SB9A

Laboratory Information

Project ID:	G296-180
Sample ID:	G296-180-2A
Collection Date/Time:	09-Oct-03 14:00
Receipt Date:	10-Oct-03
Extraction Date:	13-Oct-03
Analysis Date:	15-Oct-03

Sample Information

Report Basis:	Dry Weight
Matrix:	Soil
Weight / Volume:	10.07 g
Solids / Lipids:	79.9 %
Original pH :	NA
Batch ID:	WG10007
Filename:	a13oct03a_4-12
Retchk:	a13oct03a_3-14
Begin ConCal:	a13oct03a_3-14
End ConCal:	a13oct03a_4-14
Initial Cal:	m8290-100103b

Method 8290
13SB9A
URS Greiner Woodward Clyde

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDF	0.784			13.34	0.78	A

Labeled Standard	Spiked Amount (ng)	RT (min.)	Ratio	Qualifier
Extraction Standards				
13C12-2,3,7,8-TCDF	2.00	13.33	0.79	

Client Information			**Sample Information**	
Project Name:	Radford Army Ammunition Plant		Report Basis:	Dry
			Matrix:	Soil
Sample ID:	13SB9A		Weight / Volume:	10.1 g
			Solids / Lipids:	79.9
			Original pH :	NA
Laboratory Information			Batch ID:	WG10007
Project ID:	G296-180		Instrument:	hrms3
Sample ID:	G296-180-2A		Filename:	c31oct03-5
Collection Date/Time:	10/09/03	14:00	Retchk:	c31oct03-2
Receipt Date:	10/10/03		Begin ConCal:	c31oct03-3
Extraction Date:	10/13/03		End ConCal:	c31oct03-9
Analysis Date/Time:	10/31/03	13:53	Initial Cal:	mCF-c100603

Analyzed by: _____
Date: 10/31/03

Reviewed by: _____
Date: 10/31/03

Method 8290

SBD9

URS Greiner Woodward Clyde

Analytical Data Summary Sheet

Analyte	Adj. MDL (pg/g)	Amount (pg/g)		Adj. RL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.132	0.132	U	1.39				
1,2,3,7,8-PeCDD	0.373	0.373	U	6.97				
1,2,3,4,7,8-HxCDF	0.301	EMPC	J	6.97	0.477	35:55	1.05	
1,2,3,6,7,8-HxCDF	0.512	1.04	J	6.97		36:00	1.07	
1,2,3,7,8,9-HxCDF	0.628	EMPC	J	6.97	1.37	36:15	1.03	
1,2,3,4,6,7,8-HpCDD	0.474	40.6		6.97		39:07	1.06	
OCDD	1.26	2900		13.9		43:04	0.88	E
~~2,3,7,8-TCDF~~	~~0.172~~	~~0.220~~	~~J~~	~~1.39~~		~~29:06~~	~~0.72~~	
1,2,3,7,8-PeCDF	0.217	0.217	U	6.97				
2,3,4,7,8-PeCDF	0.261	0.261	U	6.97				
1,2,3,4,7,8-HxCDF	0.257	EMPC	J	6.97	0.276	35:16	0.93	
1,2,3,6,7,8-HxCDF	0.130	0.243	J	6.97		35:21	1.16	
2,3,4,6,7,8-HxCDF	0.507	0.507	U	6.97				
1,2,3,7,8,9-HxCDF	0.622	0.622	U	6.97				
1,2,3,4,6,7,8-HpCDF	0.549	2.14	J	6.97		37:57	1.08	
1,2,3,4,7,8,9-HpCDF	0.489	0.489	U	6.97				
OCDF	0.796	4.35	J	13.9		43:18	0.87	
Total TCDDs	0.132	ND	J	6.97	0.399			
Total PeCDDs	0.373	2.57	J	6.97				
Total HxCDDs	0.301	10.5		6.97	13.1			
Total HpCDDs	0.474	93.9		6.97				
Total TCDFs	0.172	1.07	J	6.97	1.94			
Total PeCDFs	0.217	0.921	J	6.97				
Total HxCDFs	0.130	2.18	J	6.97	2.93			
Total HpCDFs	0.489	4.88	J	6.97				
ITEF TEQ (ND=0)		3.48			3.69			
ITEF TEQ (ND=½)		3.89			4.05			

J, I
J, I
J, Q
see next page
4/5 3/5/04
B, X

Client Information

Project Name:	Radford Army Ammunition Plant
Sample ID:	SBD9

Laboratory Information

Project ID:	G296-180
Sample ID:	G296-180-5A
Collection Date:	09-Oct-03
Receipt Date:	10-Oct-03
Extraction Date:	13-Oct-03
Analysis Date:	15-Oct-03

Sample Information

Report Basis:	Dry Weight	
Matrix:	Soil	
Weight / Volume:	10.00	g
Solids / Lipids:	71.7	%
Original pH :	NA	
Batch ID:	WG10007	
Filename:	a15oct03a-11	
Retchk:	a15oct03a-14	
Begin ConCal:	a15oct03a-14	
End ConCal:	a15oct03a-14	
Initial Cal:	m8290-100103b	

Method 8290

SBD9

URS Greiner Woodward Clyde

Analytical Data Summary Sheet

Analyte	Amount (pg/g)	EDL (pg/g)	EMPC (pg/g)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDF	EMPC	0.139	0.194	13.34	0.92 *	A

Labeled Standard	Spiked Amount (ng)	RT (min.)	Ratio	Qualifier
Extraction Standards				
13C12-2,3,7,8-TCDF	2.00	13.33	0.78	

Client Information		**Sample Information**	
Project Name:	Radford Army Ammunition Plant	Report Basis:	Dry
		Matrix:	Soil
Sample ID:	SBD9	Weight / Volume:	10.0 g
		Solids / Lipids:	71.7
		Original pH :	NA
Laboratory Information		Batch ID:	WG10007
Project ID:	G296-180	Instrument:	hrms3
Sample ID:	G296-180-5A	Filename:	c31oct03-11
Collection Date/Time:	10/09/03	Retchk:	c31oct03-2
Receipt Date:	10/10/03	Begin ConCal:	c31oct03-3
Extraction Date:	10/13/03	End ConCal:	c31oct03-12
Analysis Date/Time:	10/31/03 15:50	Initial Cal:	mCF-c100603

Analyzed by: _____
Date: 10/31/03

Reviewed by: _____
Date: 10/31/03

DATA VALIDATION WORKSHEET

Dioxins and Furans Analysis

Reviewer: AS
Date: March-03
DV Level: II III IV
Review Document:
__X__ SW-846 __X__ Project QAPP/SAP __X__ NFG EPA 540-R-02-003 (August 2002)

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: Paradigm
SDG No.: G296-180
Method No.: 8290

1.0 General: Chain-of-Custody

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Notes:

2.0 Preservation/ Holding Times

		Yes	No	NA
2.1	Were samples preserved properly? Stored at 4°C ± 2°C (<4°C to lab and <-10°C at lab for tissue) in the dark. For aqueous, 80mg/L of sodium thiosulfate is required if residual chlorine is present and if the pH is >9, this is adjusted to 7-9 with sulfuric acid. If not, J(+)/UJ(-)	X		
2.2	Have any technical holding times been exceeded? Extraction within 30 days of collection and analysis within 45 days of extraction (tissue must be extracted within 24 hours of defrost) (To comply with 40CFR Part 136.3, drinking water must be extracted within seven days of collection). If yes, J(+)/UJ(-).		X	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-) .		X	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Was a preparation blank prepared with each batch?	X		
3.2	Do any blanks have positive results? Action: If yes, an action level of 5 times the blank value is used to qualify sample results "B".		X	
3.3	Do any field equipment blanks/trip blanks have positive results? Use the same rule.	X		

Notes:

4.0 Instrument Calibration

		Yes	No	NA
4.1	Are five standards included in the calibration curve? If no, apply "J+/R-".	X		
4.2	Are RSD/%D ± 20% for standard compounds? If no, for RSD out apply "J+/UJ-" to associated specific analytes. For %D indicating a positive bias, flag "J+". For %D indicating a negative bias, flag "J+/UJ-".	X		
4.3	Are RSD/%D ± 30% for reference compounds? If no, apply "J" to all positive associated analytes.	X		
4.4	Is the signal to noise ratio acceptable for each selected ion current profile? (ICAL≥ 2.5:1 ; CCC ≥10:1) If no, apply "R" to estimated detection limits.	X		
4.5	Are Isotopic ratios within the following established control limits...? If no, apply "J+/R-".	X		

# Cl ion atoms	Ion Type	Theoretical Ratio	Control Limits
4	M/M+2	0.77	0.65- 0.89
5	M+2/M+4	1.55	1.32- 1.78
6	M+2/M+2	1.24	1.05- 1.43
(13)C-HxCDF	M/M+2	0.51	0.43- 0.59
(13)C-HpCDF	M/M+2	0.44	0.37- 0.51
7	M+2/M+4	1.04	0.88- 1.2
8	M+2	0.89	0.76- 1.02

4.6	Was the CCV analyzed at the beginning and end of every 12 hours? If no, J(+)/UJ(-) all associated samples.	X		

Notes:

5.0 GC/MS Instrument Performance Check

		Yes	No	NA
5.1	Are tuning forms present using perfluorokerosene (PFK) for each start of a 12 hour sequence? If no, apply "R".	X		
5.1a	Is the resolving power ≥ 10,000 with m/z 304.9824? If not, apply "R".	X		
5.1b	Is the deviation from exact m/z and theoretical m/z <0.005 amu or 5 ppm? If not, apply "R".	X		
5.2	Was a window defining mix analyzed defining descriptor switching times of scan ranges? If not, flag total homologue results "J+/UJ-".	X		
5.3	Was an isomer specificity check analyzed with peaks resolved with a valley ≥ 25%? (DB5 column: 2,3,7,8-TCDD and 1,2,3,8-TCDD ; DB225 column: 2,3,7,8-TCDF and 2,3,4,7-TCDF) If not, flag positive 2,3,7,8-TCDD and /or 2,3,7,8-TCDF, whichever failed, "J".	X		

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	X		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	X		
6.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	X		
6.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		X	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)		Yes	No	NA
7.1	Is the LCS recovery form present?	X		
7.2	Was an LCS analyzed for each batch?	X		
7.3	Are there any percent recoveries outside the QC limits of ±20% for targets and ±30% for reference compounds?	X		
	If Yes, for %R > UCL, "J+" only; for %R < LCL but greater than 10%, "J+/UJ-"; for %R < 10%, flag "J+/R-".			

Notes:

8.0 Nine Internal Standards and Two Clean-Up Recovery Standards		Yes	No	NA
8.1	Are internal standard recoveries for all samples within 40-135%? If no, apply J/UJ to associated targets.	X		
8.2	Are standard recoveries for all samples within 40-135% for all samples? If no, apply J/UJ.	X		

Notes: soil MB displayed all standards > 135%

9.0 Field Duplicate

		Yes	No	NA
9.1	Was a field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix)?	X		
9.2	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		X	

Notes:

10.0 Sample Results/Detection Limit Verification

		Yes	No	NA
10.1	Were all sample results within the calibrated range, if not apply J.	X		
10.2	Is the signal to noise ion ratios ≥ 2.5:1 for positive results? If not, flag "J".	X		
10.3	Is the ion abundance ratio within 10% of the ratio in the most current CCC for positive results? If no, this result should be reported as an EMPC.	X		
10.4	Are the two identification peak apexs within 2 seconds for positive identifications? If not, flag "R".	X		
10.5	Was a second column confirmation used for positive 2,3,7,8-TCDF? If no, apply "R" to the 2,3,7,8-TCDF results.	X		
10.6	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	X		

Notes:

11.0 Data Completeness

		Yes	No	NA
11.1	Is the percent completeness within the control limits? (Control limit 90%)	X		
11.1.1	Number of samples: 3			
11.1.2	Number of target compounds in each analysis: 17			
11.1.3	Number of results rejected and not reported: 0			
	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = 100%			

Notes:

Method 8290 - Blank Results

LMB

MB for 2 Soils

Analytical Data Summary Sheet

Analyte	Adj. MDL (ng/L)	Amount (ng/L)		Adj. RL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.246	0.246	U	0.500				
1,2,3,7,8-PeCDD	1.11	1.11	U	2.50				
1,2,3,4,7,8-HxCDD	0.493	0.493	U	2.50				
1,2,3,6,7,8-HxCDD	0.711	0.711	U	2.50				
1,2,3,7,8,9-HxCDD	0.661	0.661	U	2.50				
1,2,3,4,6,7,8-HpCDD	0.621	0.621	U	2.50				
OCDD	3.10	3.10	U	5.00				
2,3,7,8-TCDF	0.247	0.247	U	0.500				
1,2,3,7,8-PeCDF	1.10	1.10	U	2.50				
2,3,4,7,8-PeCDF	1.01	1.01	U	2.50				
1,2,3,4,7,8-HxCDF	0.573	0.573	U	2.50				
1,2,3,6,7,8-HxCDF	0.610	0.610	U	2.50				
2,3,4,6,7,8-HxCDF	0.536	0.536	U	2.50				
1,2,3,7,8,9-HxCDF	0.655	0.655	U	2.50				
1,2,3,4,6,7,8-HpCDF	0.481	0.481	U	2.50				
1,2,3,4,7,8,9-HpCDF	0.433	0.433	U	2.50				
OCDF	0.823	0.823	U	5.00				
Total TCDDs	0.246	0.246	U	2.50				
Total PeCDDs	1.11	1.11	U	2.50				
Total HxCDDs	0.493	0.493	U	2.50				
Total HpCDDs	0.621	0.621	U	2.50				
Total TCDFs	0.247	0.247	U	2.50				
Total PeCDFs	1.01	1.01	U	2.50				
Total HxCDFs	0.536	0.536	U	2.50				
Total HpCDFs	0.433	0.433	U	2.50				
ITEF TEQ (ND=0)		0			0			
ITEF TEQ (ND=½)		0.196			0.196			

Laboratory Information

Sample ID:	LMB10007-A
Extraction Date:	13-Oct-03
Analysis Date:	14-Oct-03

Sample Information

Matrix:	Water	
Weight / Volume:	10.0	mL
Solids / Lipids:	NA	%
Original pH :	NA	
Batch ID:	WG10007	
Filename:	a13oct03a_3-3	
Retchk:	a13oct03a_2-14	
Begin ConCal:	a13oct03a_2-14	
End ConCal:	a13oct03a_3-14	
Initial Cal:	m8290-100103b	

Method 8290 - Blank Results

LMB

Analytical Data Summary Sheet

Labeled Standard	Expected Amount (ng)	Measured Amount (ng)	Percent Recovery (%)	RT (min.)	Ratio	Qualifier
Extraction Standards						
$^{13}C_{12}$-2,3,7,8-TCDD	1.00	1.48	148	30:02	0.79	
$^{13}C_{12}$-1,2,3,7,8-PeCDD	1.00	1.64	164	33:28	1.58	
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	1.00	1.43	143	36:02	1.23	
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	1.00	1.57	157	39:08	1.05	
$^{13}C_{12}$-OCDD	2.00	2.71	136	43:06	0.84	
$^{13}C_{12}$-2,3,7,8-TCDF	1.00	1.47	147	29:06	0.82	
$^{13}C_{12}$-1,2,3,7,8-PeCDF	1.00	1.61	161	32:42	1.66	
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	1.00	1.46	146	35:22	0.52	
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	1.00	1.50	150	37:59	0.46	
Cleanup Standards						
$^{37}Cl_4$-2,3,7,8-TCDD	0.200	0.322	161	30:02		
$^{13}C_{12}$-2,3,4,7,8-PeCDF	0.200	0.340	170	33:17	1.64	
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	0.200	0.301	151	35:57	1.21	
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	0.200	0.350	175	35:16	0.51	
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	0.200	0.280	140	39:44	0.47	
Injection Standards						
$^{13}C_{12}$-1,2,3,4-TCDD	2.00			29:18	0.79	
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	2.00			36:15	1.21	

Laboratory Information

Sample ID: LMB10007-A

Extraction Date: 13-Oct-03
Analysis Date: 14-Oct-03

Analyzed by: _____
Date: 10/31/03

Sample Information

Matrix:	Water	
Weight / Volume:	10.0	mL
Solids / Lipids:	NA	%
Original pH :	NA	
Batch ID:	WG10007	
Filename:	a13oct03a_3-3	
Retchk:	a13oct03a_2-14	
Begin ConCal:	a13oct03a_2-14	
End ConCal:	a13oct03a_3-14	
Initial Cal:	m8290-100103b	

Reviewed by: _____
Date: 10/31/03

Analytical Results
for
Ongoing Precision Result (OPRD)

Analyte	Spiked	AMT	Recovery		Range %		OPR		%D	
	pg/ul	pg/ul	%	#	Lower	Upper	Rec(%)	#		#
2,3,7,8-TCDD	10.0	11.4	114		80.0	120	113		0.670	
1,2,3,7,8-PeCDD	50.0	54.7	109		80.0	120	109		0.627	
1,2,3,4,7,8-HxCDD	50.0	54.2	108		80.0	120	118		8.21	
1,2,3,6,7,8-HxCDD	50.0	61.9	124	#	80.0	120	120		3.27	
1,2,3,7,8,9-HxCDD	50.0	64.9	130	#	80.0	120	129	#	0.309	
1,2,3,4,6,7,8-HpCDD	50.0	53.8	108		80.0	120	108		0.0966	
OCDD	100	106	106		80.0	120	104		1.55	
2,3,7,8-TCDF	10.0	11.2	112		80.0	120	106		4.94	
1,2,3,7,8-PeCDF	50.0	57.5	115		80.0	120	106		7.94	
2,3,4,7,8-PeCDF	50.0	53.6	107		80.0	120	98.2		8.66	
1,2,3,4,7,8-HxCDF	50.0	57.1	114		80.0	120	111		3.24	
1,2,3,6,7,8-HxCDF	50.0	60.2	120 OKAY	#	80.0	120	112		7.18	
2,3,4,6,7,8-HxCDF	50.0	58.7	117		80.0	120	112		4.54	
1,2,3,7,8,9-HxCDF	50.0	55.7	111		80.0	120	110		1.55	
1,2,3,4,6,7,8-HpCDF	50.0	58.3	117		80.0	120	116		0.743	
1,2,3,4,7,8,9-HpCDF	50.0	53.6	107		80.0	120	108		0.499	
OCDF	100	110	110		80.0	120	108		1.61	

%D limit is 25%
= Outside URS limits
* = Ion Ratio Out

QC Information

OPR Project No:	OPRD10007
Extraction Date:	13-Oct-03
Analysis Date:	14-OCT-03
Method:	8290

Sample Information

Matrix:	Soil

File Information

OPRD Filename :	a13oct03a_3-2
Retchk:	a26oct03a_6-14
Begin ConCal:	a26oct03a_6-14
End ConCal:	a13oct03a_3-14
Initial Cal:	m8290-100103b

13SB9A

Method 8290

Results for MS/MSD

DP 558 0925

Analyte	Sample pg/g	Spike pg	MS pg/g	%REC (75-125)	MSD pg/g	%REC (75-125)	%RPD (20)
2,3,7,8-TCDD	ND	200	29.1	117	27.4	117	0.0619
1,2,3,7,8-PeCDD	0.656	1000	136	109	125	107	2.52
1,2,3,4,7,8-HxCDD	0.735	1000	138	111	133	113	2.25
1,2,3,6,7,8-HxCDD	2.24	1000	150	119	145	122	2.51
1,2,3,7,8,9-HxCDD	2.33	1000	157	125	160	135 #	7.87
1,2,3,4,6,7,8-HpCDD	50.0	1000	170	96.9	160	94.3	2.74
OCDD	1520	2000	2090	2300 #	1870	1500 #	42.2 # OKAY due to HxRule
2,3,7,8-TCDF	0.842	200	27.4	107	25.8	107	0.256
1,2,3,7,8-PeCDF	0.450	1000	135	109	129	110	1.40
2,3,4,7,8-PeCDF	0.574	1000	141	113	136	116	2.33
1,2,3,4,7,8-HxCDF	0.681	1000	149	120	138	118	1.75
1,2,3,6,7,8-HxCDF	0.534	1000	144	116	138	118	1.69
2,3,4,6,7,8-HxCDF	0.494	1000	152	122	147	126	2.60
1,2,3,7,8,9-HxCDF	ND	1000	144	116	161	138 #	17.1
1,2,3,4,6,7,8-HpCDF	5.11	1000	145	113	137	113	0.0688
1,2,3,4,7,8,9-HpCDF	0.460	1000	128	103	129	110	6.74
OCDF	11.2	2000	257	99.2	243	99.3	0.0932

Client Information

		Solids:	79.9	%
Project ID:	Coleman Evans	Sample amount:	10.1	g
Sample ID:	DP 558 0925	MS amount:	10.1	g
		MSD amount:	10.7	g

Laboratory Information

Project ID:	G296-180
Sample ID:	G296-180-2A
MS ID:	G296-180-3A
MSD ID:	G296-180-4A

Reviewed By: _____

Extraction by Modified Method 3540C

(Soxhlet with Dean-Stark Adapter - SDS)

Soil 1 of 6

Analytical Method: 8290 1613 8280
1668 680 Other_____

QC Date	QC Batch*	Prev. WG	Workgroup*	Logbook#	Page#
~~30~~-Oct-03	100037	~~10005~~ N/A	WG	10	007

10.13.03

#20	Sample Identification								
	Client* ID	Project* ID	Sample* ID	Container* ID	Sample Matrix	Sample Weight*	ES Amt.* (µL)	MX Amt. (µL)	Analyst (initials)
	N/A	N/A	LMB-10007	N/A	Soil	10.00	40	0	BK
1 10	G515	561	1	A	Soil	5.32	40	0	
2 11	G349	85	1	B	Soil	1.01	40	0	
3 12	G349	85	2	B	Soil	1.02	40	0	
4 13	G296	180	2	A	Soil	10.07	40	0	
5 14	G296	180	3	A-MS	Soil	10.10	40	40	
6 15	G296	180	4	A-MSD	Soil	10.72	40	40	
7 16	G296	180	5	A	Soil	10.00	40	0	
8 17	G515	563	1	A	Soil	5.09	40	0	
9 18	G301	134	1	A	Soil	5.12	40	0	
10 19	G301	134	2	A	Soil	5.19	40	0	
11 20	G301	134	3	A	Soil	5.30	40	0	
	N/A	N/A	OPR-10007	N/A	Soil	10.00	40	40	
	N/A	N/A	OPR-10007D	N/A	Soil	10.00	40	40	

10.14.03

Items	Lot #	Conc. (ng/µL)	Witness
Toluene	C4469		
Tridecane	SPL1-5		
Salt	43154324		
Thimbles	30466 10		
Extraction Std.	517-276	0.05	MM
Matrix Spike	517-277	0.005	MM

☐ Pre-Sox? ☑ Tridecane added?

Start Date/Time: 1500 10-13-03

Finish Date/Time: 800 10-14-03

Comments:

* = To be entered in the Prep Table.

DC7.083003.5

☑ Data in prep table?

247

Dry Weight Log

Soil 2 of 6

Sample #	tare*	total*	dry weight 1	dry weight 2*	dry weight 3*	Initials
6515561-1A	1.23 g	start time: 1400 date: ~~10-13-03~~ 10-13-03 12.08 g	time: 800 date: 10.14.03 10.07 g	time: 900 date: 10-14-03 10.07 g	time: date: g	PS
6296-180-2A	1.22 g	start time: 1400 date: 10.13.03 10.00 g	time: 800 date: 10.14.03 8.24 g	time: 900 date: 10-14-03 8.24 g	time: date: g	
6296-180-3A	1.23 g	start time: 1400 date: 10.13.03 935 10.58 g	time: 800 date: 10-14-03 8.71 g	time: 900 date: 10.14.03 80 8.70 g	time: date: g	
6296-180-4A	1.21 g	start time: 1400 ~~date: 10-13-03~~ time: ~~800~~ date: 10-1405 8.53 g	time: 900 date: 10.14.03 74 8.52 g	time: date: g		
6296180-5A	1.22 g	start time: 1400 date: 10-13-03 10.69 g	time: 800 date: 10-14-03 8.01 g	time: 900 date: 10.14.03 8.02 g	time: date: g	
6515-563-1A	1.23 g	start time: 1400 date: 10-13-03 16.14 g	time: 800 date: 10-14-03 8.02 g	time: 900 date: 10-14-03 8.02 g	time: date: g	
6291-134-1A	1.22 g	start time: 1400 date: 101303 10.72 g	time: 800 date: 10-14-03 9.41 g	time: 900 date: 10-14-03 9.42 g	time: date: g	

10.14.03

3 & 4 are missing same samples as 6296-180-2

*= Enter final weight in the Prep Table.

Page: 169

Extract cleanup by modified method 3630/3620

Silica/florisil

Soil 3of6

	Sample Identification											
	Client ID	Project ID	Sample ID	Container ID	Train	CS Amt.* (µL)	Witness (initials)	Analyzed (%)	Analyst (initials)	Date	Method	Matrix
	N/A	N/A	LMB10007	A	1	✓40	BWS	100	MM	14-Oct-03	8290	Soil
A	G515	561	1	A	2	✓40	↓	100	↓	14-Oct-03	8290	Soil
A	G301	134	1	A	3	✓40	↓	100	↓	14-Oct-03	8290	Soil
A	G301	134	2	A	4	✓40	↓	100	↓	14-Oct-03	8290	Soil
B	G301	134	3	A	5	✓40	↓	100	↓	14-Oct-03	8290	Soil
B	G515	563	1	A	6	✓40	↓	100	↓	14-Oct-03	8290	Soil
B	G349	85	1	B	7	✓40	↓	100	↓	14-Oct-03	8290	Soil
B	G349	85	2	B	8	✓40	↓	100	↓	14-Oct-03	8290	Soil
C	G296	180	2	A	9	✓40	↓	100	↓	14-Oct-03	8290	Soil
C	G296	180	3	A	10	✓40	↓	100	↓	14-Oct-03	8290	Soil
C	N/A	N/A	OPR10007	A	11	✓40	↓	100	↓	14-Oct-03	8290	Soil
C	N/A	N/A	OPRD10007	A	12	✓40	↓	100	↓	14-Oct-03	8290	Soil

Item	Lot #'s	Conc. (ng/µL)
Hexane	CI346	
Methylene Chloride	CI119	
Acid Silica	SPL1-7	
Base Silica	7/18/03	
Silica	SPL1-1B	
Florisil	SPO2578	
Salt	42364305	
Tridecane	N/A	
Cleanup Std.	S18-1	0.01

Comments:

252

DC1.090203.6

* = to be entered in the Prep table.

Log Book: 15 Page: 010

Extract cleanup by modified method 3630/3620

Silica/florisil

Soil 4 of 6

	Sample Identification											
	Client ID	Project ID	Sample ID	Container ID	Train	CS Amt.* (µL)	Witness (initials)	Analyzed (%)	Analyst (initials)	Date	Method	Matrix
A	G296	180	4	A	1	✓40	BWS	100	MM	14-Oct-03	8290	Soil
	G296	180	5	A	2	✓40	↓	100	↓	14-Oct-03	8290	Soil
					3							
					4							
B					5							
					6							
					7							
					8				MM			
					9				10.14.03			
C					10							
					11							
					12							

Item	Lot #'s
Hexane	CI346
Methylene Chloride	CI119
Acid Silica	SPL1-7
Base Silica	7/18/03
Silica	SPL1-1B
Florisil	SPO2578
Salt	42364305
Tridecane	N/A
Cleanup Std.	518-1

Conc. (ng/µL)
0.01

Comments:

DC1.090203.6

* = to be entered in the Prep table.

Log Book: 15 Page: 011

Cleanup Observation Form

Soil 5of6

Reference: PCU Log

Log:	Page:
15	010

	Train					
	7	8	9	10	11	12
Silica	☐ Clear/Colorless ☐ Brown 2 ☐ ____ ____ ☐ ____ ____ Travel 1	☐ Clear/Colorless ☐ Brown 1 ☐ ____ ____ ☐ ____ ____ Travel 1	☐ Clear/Colorless ☐ Brown 2 ☐ ____ ____ ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ Brown 2 ☐ ____ ____ ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____
Acid	☐ Clear/Colorless ☐ purple 1 ☐ ____ ____ ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ purple 1 ☐ ____ ____ ☐ ____ ____ Travel 1	☐ Clear/Colorless ☐ purple 2 ☐ ____ ____ ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ purple 2 ☐ ____ ____ ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ Orange 1 ☐ ____ ____ ☐ ____ ____ Travel 1	☐ Clear/Colorless ☐ Orange 1 ☐ ____ ____ ☐ ____ ____ Travel 1
Base	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____
Florisil	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☒ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____
Extract	☒ Clear/Colorless ☐ ____ ____	☒ Clear/Colorless ☐ ____ ____	☒ Clear/Colorless ☐ ____ ____	☒ Clear/Colorless ☐ ____ ____	☒ Clear/Colorless ☐ ____ ____	☒ Clear/Colorless ☐ ____ ____
Sx	G349-85-1B	G349-85-2B	G296-180-2A	G296-180-3A	OPR10007-A	OPRD10007-A
Comments						

Cleanup Observation Form

Soil 6 of 6

Reference: PCU Log

Log:	Page:
15	011

	Train 1	2	3	4	5	6
Silica	☐ Clear/Colorless ☐ Brown 2 ☐ Yellow 1 ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ Brown 1 ☐ ____ ____ ☐ ____ ____ Travel 1	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____
Acid	☐ Clear/Colorless ☐ purple 3 ☐ ____ ____ ☐ ____ ____ Travel 2	☐ Clear/Colorless ☐ purple 2 ☐ ____ ____ ☐ ____ ____ Travel 1	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____
Base	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____
Florisil	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____	☐ Clear/Colorless ☐ ____ ____ ☐ ____ ____ ☐ ____ ____ Travel ____
Extract	☐ Clear/Colorless ☐ ____ ____	☐ Clear/Colorless ☐ ____ ____	☐ Clear/Colorless ☐ ____ ____	☐ Clear/Colorless ☐ ____ ____	☐ Clear/Colorless ☐ ____ ____	☐ Clear/Colorless ☐ ____ ____
Sx	G296-180-4A	G296-180-5A	--	--	--	--
Comments						MRA 10-14-03

QCZ

DC29.072500.3

☐ Continued on next page.

Method 8290 - Blank Results

LMB

MB for EQB

Analytical Data Summary Sheet

Analyte	Adj. MDL (ng/L)	Amount (ng/L)		Adj. RL (ng/L)	EMPC (ng/L)	RT (min.)	Ratio	Qualifier
2,3,7,8-TCDD	0.00493	0.00493	U	0.0100				
1,2,3,7,8-PeCDD	0.0221	0.0221	U	0.0500				
1,2,3,4,7,8-HxCDD	0.00986	0.00986	U	0.0500				
1,2,3,6,7,8-HxCDD	0.0142	0.0142	U	0.0500				
1,2,3,7,8,9-HxCDD	0.0132	0.0132	U	0.0500				
1,2,3,4,6,7,8-HpCDD	0.0124	0.0124	U	0.0500				
OCDD	0.0619	0.0619	U	0.100				
2,3,7,8-TCDF	0.00493	0.00493	U	0.0100				
1,2,3,7,8-PeCDF	0.0221	0.0221	U	0.0500				
2,3,4,7,8-PeCDF	0.0201	0.0201	U	0.0500				
1,2,3,4,7,8-HxCDF	0.0115	0.0115	U	0.0500				
1,2,3,6,7,8-HxCDF	0.0122	0.0122	U	0.0500				
2,3,4,6,7,8-HxCDF	0.0107	0.0107	U	0.0500				
1,2,3,7,8,9-HxCDF	0.0131	0.0131	U	0.0500				
1,2,3,4,6,7,8-HpCDF	0.00962	0.00962	U	0.0500				
1,2,3,4,7,8,9-HpCDF	0.00866	0.00866	U	0.0500				
OCDF	0.0165	0.0165	U	0.100				
Total TCDDs	0.00493	0.00493	U	0.0500				
Total PeCDDs	0.0221	0.0221	U	0.0500				
Total HxCDDs	0.00986	0.00986	U	0.0500				
Total HpCDDs	0.0124	0.0124	U	0.0500				
Total TCDFs	0.00493	0.00493	U	0.0500				
Total PeCDFs	0.0201	0.0201	U	0.0500				
Total HxCDFs	0.0107	0.0107	U	0.0500				
Total HpCDFs	0.00866	0.00866	U	0.0500				
ITEF TEQ (ND=0)		0			0			
ITEF TEQ (ND=½)		0.00475			0.00475			

Laboratory Information

Sample ID:	LMB10010-A
Extraction Date:	15-Oct-03
Analysis Date:	17-Oct-03

Sample Information

Matrix:	Water	
Weight / Volume:	500	mL
Solids / Lipids:	NA	%
Original pH :	5	
Batch ID:	WG10010	
Filename:	a15oct03a_4-6	
Retchk:	a15oct03a_3-14	
Begin ConCal:	a15oct03a_3-14	
End ConCal:	a15oct03a_4-14	
Initial Cal:	m8290-100103b	

Analytical Results
for
Ongoing Precision Result (OPRD)

LCS for EQB

LCSD LCS

Analyte	Spiked pg/ul	AMT pg/ul	Recovery %	#	Range % Lower	Range % Upper	OPR Rec(%)	#	%D	#
2,3,7,8-TCDD	5.00	5.29	106		80.0	120	124	#	15.4	
1,2,3,7,8-PeCDD	25.0	25.3	101		80.0	120	112		9.92	
1,2,3,4,7,8-HxCDD	25.0	23.7	95.0		80.0	120	110		14.3	
1,2,3,6,7,8-HxCDD	25.0	27.6	111		80.0	120	124	#	11.8	
1,2,3,7,8,9-HxCDD	25.0	28.7	115		80.0	120	130	#	12.5	
1,2,3,4,6,7,8-HpCD	25.0	24.6	98.5		80.0	120	109		10.4	
OCDD	50.0	47.1	94.2		80.0	120	106		11.9	
2,3,7,8-TCDF	5.00	5.00	100		80.0	120	115		13.9	
1,2,3,7,8-PeCDF	25.0	25.2	101		80.0	120	114		11.8	
2,3,4,7,8-PeCDF	25.0	24.4	97.7		80.0	120	107		8.62	
1,2,3,4,7,8-HxCDF	25.0	26.9	108		80.0	120	120		10.6	
1,2,3,6,7,8-HxCDF	25.0	27.1	109		80.0	120	123	#	12.5	
2,3,4,6,7,8-HxCDF	25.0	27.2	109		80.0	120	125	#	13.4	
1,2,3,7,8,9-HxCDF	25.0	25.1	100		80.0	120	116		14.2	
1,2,3,4,6,7,8-HpCDF	25.0	25.8	103		80.0	120	116		11.7	
1,2,3,4,7,8,9-HpCDF	25.0	23.1	92.6		80.0	120	107		14.1	
OCDF	50.0	51.3	103		80.0	120	115		11.1	

%D limit is 25%
= Outside URS limits
* = Ion Ratio Out

QC Information

OPR Project No:	OPRD10010
Extraction Date:	15-Oct-03
Analysis Date:	17-OCT-03
Method:	8290

Sample Information

Matrix:	Soil

File Information

OPRD Filename :	a15oct03a_4-5
Retchk:	a15oct03a_3-14
Begin ConCal:	a15oct03a_3-14
End ConCal:	a15oct03a_4-14
Initial Cal:	m8290-100103b

Extraction by Modified Method 3520C

EQB 1 of 5

(Continuous Liquid/Liquid - CLLE)

Analytical Method: (8290) 1613 8280 1613DW 1668 680 Other _____

QC Date	QC Batch*	Prev. WG	Workgroup*	Logbook#	Page#
15-Oct-03	10010	N/A	WG	10	010

	Sample Identification											
#/20	Client ID* ID	Project* ID	Sample*	Container*	Volume*	Sample*	pH*	ES Amt.*	MX Amt. (µL)	Tridecane (100 µL)	CS Amt. (µL)	Analyst (Initials)
	N/A	N/A	LMB10010	N/A	500	5.00	✓	↘ 20	0	✓	↘ 20	BLS
	G341	159	1	A	515	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	2	A	507	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	3	A	517	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	4	A	505	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	5	A	510	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	6	A	505	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	7	A	508	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	8	A	507	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	9	A	510	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	10	A	518	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	11	A	515	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	12	A	508	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	13	A	511	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	14	A	512	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	15	A	513	8	✓	↘ ** 20	0	✓	↘ 20	
	G341	159	16	A	512	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	17	A	501	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	18	A	510	8	✓	↘ 20	0	✓	↘ 20	
	G341	159	19	A-MS	509	8	✓	↘ 20	↘ 20	✓	↘ 20	
	G341	159	20	A-MSD	516	8	✓	↘ 20	↘ 20	✓	↘ 20	
▷	G296	180	1	A	500	6	✓	↘ 20	0	✓	↘ 20	
	N/A	N/A	OPR10010	N/A	500	5.00	✓	↘ 20	↘ 20	✓	↘ 20	
	N/A	N/A	OPRD10010	N/A	500	5.00	✓	↘ 20	↘ * 20	✓	↘ 20	

Items	Lot #	Conc. (ng/µL)	Witness
MeCl	CI 785		
Tridecane	SPLI-5		
Salt	43196331		
H_2SO_4	Y09046		
Extraction Std.	517-276	0.05	MPR
Matrix Spike	517-277	0.005	MPR
Clean-up Std.	518-1	0.01	MPR
DC61.081903.3	Δ 518-5	0.01 mg/kg	MPR

☐ Pre-Sox? ☑ Tridecane added?

Start Date/Time: 10-15-03 9:05

Finish Date/Time: 10-15-03 1335

Comments: * 8290 MX 0.05 ng/µL Lot # 518-7 ES
** 8290 ES 0.005 ng/µL Lot # 518-8 MX

MPR 10-15-03

* = To be entered in the Prep Table.

☑ Data in prep table?

EQB 2of5

[redacted] Analytical Laboratories

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WG10010

Sample ID	EXT	WG	Tare	Total	Final	Ext Date	%2ms	Final Vol	Init Vol	pH	ES Add	CS Add	% Moisture	QC Batch
G296-180-1		G1001	0	0	0	2003-10-15	100	20	500	6	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	518	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	515	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	508	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	511	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	512	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	513	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	512	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	501	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	510	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	509	8	1	0.2	0	10010
G341-159-1		G1001	0	0	0	2003-10-15	100	20	515	8	1	0.2	0	10010
G341-159-2		G1001	0	0	0	2003-10-15	100	20	516	8	1	0.2	0	10010
G341-159-2		G1001	0	0	0	2003-10-15	100	20	507	8	1	0.2	0	10010
G341-159-3		G1001	0	0	0	2003-10-15	100	20	517	8	1	0.2	0	10010
G341-159-4		G1001	0	0	0	2003-10-15	100	20	505	8	1	0.2	0	10010
G341-159-5		G1001	0	0	0	2003-10-15	100	20	510	8	1	0.2	0	10010
G341-159-6		G1001	0	0	0	2003-10-15	100	20	505	8	1	0.2	0	10010
G341-159-7		G1001	0	0	0	2003-10-15	100	20	508	8	1	0.2	0	10010
G341-159-8		G1001	0	0	0	2003-10-15	100	20	507	8	1	0.2	0	10010
G341-159-9		G1001	0	0	0	2003-10-15	100	20	510	8	1	0.2	0	10010
LMB10010	LMB	G1001	0	0	0	2003-10-15	100	20	500	5	1	0.2	0	10010

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EQB 3of5

Extract cleanup by modified method 3630/3620

Silica/florisil

	Sample Identification											
	Client ID	Project ID	Sample ID	Container ID	Train	CS Amt.* (µL)	Witness (initials)	Analyzed (%)	Analyst (initials)	Date	Method	Matrix
	N/A	N/A	LMB10010	A	1	0	N/A	100		15-Oct-03	8290	Water
A	G341	159	1	A	2	0	N/A	100		15-Oct-03	8290	Water
	G341	159	2	A	3	0	N/A	100		15-Oct-03	8290	Water
	G341	159	3	A	4	0	N/A	100		15-Oct-03	8290	Water
	G341	159	4	A	5	0	N/A	100		15-Oct-03	8290	Water
B	G341	159	5	A	6	0	N/A	100		15-Oct-03	8290	Water
	G341	159	6	A	7	0	N/A	100		15-Oct-03	8290	Water
	G341	159	7	A	8	0	N/A	100		15-Oct-03	8290	Water
	G341	159	8	A	9	0	N/A	100		15-Oct-03	8290	Water
C	G341	159	9	A	10	0	N/A	100		15-Oct-03	8290	Water
	N/A	N/A	OPR10010	A	11	0	N/A	100		15-Oct-03	8290	Water
	N/A	N/A	OPRD10010	A	12	0	N/A	100		15-Oct-03	8290	Water

Item	Lot #'s	Conc. (ng/µL)
Hexane	CI346	
Methylene Chloride	CI119	
Acid Silica	SPL1-7	
Base Silica	7/18/03	
Silica	SPL1-1B	
Florisil	SPO2578	
Salt	42364305	
Tridecane	N/A	
Cleanup Std.	N/A	

Comments:

DC1.090203.6

* = to be entered in the Prep table.

Log Book: 15 Page: 014

EQB 4 of 5

Extract cleanup by modified method 3630/3620
Silica/florisil

	Sample Identification										
	Client ID	Project ID	Sample ID	Container ID	Train	CS Amt.* (µL)	Witness (initials)	Analyzed (%)	Analyst (initials)	Date	Method	Matrix
A	G341	159	10	A	1	0	N/A	100	MM	16-Oct-03	8290	Water
	G341	159	11	A	2	0	N/A	100		16-Oct-03	8290	Water
	G341	159	12	A	3	0	N/A	100		16-Oct-03	8290	Water
	G341	159	13	A	4	0	N/A	100		16-Oct-03	8290	Water
B	G341	159	14	A	5	0	N/A	100		16-Oct-03	8290	Water
	G341	159	15	A	6	0	N/A	100		16-Oct-03	8290	Water
	G341	159	16	A	7	0	N/A	100		16-Oct-03	8290	Water
	G341	159	17	A	8	0	N/A	100		16-Oct-03	8290	Water
C	G341	159	18	A	9	0	N/A	100		16-Oct-03	8290	Water
	G341	159	19	A	10	0	N/A	100		16-Oct-03	8290	Water
	G341	159	20	A	11	0	N/A	100	✓	16-Oct-03	8290	Water
	G296	180	1	A	12	0	N/A	100		16-Oct-03	8290	Water

Item	Lot #'s
Hexane	CI346
Methylene Chloride	CI119
Acid Silica	SPL1-7
Base Silica	7/18/03
Silica	SPL1-1B
Florisil	SPO2578
Salt	42364305
Tridecane	N/A
Cleanup Std.	N/A

Conc. (ng/µL)

Comments:

187

DC1.090203.6

* = to be entered in the Prep table.

Log Book: 15 Page: 015

Cleanup Observation Form

EQB 5of5
Reference: PCU Log

Log:	Page:
15	015

	Train					
	7	8	9	10	11	12
Silica	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ Brown 1 ☐ _____ ___ ☐ _____ ___ Travel 1	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____
Acid	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____
Base	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____
Florisil	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____	☐ Clear/Colorless ☐ _____ ___ ☐ _____ ___ ☐ _____ ___ Travel_____
Extract	☐ Clear/Colorless ☐ _____ ___	☐ Clear/Colorless ☐ _____ ___	☐ Clear/Colorless ☐ _____ ___	☐ Clear/Colorless ☐ _____ ___	☐ Clear/Colorless ☐ _____ ___	☐ Clear/Colorless ☐ _____ ___
Sx	G341-159-16A	G341-159-17A	G341-159-18A	G341-159-19A	G341-159-20A	G296-180-1A
Comments						EB

Table 1. Concentration in ppt

PAL Project: G296-180

Analyte	LMB LMB10010-A_8290	EQB-4 G296-180-1A_8290	LMB LMB10007-A_8290	13SB9A G296-180-2A_8290	SBD9 G296-180-5A_8290
2,3,7,8-TCDD	(0.0100)	(0.0100)	(0.500)	(1.24)	(1.39)
1,2,3,7,8-PeCDD	(0.0500)	(0.0500)	(2.50)	[0.656]	(6.97)
1,2,3,4,7,8-HxCDD	(0.0500)	(0.0500)	(2.50)	0.735	[0.477]
1,2,3,6,7,8-HxCDD	(0.0500)	(0.0500)	(2.50)	2.24	1.04
1,2,3,7,8,9-HxCDD	(0.0500)	(0.0500)	(2.50)	2.33	[1.37]
1,2,3,4,6,7,8-HpCDD	(0.0500)	(0.0500)	(2.50)	50.0	40.6
OCDD	(0.100)	(0.100)	(5.00)	1520	2900
2,3,7,8-TCDF	(0.0100)	(0.0100)	(0.500)	0.842	0.220
1,2,3,7,8-PeCDF	(0.0500)	(0.0500)	(2.50)	0.450	(6.97)
2,3,4,7,8-PeCDF	(0.0500)	(0.0500)	(2.50)	0.574	(6.97)
1,2,3,4,7,8-HxCDF	(0.0500)	(0.0500)	(2.50)	0.681	[0.276]
1,2,3,6,7,8-HxCDF	(0.0500)	(0.0500)	(2.50)	0.534	0.243
2,3,4,6,7,8-HxCDF	(0.0500)	(0.0500)	(2.50)	0.494	(6.97)
1,2,3,7,8,9-HxCDF	(0.0500)	(0.0500)	(2.50)	(6.21)	(6.97)
1,2,3,4,6,7,8-HpCDF	(0.0500)	(0.0500)	(2.50)	5.11	2.14
1,2,3,4,7,8,9-HpCDF	(0.0500)	(0.0500)	(2.50)	[0.46]	(6.97)
OCDF	(0.100)	(0.100)	(5.00)	11.2	4.35
Total TCDDs	(0.0500)	(0.0500)	(2.50)	1.08	[0.399]
Total PeCDDs	(0.0500)	(0.0500)	(2.50)	3.82	2.57
Total HxCDDs	(0.0500)	(0.0500)	(2.50)	21.6	10.5
Total HpCDDs	(0.0500)	(0.0500)	(2.50)	96.8	93.9
Total TCDFs	(0.0500)	0.00768	(2.50)	7.11	1.07
Total PeCDFs	(0.0500)	(0.0500)	(2.50)	4.85	0.921
Total HxCDFs	(0.0500)	(0.0500)	(2.50)	8.31	2.18
Total HpCDFs	(0.0500)	(0.0500)	(2.50)	13.0	4.88
Total PCDD/Fs	0.0000	0.00768	0.0000	1690	3020
TEQ (ND=0)	0.0000	0.0000	0.0000	3.18	3.48
TEQ (ND=½)	0.00475	0.00461	0.196	3.43	3.89
TEQ w/EMPC (ND=0)	0.0000	0.0000	0.0000	3.51	3.69
TEQ w/EMPC (ND=½)	0.00475	0.00461	0.196	3.69	4.05

Note:
( ) = ND using DL value.
[ ] = EMPC value.

Table 2: Toxic Equivalency Factors

Analyte	World Health Organization	International-89	MADEP
2,3,7,8-TCDD	1	1	1
1,2,3,7,8-PeCDD	1	0.5	0.5
1,2,3,4,7,8-HxCDD	0.1	0.1	0.1
1,2,3,6,7,8-HxCDD	0.1	0.1	0.1
1,2,3,7,8,9-HxCDD	0.1	0.1	0.1
1,2,3,4,6,7,8-HpCDD	0.01	0.01	0.1
OCDD	0.0001	0.001	0.001
2,3,7,8-TCDF	0.1	0.1	0.1
1,2,3,7,8-PeCDF	0.05	0.05	0.5
2,3,4,7,8-PeCDF	0.5	0.5	0.5
1,2,3,4,7,8-HxCDF	0.1	0.1	0.1
1,2,3,6,7,8-HxCDF	0.1	0.1	0.1
2,3,4,6,7,8-HxCDF	0.1	0.1	0.1
1,2,3,7,8,9-HxCDF	0.1	0.1	0.1
1,2,3,4,6,7,8-HpCDF	0.01	0.01	0.1
1,2,3,4,7,8,9-HpCDF	0.01	0.01	0.1
OCDF	0.0001	0.001	0.001

G296-180

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1142

Project Number	Project Name
09604 317	RFAAP

Project Contact (Name and Phone Number): Darren Rankin (804) 965 9000

Samplers: Brad Fehn / John Spagnolo

LAB: Paradigm

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	ANALYSES: TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
EQB-4	10/9/03 16:20	5 ✓		X	4	F	U	2							X								

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	10/9/03 1800				
Relinquished by:	Date/time	Received by: (for lab) [signature]	Date/Time 10/10/03 1605		NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement

3.6°C

Radford Army Ammunition Plant
Chain Of Custody Record

G296-480

№ 1146

Project Number	Project Name
09604.317	RFAAP

Project Contact (Name and Phone Number): Darren Rennie (804) 765 9000

Samplers: Brett Fisher / John Spayler

LAB: Paradigm

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
13589 A	10/9/03 1400	15		X	5	F	/	2							X								
5BD9	10/9/03	15		X	5	F	/	2							X								
13589A MS	10/9/03 1400	15		X	5	F	/	2							X								
13589A MSD	10/9/03 1400	15		X	5	P	/	2							X								

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/9/03 1800				
Relinquished by:	Date/time	Received by: (for lab) Julie Johnson	Date/Time 10/10/03 1005 3.6°C	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

6

Paradigm Analytical Laboratories

Cust Proj ID: Radford Army Ammunition Plant
Client Name: URS Greiner Woodward Clyde

G296-180

Due Date: 2003-10-31 17:00:00
Login Date: 2003-10-10 11:40:16

Sample ID		Cust Sample ID	PRI	Date Collected	Date Received	Date Due	Matrix	LOC	DEPT	Report	Analysis	Status
G296-180-1	A	EQB-4	STD	2003-10-09 16:20:00	2003-10-10	2003-10-31 17:00:00	Water	W2	17	Full	8290	PR::NEED
	B							W2	17		8290	
G296-180-2	A	13SB9A	STD	2003-10-09 14:00:00	2003-10-10	2003-10-31 17:00:00	Soil	W2	17	Full	8290	PR::NEED
	B							W2	17		8290	
G296-180-3	A	13SB9A MS	STD	2003-10-09 14:00:00	2003-10-10	2003-10-31 17:00:00	Soil	W2	17	Full	8290	PR::NEED
	B							W2	17		8290	
G296-180-4	A	13SB9A MSD	STD	2003-10-09 14:00:00	2003-10-10	2003-10-31 17:00:00	Soil	W2	17	Full	8290	PR::NEED
	B							W2	17		8290	
G296-180-5	A	SBD9	STD	2003-10-09 00:00:00	2003-10-10	2003-10-31 17:00:00	Soil	W2	17	Full	8290	PR::NEED
	B							W2	17		8290	

Sample Receipt Checklist (SRC)

Paradigm Analytical Labs

Clie[illegible] **JRS Greiner Woodward Clyde** Lab Proj. ID: **G296-180**

Client Proj. ID: **Radford Army Ammunition Plant**

1. X Shipped
__ Hand De[illegible]ered
Notes: _____

2. __ Proper, f[illegible] and complete documentation
(unique sa[illegible]le identification on durable label with indelible ink, location [illegible] collection, date/time of collection, collector's name, pre[illegible]rvation type, sample type (method/matrix))
X Acceptab[illegible] documentation (but, incomplete)
__ Unacceptable documentation
Notes: _____

3. __ Custody Tape on Container
X No Custody Tape
Notes: _____

4. X Samples Intact*
(are in appropriate container, are not damaged, and do not show signs of contamination)
__ Samples Broken / Leaking
__ VOA Vials Checked for Air Bubbles
Notes: _____

5. X Chilled on Receipt* Actual Temp.(s) in °C: 3.6
__ Ambient on Receipt
__ Walk-in on Ice; Coming down to temp.
__ Received out of temperature protocol
Notes: _____

6. X Sufficient Sample Submitted
__ Insufficient Sample Submitted
Notes: _____

7. X Samples Preserved Correctly*
(see preservative checklist where applicable)
__ Improper Preservative(s)
__ None recommended (N/A)
Notes: _____

8. X Received Within Holding Time
__ Not Received Within Holding Time
__ N/A
Notes: _____

9. X No Discrepancies Noted
__ Discrepancies Noted
Notes: _____

Comments: _____

* = Rejection of sample is required when not marked; Contact client services immediately for a resolution.

Inspected and Logged in by: _____

DC27.091503.3 Date / Time: Fri-10/10/03 12:01

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

Severn Trent Laboratories, Inc.

Perchlorate

DATA VALIDATION REPORT - Level III Review

SDG No.: H3J110144 **Fraction:** Perchlorate

Lab: STL-Knoxville **Project Name:** Radford SSP

Reviewer: Andrea_Sansom **Date:** February 19, 2004

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Inorganic Data Review as pertains to the specifics of the analytical method employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: The chain of custody erroneously displayed the identification of the sample collected on 10/10/2003 at 1300 as 13SW1. The label on the sample container correctly displayed the identification of this sample as 13SW3. As directed by the client, the laboratory used the identification from the container label.

All data are usable for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

SAMPLE SUMMARY

H3J110144

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
F2C73	001	13SW3	10/10/03	13:00
F2C75	002	SWD1	10/10/03	13:00
F2C76	003	13SW2	10/10/03	14:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

URS

Client Sample ID: 13SW3

General Chemistry

Lot-Sample #...: H3J110144-001 **Work Order #...:** F2C73 **Matrix.....:** WG
Date Sampled...: 10/10/03 **Date Received..:** 10/11/03

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Perchlorate	ND	1.0	ug/L	KNOX 314.0 MOD	11/03-11/04/03	3309167

Dilution Factor: 1

URS

Client Sample ID: SWD1

General Chemistry

Lot-Sample #...: H3J110144-002 **Work Order #...:** F2C75 **Matrix.....:** WG
Date Sampled...: 10/10/03 **Date Received..:** 10/11/03

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Perchlorate	ND	1.0	ug/L	KNOX 314.0 MOD	11/03-11/04/03	3309167

Dilution Factor: 1

URS

Client Sample ID: 13SW2

General Chemistry

Lot-Sample #...: H3J110144-003 Work Order #...: F2C76 Matrix.....: WG
Date Sampled...: 10/10/03 Date Received..: 10/11/03

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Perchlorate	ND	1.0	ug/L	KNOX 314.0 MOD	11/03-11/04/03	3309167

Dilution Factor: 1

DATA ASSESSMENT WORKSHEET

Reviewer: AS
Date: 2/18//2003
DV Level: **II** **III** **IV** (circle 1)
Review Document:

Perchlorate

EPA method - Modified for USEPA Region III Modifications to NFGs (Inorganic)

Project Name: Radford SSP
Project Number: 15291974.30000
Laboratory: STL-Knoxville
SDG No.: H3J110144
Test Name: Perchlorate
Method No.: E314.0

1.0 Laboratory Deliverables		**Yes**	**No**	**NA**
1.1a	Do Chain-of-Custody forms list all samples that were analyzed?	x		
1.1b	Do sample ID Numbers on COC match those in report?		x	
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. % solids	x		
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	x		
	Action: Resolve any discrepancies before proceding further.			

Notes:

2.0 Holding Times and Preservation		**Yes**	**No**	**NA**
2.1	Do sample collection, preservation, shipping, and storage condition meet the requirement of the relevant Project Controlling Documents (PCDs)?	x		
	Action: No chemical preservation required.			
2.2	Have technical holding times (28 days), determined from date of sampling to date of analysis (including dilution or reanalysis) been exceeded? If yes, apply J(+)/UJ(-) to all associated analytes.		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, apply J(+)/R(-) to all associated analytes.		x	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were required blanks (MB) prepared/submitted at the appropriate frequency? If not, note in DV report.	x		
3.2	Do any method blanks have positive results above the MDL? Action: If Yes, positive associated sample results less than 5X the concentration in the blank should be qualified "B" indicating the result is qualitatively suspect.		x	
3.3	After correcting for method blank contamination, do any field/equipment/trip blanks have positive results? If so, apply the same rules given above based on the highest blank value of those associated with the sample.			x

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are five standards included in the calibration curve? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	x		
4.2	Are all initial calibration correlation coefficients within the control limits (i.e., r > 0.99)? If No, apply "R" to all non-detects; "J" to positive results for all samples associated with the calibration.	x		
4.3	Was a instrument performance check (IPC) analyzed at the matrix conductivity threshold (MCT)? If no, verify that the sample chromatagrams do not display this interference.	x		
4.4	Is the $Pd_{A/H}$ < 25%, % recovery between 80-120%, and the retention time shift < 5%. If No, apply R to all results for sample that display this type of interference.	x		
4.5	Has a continuing calibration verification been analyzed prior and after every 10 samples and at the end of the analysis sequence? Control limit: $\leq \pm$ 15%. If No, apply "R" to all non-detects; "J*" to positive results for all samples associated with the calibration. Positive results are to be used only qualitatively.	x		

Notes:

5.0 Matrix Spikes		Yes	No	NA
5.1	Was a matrix spike analyzed at required frequency per the PCDs?	x		
5.2	Is the %R for the matrix spike and matrix spike duplicate outside the QC limits?		x	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

13SW2

6.0 Laboratory Control Samples (LCS/LCSDs)		Yes	No	NA
6.1	Were LCS analyzed at required frequency per the PCDs?	x		
6.2	Are there any LCS and/or LCSD recoveries outside the QC limits (i.e., 85-115%)?		x	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
6.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits (i.e., 15%)?		x	
	Action: If Yes, J(+) only.			

Notes:

7.0 Field Duplicates		Yes	No	NA
7.1	Was a field duplicate submitted/analyzed at an appropriate frequency of one per ten?	x		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
7.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	x		

Notes: SWD1 and 13SD3 are both non-detect

8.0 Laboratory Duplicates (matrix spike duplicate)		Yes	No	NA
8.1	Was a duplicate analyzed at the correct frequency?	x		
8.2	Are all analyte duplicate results within control limits? If No, J(+) only. Note in DV report any instance where one or another of the pair was positive while the other was negative.	x		

Notes:

9.0 Analyte Identification and Detection Limit Verification		Yes	No	NA
9.1	Do retention times in calibrations and samples fall within appropriately developed and applied windows? If not, look for uniform shifts. Failing that, flag all results "R" as qualitatively suspect.	x		
9.2	Verify quantitative results. Do manual calculations agree with reported values to within rounding error? If not, increase audit. If additional errors are found, require resubmission. Notify PM immediately.	x		
9.3	Do detection/reporting limits meet those required by the QAPP and were they properly adjusted for dilution factors and dry weight equivalent of wet weight aliquot)? If not, note affected sample Ids in DV report.	x		

Notes:

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit: 90%)	x		
10.1.1	Number of samples: 3			
10.1.2	Number of target compounds in each analysis: 1			
10.1.3	Number of results rejected and not reported: 0			
10.1.4	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%			

Notes:

STL Knoxville
Perchlorate Analysis – Conductivity Readings
SOP KNOX-WC-0014, current revision

Date: ~~DFW~~ 11/3/08 **Analyst:** DFW **Conductivity Meter ID:** FISHER (MODEL 09-326-2)

QC Check	Conductance (uS/cm) at 25° C	Acceptance Criteria
Blank	0.43	< 1 uS/cm
Standard KCl Solution (ID: WC-820)	1410.	1380 - 1440 uS/cm
IPC - 4571	4170.	±10% of original conductance (4170.)

	Lot Number	Work Order Number	Conductance (uS/cm) at 25° C	
1	H3J220112	F244M	625.	(pH ~ 7)
2		F244Q	595.	(pH ~ 7)
3		F244T	575.	(pH ~ 7)
4		F244V	468.	(pH ~ 7)
5		F244W	482.	(pH ~ 7)
6		F244X	558.	(pH ~ 7)
7		F2440	711.	(pH ~ 7)
8		F2441	540.	(pH ~ 7)
9	H3J110144	F2C73	135.0	(pH ~ 7)
10		F2C75	135.1	(pH ~ 7)
11		F2C76	140.5	(pH ~ 7)
12	H3J300174	F3Q89	79.4	(pH ~ 6)
13		F3QQF	99.7	(pH ~ 6)
14		F3QQH	100.9	(pH ~ 6)
15	H3J310137	F3T7G	1.46	(pH ~ 6)
16		F3T7W	95.6	(pH ~ 6)
17		F3T7D	100.7	(pH ~ 6)
18				
19				
20				

STL KNOXVILLE
DX 320 IC Runlog

Analyst: DFW
Date: 11/4/03

(BLANK + LCS/LCSD
Sample Preparation Date: 11/3-4/03)

Schedule Number: K04P.SEQ
Method: EPA 314.0
(J31PCAL2.MTH)

Run No.	Lot Number	Sample ID	Matrix	Bench Dilution	Initial Wt / Vol Final Vol
1	IPC/MCT	IPC-4571	H2O	1.0	—
2	ICB/METHOD	BLANK		1.0	100mL/10mL
3	ICCS-4PPB	ICWS-4560		1.0	—
4	LFB/LCS	-4573		1.0	100mL/10.mL
5	" /LCSD	-4574		1.0	
6	H3J110144	F2C73		1.0	
7		F2C75		1.0	
8		F2C76 (MS)		1.0	
9		(MS)		1.0	
10		(MSD)		1.0	
11	CCV=50ppb	ICWS-4562		1.0	—
12	CCB	BLANK		1.0	—
13	H3J300174	F3QP9		1.0	100mL/10mL
14		F3QQF		1.0	
15		F3QQH		1.0	
16	H3J310137	F3T76		1.0	
17		F3T7W		1.0	
18		F3T70		1.0	
19		(MS)		1.0	
20		(MSD)		1.0	
21	CCV=100PPB	ICWS-4563		1.0	—
22	CCB	BLANK		1.0	—
23					
24					
25					
26					
27					
28					
29					
30					
31					

Preventive Maintenance

Daily
- ✓ Check pump and gas pressure
- ✓ Check all lines for crimping, leaks and discoloration

As Needed
- ○ Change column and guard column
- ○ Change column and/or guard column bed support
- ○ Clean conductivity cell
- ○ De-gas pump head when flow is erratic

Other:
- Flow Rate = 1.00 mL/min
- Pressure = ~2415 PSI
- SRS = 300 mA
- Conductance = ~2.2 uS
- Eluent = Perc.-EI-653

MS/MSD Spike Information

Final Sample Volume = 100 ml. / Conc in 10mL

Compound	Spike ID/ppm	ml
Fluoride		
Chloride		
Nitrite-N		
Bromide		
Nitrate-N		
Phosphate-P		
Sulfate		
Perchlorate	ICWL-4558 / (10,000 ppb)	0.10

Comments: IPC/MCT = IPC-4571 A/H=26.6 RT = 15.541
LFB/LCS = ICWS-4573 A/A=25.9

PROJECT NARRATIVE
H3J110144

The results reported herein are applicable to the samples submitted for analysis only.

This report shall not be reproduced except in full, without the written approval of the laboratory.

The original chain of custody documentation is included with this report.

Sample Receipt

The sample ID given on the label and the chain of custody did not match. The client was notified (A. Sansom, 10/14/03) and instructed the laboratory to use the ID on the label.

Quality Control

Unless otherwise noted, all holding times and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

STL Knoxville maintains the following certifications, approvals and accreditations: Arkansas DEQ Cert. # 03-049-0, California DHS ELAP Cert. #2423, Colorado DPHE, Connecticut DPH Cert. #PH-0223, Florida DOH Cert. #E87177, Georgia DNR Cert. #906, Hawaii DOH, Illinois EPA Cert. # 000687, Indiana DOH Cert. #C-TN-02, Kansas DHE Cert. # E-10349, Kentucky DEP Lab ID #90101, Louisiana DEQ Cert. #03079, Louisiana DOHH Cert. #LA030024, Maryland DHMH Cert. #277, Massachusetts DEP Cert. #M-TN009, Michigan DEQ Lab ID #9933, New Jersey DEP Cert. #TN001, New York DOH Lab #10781, North Carolina DPH Lab ID #21705, North Carolina DEHNR Cert. #64, Oklahoma DEQ ID #9415, Pennsylvania DEP Cert. # 68-576, South Carolina DHEC Lab ID #84001001, Tennessee DOH Lab ID #02014, Utah DOH Cert. #QUAN3, Virginia DGS Lab ID #00165, Washington DOE Lab #C120, Wisconsin DNR Lab ID #998044300, US Army Corps of Engineers, Naval Facilities Engineering Service Center, US EPA Perchlorate Approval and USDA Soil Permit #S-46424. This list of approvals is subject to change and does not imply that laboratory certification is available for all parameters reported in this environmental sample data report.

#35101444

Radford Army Ammunition Plant
Chain Of Custody Record

№ 1110

Project Number	Project Name
096043.17	RFAAP

Project Contact (Name and Phone Number): Tim Rose (804) 965 7000

Samplers: Brett Fisher / John Snyder

LAB: STL Knoxville

AIRBILL No:

Courier:

Field Sample ID	Date/Time (MM-DD-YY/HH:MM)	Turnaround Time (See Box #4)	Composite	Grab	Matrix Type (See Box #1)	Preservative (See Box #2)	Filtered or Unfiltered (See Box #3)	# of Containers	TCL Volatile Organic Compounds (8260B)	TCL Semivolatile Organic Compounds (8270C)	Polyaromatic Hydrocarbons (8310)	TCL Pesticides (8081A)	TCL Polychlorinated Biphenyl (8082)	Explosives (8330, 8332)	Dioxin/Furan(8290)	TAL Metals (Including Mercury)	Perchlorate (314.0)	TCLP (1311, FULL)	Ignitability (1010)	Corrosivity (9045C)	Reactivity	Paint Filter (9095B)	REMARKS (Include Other Required Test Methods, Sample Depth, Cautions, Observations)
135W1	10/10/03 1300	5		X	1	F	U	1									X						
SWD1	10/10/03	5		X	1	F	U	1									X						
135W2	10/10/03 1400	5		X	1	F	U	1									X						
135W2MS	10/10/03 1400	5		X	1	F	U	1									X						
135W2MSD	10/10/03 1400	5		X	1	F	U	1									X						
																							Rcvd temp. 3°c
																							Custody Seals intact
																							1 Cooler Fedex #
																							8329 4253 9647
																							MFH 10-11-03

Box #1
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil Sediment/Sludge
6. Trip Blank
7. Oil
8. Waste
9. Other _____

Box #2
A. HCl + Ice
B. HNO3 + Ice
C. NaOH + Ice
D. H2SO4 + Ice
E. Unpreserved
F. Ice Only
G. Other _____
H. NaHSO4 + Ice
I. ZnAc + NaOH + Ice

Box #3
F. Filtered
U. Unfiltered

Box #4
R. Rush - 3 Day
S. Standard 28 Day
T. Timely 14 Day
O. Other _____

Relinquished by:	Date/time	Received by:	Relinquished by:	Date/Time	Received by:
Brett Fisher	10/10/03 1800				
Relinquished by:	Date/time	Received by: (for lab) Matthew J. Howard	Date/Time 10-11-03, 09:15	NOTE: Analyses must be performed in accordance with the Quality Assurance Plan, the Work Order, and the executed Subcontract Agreement	

STL KNOXVILLE
SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

CLIENT: _____ PROJECT: _____ Lot No.: 143J110149

TO BE COMPLETED BY SAMPLE RECEIPT ASSOCIATE:

	YES	NO	NA
1. Sample Receipt:			
a. Do sample container labels match COC? (IDs, Dates, Times)	—	✓	—
b. Is the cooler temperature within acceptance limits? (NOTE: North Carolina, 1668, 1613B: 0-4°C; VOST: 10°C)	✓	—	—
c. Were samples received with correct chemical preservative (excluding Encore)?	✓	—	—
d. Were custody seals present/intact on cooler and/or containers?	✓	—	
e. Were all of the samples listed on the COC received?	✓	—	—
f. Were all of the sample containers received intact?	✓	—	—
g. Were containers received for VOAs received without headspace?	—	—	✓
h. Were samples received in the appropriate containers?	✓	—	—
i. Did you check for residual chlorine, if necessary?	—	—	✓
j. Were samples received within 1/2 of the holding time?	✓	—	—
k. Were samples screened for radioactivity?	—		✓
l. For aqueous samples for SOG tests (i.e., 1613B, 1668A, 8290, LR PAHs), does the sample(s) have visible solids present?	—	—	✓
If yes, was SOG staff notified?	—		✓
m. Were client's sample documents (RFA/COC) received?	✓	—	—
n. Has the RFA/COC been relinquished? (Signed, Dated, Timed)	✓	—	—
o. Are test/parameters listed for each sample?	✓	—	—
p. Is the matrix of the samples noted?	✓	—	—
q. Is the date/time of sample collection noted?	✓	—	—
r. Is the client and project name/No. identified?	✓	—	—
s. Was the sampler identified on the RFA/COC?	✓	—	

SAMPLE RECEIVING ASSOCIATE: Matthew F. Howard DATE: 10-11-03

TO BE COMPLETED BY PROJECT MANAGER :

	YES	NO	NA
1. Project manager "Sample Greet":			
a. Quote number to be logged-in under 50903			
b. Informed Login associates of special instructions ?	—	—	X

PROJECT MANAGER : jm DATE: 10/13/03

Client Sample ID	Analysis Requested	Condition (See Legend)	Comments/Action
135w1	314.0	19	Sample ID: 135w3 use label

☒ Client informed on 10/14/03 by email. Person contacted: A Sansom.
☑ Noted actions in comments section above.
☐ No action necessary; process as is.
Project Manager: jm Date: 10/14/03

QA026R12.doc, 8/11/03

STL KNOXVILLE
SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST
LEGEND

Lot No.: H3J160144

Item	Condition
Cooler:	1a Not received, COC available
	1b Leaking
	1c Other:_____
Temperature:	2a Temp Blank = _____
	2b Cooler Temp = _____
	(cooler temp should be used only if there is no temp blank)
Container:	3a Leaking
	3b Broken
	3c Extra
	3d No labels
	3e Headspace (VOA only)
	3f Other: _____
Samples:	4a Samples received but not on COC
	4b Samples not received but on COC
	4c Holding time expired
	4d Sample received with < ½ holding time remaining
	4e Sample preservative: _____
	4f Other: _____
Custody Seals:	5a None
	5b Not intact
	5c Other:_____
Chain of Custody (COC):	6a Not relinquished by client
	6b Incomplete information
	6c Other:_____
Container Labels:	(7a) Doesn't match COC
	7b Incomplete information
	7c Marking smeared
	7d Label torn
	7e Other:_____

Other (8): _____

_____

_____

_____

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	h	Holding time violation
h	Holding time violation	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
i	Internal standard failure	h	Holding time violation	l	LCS recovery failure
j	Tuning failure or poor mass spectrometer performance	i	Internal standard failure	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				

APPENDIX G.2.2
RCRA FACILITY INVESTIGATION SAMPLING DATA VALIDATION REPORTS
2007-2008

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DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-42 **Fraction:** VOCs, SVOCs, Pest, PCBs, Explosives, Metals, & TOC

Lab: TriMatrix **Project Name** Radford RAAP 10

Reviewer: RA **Date:** January 28, 2008

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the Region III Modifications to the USEPA National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical method employed and provisions of the approved project-specific QAPP.

Major Anomalies: For the SVOCs analyses, the laboratory control sample pair analyzed for batch 714041 displayed percent recoveries (%Rs) less than the lower control limit of 64% for caprolactam at 13% and 15%. The associated equipment blank results were non-detects and were flagged "R,l".

Minor Anomalies: For the VOCs analyses, the method blanks displayed positive detections for acetone at 9.18 ug/Kg and carbon disulfide at 2.55 ug/Kg. Positive associated field sample results less than ten times the method blank concentration for acetone and less than five times the method blank concentration for carbon disulfide were flagged "B,z". The equipment blank, EQBK-1 also displayed a positive detection for acetone at 1.9 ug/L. The associated positive field sample result less than ten times the equipment blank concentration was flagged "B,x".

The second source calibration displayed a %R less than the lower control limit of 75% for dichlorodifluoromethane at 74%. The associated field sample results were non-detects and were flagged "UJ,c".

The continuing calibration analyzed on 11/19/07 displayed a percent difference (%D) greater than the control limit (i.e., 20%) with a positive bias for 1,1,2-trichloro-1,2,2-trifluoroethane at 43.6%. The continuing calibration analyzed on 11/20/07 displayed %Ds greater than the control limit with a positive bias for methyl acetate at 30.9% and 1,1,2-trichloro-1,2,2-trifluoroethane at 60.9%; and with a negative bias for 2-butanone at 20.6%. The continuing calibration analyzed on 11/21/07 displayed a %D greater than the control limit with a positive bias for acetone at 81.2%. Positive associated field sample results were flagged "J,c" for the compounds that displayed a positive bias. Positive associated field sample results were flagged "J,c" and non-detects were flagged "UJ,c" for 2-butanone.

The laboratory control sample pair displayed %Rs greater than the upper control limits for 1,1,2-trichloro-1,2,2-trifluoroethane (144%, 161%), acetone (181%), and methyl acetate (131%). The laboratory control sample pair also displayed a relative percent difference greater than the control limit for 1,1,2-trichloro-1,2,2-trifluoroethane at 31%. Positive associated field sample results were previously flagged for other anomalies and no further data qualifying action was taken.

The field duplicate pair (35SB5A/DUP-2) displayed results outside the control limits for methyl acetate. These results were flagged "J,f" in these two samples.

For the SVOCs analyses, the method blanks displayed positive detections for acetophenone at 0.05 ug/L, di-n-butyl phthalate at 4.43 ug/L, and bis(2-ethylhexyl)phthalate at 9.17 ug/L and 3 ug/Kg. Positive associated field sample results less than ten times the method blank concentrations for the phthalates and less than five times the method blank concentration for acetophenone were flagged "B,z". Equipment blank, EQBK-1 displayed positive detections for butyl benzyl phthalate at 0.038 ug/L, diethyl phthalate at 0.038 ug/L, and naphthalene at 0.028 ug/L. Equipment blank, EQBK-2 displayed positive detections for benzaldehyde at 0.61 ug/L and diethyl phthalate at 0.047 ug/L. The associated field sample results were well above the equipment blank concentrations and no data qualifying action was required.

The continuing calibration analyzed on 11/28/07 displayed a %D greater than the control limit (i.e., 20%) with a negative bias for 3,3'-dichlorobenzidine at 29.4%. The associated field sample result was a non-detect and was flagged "UJ,c".

Sample 35SB6A displayed a %R greater than the upper control limit of 100% for surrogate nitrobenzene-d5 at 114%. Sample 35SB10C displayed %Rs less than the lower control limits for surrogates, phenol-d6 at 38% and 2-fluorobiphenyl at 44%. No data qualifying action is required based on one surrogate failure from each fraction, and no data flags were applied. Surrogates were diluted out for samples 35SB9A (DF=5) and 35SB7C (DF=5). Positive associated field sample results were flagged "L,s" and non-detects were flagged "UL,s" for these samples. Surrogates were also diluted out for samples 35SB7A (DF=25), 35SB5A (DF=25), DUP-2 (DF=25), 35SB8A (DF=25), and 35SB10A (DF=50). No data qualifying action was taken since these samples were analyzed at dilution factors greater than ten.

The laboratory control sample analyzed for batch 714041 displayed a %R greater than the upper control limit for di-n-butyl phthalate at 116%. The associated positive field sample results were previously flagged for method blank contamination and no further data qualifying action was required. The laboratory control sample pair analyzed for batch 714466 displayed a relative percent difference greater than the control limit for 4-chloroaniline at 62%. The associated field sample results were non-detects and no data qualifying action was necessary.

For the pesticides analyses, sample 35SB5A was re-extracted 13 days after the holding time had expired since the original sample had a low surrogate percent recovery. Positive associated field sample results were flagged "J,h" and non-detects were flagged "UJ,h". The original sample results should be used.

Equipment blank, EQBK-2 displayed a positive detection for endosulfan I at 0.0062 ug/L. The associated field sample results were non-detects and no data qualifying action was necessary.

The second source calibration analyzed for sequence 7113009 displayed a %R greater than the upper control limit of 120% with a positive bias for alpha-BHC at 121%. The associated field sample results were non-detects while the calibration displayed a positive bias, and no data qualifying action was required. The continuing calibration analyzed for sequence 7121830 displayed %Ds greater than the control limit of 20% with a positive bias for alpha-BHC (25.8%, 20.7%), gamma-BHC (20.9%), and delta-BHC (21.3%). The continuing calibration analyzed for sequence 7122808 displayed %Ds greater than the control limit with a positive bias for alpha-BHC (24%, 21.8%), delta-BHC (25.6%), 4,4'-DDD (22.7%), and 4,4'-DDE (24.1%). The continuing calibration analyzed for sequence 8011111 displayed %Ds greater than the control limit with a positive bias for toxaphene (20.8, 21.2%). The associated field sample results were non-detects while the calibration displayed a positive bias, and no data qualifying action was required.

Surrogate tetrachloro-m-xylene displayed %Rs less than the lower control limit of 70% for samples 35SB6A (59%, 60%), 35SB9A (61%, 60%), 35SB10A (68%, 66%), 35SB5A (59%, 59%), and 37SB10A (59%, 59%). Surrogates tetrachloro-m-xylene and decachlorobiphenyl displayed %Rs less than the lower control limits for sample 37SB7A at 47%, 46%, and 46%, respectively. Positive associated field sample results were flagged "L,s" and non-detects were flagged "UL,s".

The matrix spike pair analyzed for sample 35SB2A displayed %Rs and/or RPDs greater than the upper control limits for 4,4'-DDE (129%), 4,4'-DDT (254%, 233%), dieldrin (137%, 129%), and toxaphene (153%, 246%, 44%). The associated parent sample results were non-detects and no data qualifying action was necessary. This matrix spike pair also displayed %Rs less than the lower control limits for beta-BHC (52%, 49%). The associated parent sample result was non-detect and was flagged "UJ,m".

Several compounds displayed percent differences greater than the control limit of 40% between the two analytical columns for several samples. These results were flagged "J,g" in the associated samples unless previously qualified for a surrogate anomaly.

For the PCBs analyses, surrogate decachlorobiphenyl displayed %Rs less than the lower control limit for samples 37SB10A (59%, 49%), 37SB7A (47%, 41%), 35SB9A (47%, 36%), 35SB5A (54%, 44%), and 35SB6A (45%, 57%). Positive associated field sample results were flagged "L,s" and non-detects were flagged "UL,s". This surrogate also displayed %Rs less than the lower control limit for samples 35SB8A (59%), 37SB9A (54%), 35SB10A (58%), and 35SB7A (40%). No data qualifying action is required based on one surrogate failure and no data flags were applied.

PCB-1254 displayed percent differences greater than the control limit of 40% between the two analytical columns for samples 35SB1A at 51%, 35SB9A at 58.8%, 35SB9C at 42.4%, and 35SB7A at 57.8%. These results were flagged "J,g" in these samples.

The field duplicate pair (35SB5A/DUP-2) displayed results outside the control limits for PCB-1254. These results were flagged "J,f" in these two samples.

For the explosives analyses by method 8330, the laboratory control sample pair analyzed for batch 714136 displayed a relative percent difference greater than the control limit for 3-nitrotoluene at 34%. The associated field sample results were non-detects and no data qualifying action was necessary.

The matrix spike pair analyzed for sample 35SB2A displayed %Rs less than the lower control limit of 80% for 2,6-dinitrotoluene (75%), 2-nitrotoluene (77%, 74%), and 4-amino-2,6-dinitrotoluene (72%,75%). The associated parent sample results were non-detects and were flagged "UJ,m".

HMX displayed percent differences greater than the control limit of 40% between the two analytical columns for samples 35SB7A at 44.6%, 35SB7C at 62.6%, 35SB5A at 65.1%, DUP-2 at 60.2%, and 35SB8A at 49.5%. These results were flagged "J,g" in these samples. The higher results should be used for data interpretation purposes.

For the metals analyses, for method 6010, the method blanks displayed positive detections for calcium, iron, and zinc. The associated field sample results were greater than five times the blank concentrations and no data qualifying action was taken.

For method 6020, the method blanks displayed positive detections for lead, copper, and zinc. The associated positive field sample result less than five times the method blank concentration for zinc was flagged "B,p" in EQBK-1. The equipment blanks displayed positive detections for calcium, iron, lead, manganese, nickel, and zinc. The associated field sample results were greater than five times the equipment blank concentrations and no data qualifying action was taken.

The method blank also displayed a positive detection for mercury at 0.00791 mg/Kg. Positive associated field sample results less than five times the method blank concentration were flagged "B,p".

For method 6010, the matrix spike analyzed for sample 35SB2A displayed a %R greater than the upper control limit of 125% for barium at 135%. Positive associated field sample results were flagged "K,m". For method 6020, the matrix spike pair analyzed for sample 35SB2A displayed a %R less than the lower control limit of 75% for selenium at 72%. Positive associated field sample results were flagged "L,m" and non-detects were flagged "UL,m".

For method 6010, the serial dilution analyzed for sample 37SB7C displayed a percent difference greater than the control limit of 10% for zinc at 11%. For method 6020, the serial dilution analyzed for sample 35SB2A displayed percent differences greater than the control limit of 10% for copper at 14% and nickel at 13%. The serial dilution analyzed for sample 35SB7B displayed percent differences greater than the control limit of 10% for nickel at 11% and vanadium at 11%. Positive associated field sample results were flagged "J,s".

For method 6010, the field duplicate pair (35SB4A/DUP-1) displayed results outside the control limits for calcium. For method 6020, the field duplicate pair (37SB9A/DUP-3) displayed results outside the control limits for lead. These results were flagged "J,f" in these samples.

Correctable Anomalies: None.

Comments: On the basis of this evaluation, the laboratory appears to have followed the specified method. All data, except for data flagged "R", are usable, as qualified, for their intended purpose based on the data reviewed. It should be noted that detection limits were raised in several samples due to dilutions.

Signed: Rayan

SAMPLE ID SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-42

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35SB3A	0711293-01
EQBK-1	0711313-01
Trip Blank	0711313-02
35SB4A	0711313-03
DUP-1	0711313-04
35SB1A	0711313-05
35SB2A	0711313-06
35SB6A	0711313-07
35SB6B	0711313-08
35SB6C	0711313-09
35SB9A	0711313-10
35SB9B	0711313-11
35SB9C	0711313-12
35SB10A	0711313-13
35SB10B	0711313-14
35SB10C	0711313-15
35SB7A	0711377-01
35SB7B	0711377-02
35SB7C	0711377-03
35SB5A	0711377-04
35SB5B	0711377-05
35SB5C	0711377-06
DUP-2	0711377-07
35SB8A	0711377-08
35SB8B	0711377-09
35SB8C	0711377-10
EQBK-2	0711377-23
Trip Blank	0711377-24

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB3A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711293-01 File ID: 29301.D

Sampled: 11/12/07 16:06 Prepared: 11/19/07 07:00 Analyzed: 11/19/07 10:19

Solids: 90.68 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112633 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	110	22	4.7	
71-43-2	Benzene	1	5.5	5.5	0.14	U
74-97-5	Bromochloromethane	1	22	22	0.14	U
75-27-4	Bromodichloromethane	1	5.5	5.5	0.27	U
75-25-2	Bromoform	1	5.5	5.5	0.53	U
74-83-9	Bromomethane	1	5.5	5.5	1.3	U
75-15-0	Carbon Disulfide	1	3.1	5.5	0.29	JB B, Z
56-23-5	Carbon Tetrachloride	1	5.5	5.5	0.32	U
108-90-7	Chlorobenzene	1	5.5	5.5	0.22	U
75-00-3	Chloroethane	1	22	22	0.39	U
67-66-3	Chloroform	1	5.5	5.5	0.16	U
74-87-3	Chloromethane	1	5.5	5.5	0.27	U
110-82-7	Cyclohexane	1	11	11	0.76	U
96-12-8	1,2-Dibromo-3-chloropropane	1	11	11	0.90	U
124-48-1	Dibromochloromethane	1	5.5	5.5	0.39	U
106-93-4	1,2-Dibromoethane	1	5.5	5.5	0.93	U
95-50-1	1,2-Dichlorobenzene	1	5.5	5.5	0.27	U
541-73-1	1,3-Dichlorobenzene	1	5.5	5.5	0.26	U
106-46-7	1,4-Dichlorobenzene	1	5.5	5.5	0.24	U
75-71-8	Dichlorodifluoromethane	1	5.5	5.5	0.36	U
75-34-3	1,1-Dichloroethane	1	5.5	5.5	0.21	U
107-06-2	1,2-Dichloroethane	1	5.5	5.5	0.33	U
75-35-4	1,1-Dichloroethene	1	5.5	5.5	0.41	U
156-59-2	cis-1,2-Dichloroethene	1	5.5	5.5	0.18	U
156-60-5	trans-1,2-Dichloroethene	1	5.5	5.5	0.25	U
78-87-5	1,2-Dichloropropane	1	5.5	5.5	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1	5.5	5.5	0.28	U
10061-02-6	trans-1,3-Dichloropropene	1	5.5	5.5	0.92	U
100-41-4	Ethylbenzene	1	5.5	5.5	0.14	U
591-78-6	2-Hexanone	1	11	11	3.3	U
98-82-8	Isopropylbenzene	1	5.5	5.5	0.14	U
79-20-9	Methyl Acetate	1	3.1	22	0.92	J
1634-04-4	Methyl tert-Butyl Ether	1	5.5	5.5	0.26	U
108-87-2	Methylcyclohexane	1	11	11	0.88	U
75-09-2	Methylene Chloride	1	22	22	4.4	U
78-93-3	2-Butanone (MEK)	1	15	22	2.7	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	11	11	2.1	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB3A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711293-01 File ID: 29301.D

Sampled: 11/12/07 16:06 Prepared: 11/19/07 07:00 Analyzed: 11/19/07 10:19

Solids: 90.68 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112633 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	5.5	5.5	0.24	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.5	5.5	0.22	U
127-18-4	Tetrachloroethene	1	5.5	5.5	0.49	U
108-88-3	Toluene	1	5.5	5.5	0.44	U
87-61-6	1,2,3-Trichlorobenzene	1	22	22	0.23	U
120-82-1	1,2,4-Trichlorobenzene	1	5.5	5.5	0.27	U
71-55-6	1,1,1-Trichloroethane	1	5.5	5.5	0.23	U
79-00-5	1,1,2-Trichloroethane	1	5.5	5.5	0.76	U
79-01-6	Trichloroethene	1	5.5	5.5	0.62	U
75-69-4	Trichlorofluoromethane	1	5.5	5.5	0.24	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.5	5.5	0.37	U
75-01-4	Vinyl Chloride	1	5.5	5.5	0.50	U
1330-20-7	Xylene (Total)	1	5.5	5.5	0.65	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.6	107	78 - 121	
1,2-Dichloroethane-d4	40.0	44.9	112	66 - 124	
Toluene-d8	40.0	40.5	101	85 - 115	
4-Bromofluorobenzene	40.0	39.6	99	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	691423	7.33	793126	7.31	
Chlorobenzene-d5	269635	17.38	314333	17.36	
1,4-Dichlorobenzene-d4	281138	22.43	346769	22.41	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711313-01 File ID: 31301.D

Sampled: 11/13/07 16:00 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 14:47

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0714339 Sequence: 7112649 Calibration: 7K26012 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	1.9	20	1.2	J
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U UJ,C
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711313-01 File ID: 31301.D

Sampled: 11/13/07 16:00 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 14:47

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0714339 Sequence: 7112649 Calibration: 7K26012 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	1.0	1.0	0.072	U
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.8	102	85 - 115	
1,2-Dichloroethane-d4	40.0	41.0	102	70 - 120	
Toluene-d8	40.0	39.3	98	85 - 120	
4-Bromofluorobenzene	40.0	38.6	96	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	465575	5.14	492753	5.14	
Chlorobenzene-d5	419077	8.08	439506	8.08	
1,4-Dichlorobenzene-d4	244331	10.38	277371	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711313-02 File ID: 31302.D

Sampled: 11/13/07 16:00 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 15:24

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0714339 Sequence: 7112649 Calibration: 7K26012 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U UJ/C
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711313-02 File ID: 31302.D

Sampled: 11/13/07 16:00 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 15:24

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0714339 Sequence: 7112649 Calibration: 7K26012 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	1.0	1.0	0.072	U
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.1	100	85 - 115	
1,2-Dichloroethane-d4	40.0	41.4	103	70 - 120	
Toluene-d8	40.0	39.6	99	85 - 120	
4-Bromofluorobenzene	40.0	38.3	96	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	460974	5.14	492753	5.14	
Chlorobenzene-d5	417191	8.08	439506	8.08	
1,4-Dichlorobenzene-d4	245169	10.38	277371	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-03 File ID: 31303.D

Sampled: 11/13/07 07:50 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 11:00

Solids: 83.32 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	92	24	5.1	
71-43-2	Benzene	1	6.0	6.0	0.15	U
74-97-5	Bromochloromethane	1	24	24	0.15	U
75-27-4	Bromodichloromethane	1	6.0	6.0	0.30	U
75-25-2	Bromoform	1	6.0	6.0	0.58	U
74-83-9	Bromomethane	1	6.0	6.0	1.5	U
75-15-0	Carbon Disulfide	1	3.5	6.0	0.32	J
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.34	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	6.0	6.0	0.18	U
74-87-3	Chloromethane	1	6.0	6.0	0.29	U
110-82-7	Cyclohexane	1	12	12	0.82	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.98	U
124-48-1	Dibromochloromethane	1	6.0	6.0	0.42	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.29	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.40	U
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.23	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.35	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.45	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.27	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	1.0	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.15	U
79-20-9	Methyl Acetate	1	24	24	1.0	U
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.96	U

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-03 File ID: 31303.D

Sampled: 11/13/07 07:50 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 11:00

Solids: 83.32 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.7	U
78-93-3	2-Butanone (MEK)	1	14	24	2.9	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	6.0	6.0	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.24	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.53	U
108-88-3	Toluene	1	6.0	6.0	0.48	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.82	U
79-01-6	Trichloroethene	1	6.0	6.0	0.67	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.40	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.55	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.70	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.0	105	78 - 121	
1,2-Dichloroethane-d4	40.0	39.8	99	66 - 124	
Toluene-d8	40.0	39.5	99	85 - 115	
4-Bromofluorobenzene	40.0	36.1	90	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	721207	7.34	794160	7.32	
Chlorobenzene-d5	251849	17.4	316611	17.38	
1,4-Dichlorobenzene-d4	212145	22.44	342648	22.42	

* Values outside of QC limits

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1/25/08 WR

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-04 File ID: 31304.D

Sampled: 11/13/07 08:00 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 11:33

Solids: 83.87 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	99	24	5.0	
71-43-2	Benzene	1	6.0	6.0	0.15	U
74-97-5	Bromochloromethane	1	24	24	0.15	U
75-27-4	Bromodichloromethane	1	6.0	6.0	0.30	U
75-25-2	Bromoform	1	6.0	6.0	0.58	U
74-83-9	Bromomethane	1	6.0	6.0	1.5	U
75-15-0	Carbon Disulfide	1	3.5	6.0	0.31	J
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.34	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	6.0	6.0	0.18	U
74-87-3	Chloromethane	1	6.0	6.0	0.29	U
110-82-7	Cyclohexane	1	12	12	0.82	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.97	U
124-48-1	Dibromochloromethane	1	6.0	6.0	0.42	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.29	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.28	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.39	U
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.23	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.35	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.44	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.27	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	0.99	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.15	U
79-20-9	Methyl Acetate	1	24	24	0.99	U
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.95	U

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1/24/08 WR

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ORGANIC ANALYSIS DATA SHEET

USEPA-8260B

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-04 File ID: 31304.D

Sampled: 11/13/07 08:00 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 11:33

Solids: 83.87 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.7	U
78-93-3	2-Butanone (MEK)	1	13	24	2.9	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	6.0	6.0	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.24	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.53	U
108-88-3	Toluene	1	6.0	6.0	0.48	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.24	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.82	U
79-01-6	Trichloroethene	1	6.0	6.0	0.67	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.39	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.54	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.70	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.1	105	78 - 121	
1,2-Dichloroethane-d4	40.0	40.8	102	66 - 124	
Toluene-d8	40.0	37.6	94	85 - 115	
4-Bromofluorobenzene	40.0	35.2	88	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	701418	7.35	794160	7.32	
Chlorobenzene-d5	239489	17.39	316611	17.38	
1,4-Dichlorobenzene-d4	202542	22.43	342648	22.42	

* Values outside of QC limits

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1/25/08 WR

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB1A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-05 File ID: 31305A.D

Sampled: 11/13/07 08:25 Prepared: 11/19/07 07:00 Analyzed: 11/19/07 11:25

Solids: 85.52 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112633 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	150	23	4.9	
71-43-2	Benzene	1	5.8	5.8	0.15	U
74-97-5	Bromochloromethane	1	23	23	0.15	U
75-27-4	Bromodichloromethane	1	5.8	5.8	0.29	U
75-25-2	Bromoform	1	5.8	5.8	0.57	U
74-83-9	Bromomethane	1	5.8	5.8	1.4	U
75-15-0	Carbon Disulfide	1	3.3	5.8	0.31	JB B, Z
56-23-5	Carbon Tetrachloride	1	5.8	5.8	0.34	U
108-90-7	Chlorobenzene	1	5.8	5.8	0.24	U
75-00-3	Chloroethane	1	23	23	0.41	U
67-66-3	Chloroform	1	5.8	5.8	0.17	U
74-87-3	Chloromethane	1	5.8	5.8	0.28	U
110-82-7	Cyclohexane	1	12	12	0.80	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.95	U
124-48-1	Dibromochloromethane	1	5.8	5.8	0.41	U
106-93-4	1,2-Dibromoethane	1	5.8	5.8	0.99	U
95-50-1	1,2-Dichlorobenzene	1	5.8	5.8	0.29	U
541-73-1	1,3-Dichlorobenzene	1	5.8	5.8	0.28	U
106-46-7	1,4-Dichlorobenzene	1	5.8	5.8	0.25	U
75-71-8	Dichlorodifluoromethane	1	5.8	5.8	0.39	U
75-34-3	1,1-Dichloroethane	1	5.8	5.8	0.23	U
107-06-2	1,2-Dichloroethane	1	5.8	5.8	0.34	U
75-35-4	1,1-Dichloroethene	1	5.8	5.8	0.43	U
156-59-2	cis-1,2-Dichloroethene	1	5.8	5.8	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	5.8	5.8	0.26	U
78-87-5	1,2-Dichloropropane	1	5.8	5.8	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	5.8	5.8	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	5.8	5.8	0.98	U
100-41-4	Ethylbenzene	1	5.8	5.8	0.15	U
591-78-6	2-Hexanone	1	12	12	3.5	U
98-82-8	Isopropylbenzene	1	5.8	5.8	0.14	U
79-20-9	Methyl Acetate	1	4.7	23	0.97	J
1634-04-4	Methyl tert-Butyl Ether	1	5.8	5.8	0.27	U
108-87-2	Methylcyclohexane	1	12	12	0.93	U
75-09-2	Methylene Chloride	1	5.5	23	4.6	J
78-93-3	2-Butanone (MEK)	1	17	23	2.8	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB1A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-05 File ID: 31305A.D

Sampled: 11/13/07 08:25 Prepared: 11/19/07 07:00 Analyzed: 11/19/07 11:25

Solids: 85.52 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112633 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	5.8	5.8	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.8	5.8	0.24	U
127-18-4	Tetrachloroethene	1	5.8	5.8	0.52	U
108-88-3	Toluene	1	5.8	5.8	0.47	U
87-61-6	1,2,3-Trichlorobenzene	1	23	23	0.24	U
120-82-1	1,2,4-Trichlorobenzene	1	5.8	5.8	0.28	U
71-55-6	1,1,1-Trichloroethane	1	5.8	5.8	0.24	U
79-00-5	1,1,2-Trichloroethane	1	5.8	5.8	0.80	U
79-01-6	Trichloroethene	1	5.8	5.8	0.66	U
75-69-4	Trichlorofluoromethane	1	5.8	5.8	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.8	5.8	0.39	U
75-01-4	Vinyl Chloride	1	5.8	5.8	0.53	U
1330-20-7	Xylene (Total)	1	5.8	5.8	0.68	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.1	110	78 - 121	
1,2-Dichloroethane-d4	40.0	43.8	110	66 - 124	
Toluene-d8	40.0	38.1	95	85 - 115	
4-Bromofluorobenzene	40.0	35.9	90	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	668345	7.34	793126	7.31	
Chlorobenzene-d5	239676	17.39	314333	17.36	
1,4-Dichlorobenzene-d4	206019	22.44	346769	22.41	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB2A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-06 File ID: 31306.D

Sampled: 11/13/07 09:20 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 17:15

Solids: 83.07 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	120	900	72	J
71-43-2	Benzene	1	60	60	7.1	U
74-97-5	Bromochloromethane	1	60	60	12	U
75-27-4	Bromodichloromethane	1	60	60	12	U
75-25-2	Bromoform	1	60	60	14	U
74-83-9	Bromomethane	1	60	60	12	U
75-15-0	Carbon Disulfide	1	300	300	17	U
56-23-5	Carbon Tetrachloride	1	60	60	9.1	U
108-90-7	Chlorobenzene	1	60	60	7.2	U
75-00-3	Chloroethane	1	60	60	12	U
67-66-3	Chloroform	1	60	60	3.7	U
74-87-3	Chloromethane	1	60	60	3.6	U
110-82-7	Cyclohexane	1	300	300	8.3	U
96-12-8	1,2-Dibromo-3-chloropropane	1	300	300	17	U
124-48-1	Dibromochloromethane	1	60	60	8.3	U
106-93-4	1,2-Dibromoethane	1	60	60	13	U
95-50-1	1,2-Dichlorobenzene	1	60	60	4.0	U
541-73-1	1,3-Dichlorobenzene	1	60	60	7.2	U
106-46-7	1,4-Dichlorobenzene	1	60	60	8.1	U
75-71-8	Dichlorodifluoromethane	1	60	60	10	U UJ, C
75-34-3	1,1-Dichloroethane	1	60	60	4.6	U
107-06-2	1,2-Dichloroethane	1	60	60	9.3	U
75-35-4	1,1-Dichloroethene	1	60	60	8.3	U
156-59-2	cis-1,2-Dichloroethene	1	60	60	10	U
156-60-5	trans-1,2-Dichloroethene	1	60	60	9.5	U
78-87-5	1,2-Dichloropropane	1	60	60	6.3	U
10061-01-5	cis-1,3-Dichloropropene	1	60	60	8.5	U
10061-02-6	trans-1,3-Dichloropropene	1	60	60	9.4	U
100-41-4	Ethylbenzene	1	60	60	7.9	U
591-78-6	2-Hexanone	1	3000	3000	26	U
98-82-8	Isopropylbenzene	1	60	60	7.5	U
79-20-9	Methyl Acetate	1	200	300	10	J
1634-04-4	Methyl tert-Butyl Ether	1	60	60	5.8	U
108-87-2	Methylcyclohexane	1	300	300	8.9	U
75-09-2	Methylene Chloride	1	300	300	9.6	U
78-93-3	2-Butanone (MEK)	1	3000	3000	20	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3000	3000	23	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB2A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-06 File ID: 31306.D

Sampled: 11/13/07 09:20 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 17:15

Solids: 83.07 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	60	60	6.5	U
79-34-5	1,1,2,2-Tetrachloroethane	1	60	60	6.0	U
127-18-4	Tetrachloroethene	1	60	60	9.0	U
108-88-3	Toluene	1	60	60	4.3	U
87-61-6	1,2,3-Trichlorobenzene	1	120	120	8.1	U
120-82-1	1,2,4-Trichlorobenzene	1	120	120	9.8	U
71-55-6	1,1,1-Trichloroethane	1	60	60	6.6	U
79-00-5	1,1,2-Trichloroethane	1	60	60	12	U
79-01-6	Trichloroethene	1	60	60	10	U
75-69-4	Trichlorofluoromethane	1	60	60	11	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	300	300	8.7	U
75-01-4	Vinyl Chloride	1	60	60	10	U
1330-20-7	Xylene (Total)	1	180	180	22	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	37.6	94	78 - 121	
1,2-Dichloroethane-d4	40.0	40.7	102	66 - 124	
Toluene-d8	40.0	39.4	98	85 - 115	
4-Bromofluorobenzene	40.0	38.5	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	439524	5.14	492753	5.14	
Chlorobenzene-d5	394076	8.08	439506	8.08	
1,4-Dichlorobenzene-d4	239050	10.38	277371	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-07 File ID: 31307.D

Sampled: 11/13/07 14:45 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 17:52

Solids: 58.85 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	160	1300	100	J
71-43-2	Benzene	1	85	85	10	U
74-97-5	Bromochloromethane	1	85	85	17	U
75-27-4	Bromodichloromethane	1	85	85	16	U
75-25-2	Bromoform	1	85	85	20	U
74-83-9	Bromomethane	1	85	85	16	U
75-15-0	Carbon Disulfide	1	420	420	24	U
56-23-5	Carbon Tetrachloride	1	85	85	13	U
108-90-7	Chlorobenzene	1	85	85	10	U
75-00-3	Chloroethane	1	85	85	17	U
67-66-3	Chloroform	1	85	85	5.3	U
74-87-3	Chloromethane	1	85	85	5.1	U
110-82-7	Cyclohexane	1	420	420	12	U
96-12-8	1,2-Dibromo-3-chloropropane	1	420	420	25	U
124-48-1	Dibromochloromethane	1	85	85	12	U
106-93-4	1,2-Dibromoethane	1	85	85	19	U
95-50-1	1,2-Dichlorobenzene	1	85	85	5.6	U
541-73-1	1,3-Dichlorobenzene	1	85	85	10	U
106-46-7	1,4-Dichlorobenzene	1	85	85	11	U
75-71-8	Dichlorodifluoromethane	1	85	85	14	U UJ,C
75-34-3	1,1-Dichloroethane	1	85	85	6.5	U
107-06-2	1,2-Dichloroethane	1	85	85	13	U
75-35-4	1,1-Dichloroethene	1	85	85	12	U
156-59-2	cis-1,2-Dichloroethene	1	85	85	14	U
156-60-5	trans-1,2-Dichloroethene	1	85	85	13	U
78-87-5	1,2-Dichloropropane	1	85	85	8.8	U
10061-01-5	cis-1,3-Dichloropropene	1	85	85	12	U
10061-02-6	trans-1,3-Dichloropropene	1	85	85	13	U
100-41-4	Ethylbenzene	1	85	85	11	U
591-78-6	2-Hexanone	1	4200	4200	36	U
98-82-8	Isopropylbenzene	1	85	85	11	U
79-20-9	Methyl Acetate	1	97	420	14	J
1634-04-4	Methyl tert-Butyl Ether	1	85	85	8.2	U
108-87-2	Methylcyclohexane	1	420	420	13	U
75-09-2	Methylene Chloride	1	420	420	14	U
78-93-3	2-Butanone (MEK)	1	4200	4200	28	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	4200	4200	32	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-07 File ID: 31307.D

Sampled: 11/13/07 14:45 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 17:52

Solids: 58.85 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	85	85	9.2	U
79-34-5	1,1,2,2-Tetrachloroethane	1	85	85	8.5	U
127-18-4	Tetrachloroethene	1	85	85	13	U
108-88-3	Toluene	1	85	85	6.1	U
87-61-6	1,2,3-Trichlorobenzene	1	170	170	11	U
120-82-1	1,2,4-Trichlorobenzene	1	170	170	14	U
71-55-6	1,1,1-Trichloroethane	1	85	85	9.3	U
79-00-5	1,1,2-Trichloroethane	1	85	85	18	U
79-01-6	Trichloroethene	1	85	85	14	U
75-69-4	Trichlorofluoromethane	1	85	85	15	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	420	420	12	U
75-01-4	Vinyl Chloride	1	85	85	15	U
1330-20-7	Xylene (Total)	1	250	250	30	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	38.6	96	78 - 121	
1,2-Dichloroethane-d4	40.0	41.4	103	66 - 124	
Toluene-d8	40.0	39.4	99	85 - 115	
4-Bromofluorobenzene	40.0	38.3	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	432279	5.13	492753	5.14	
Chlorobenzene-d5	396586	8.08	439506	8.08	
1,4-Dichlorobenzene-d4	238575	10.38	277371	10.38	

* Values outside of QC limits

0315

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-08 File ID: 31308.D

Sampled: 11/13/07 14:55 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 13:45

Solids: 85.53 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	32	23	4.9	
71-43-2	Benzene	1	5.8	5.8	0.15	U
74-97-5	Bromochloromethane	1	23	23	0.15	U
75-27-4	Bromodichloromethane	1	5.8	5.8	0.29	U
75-25-2	Bromoform	1	5.8	5.8	0.57	U
74-83-9	Bromomethane	1	5.8	5.8	1.4	U
75-15-0	Carbon Disulfide	1	3.1	5.8	0.31	J
56-23-5	Carbon Tetrachloride	1	5.8	5.8	0.34	U
108-90-7	Chlorobenzene	1	5.8	5.8	0.24	U
75-00-3	Chloroethane	1	23	23	0.41	U
67-66-3	Chloroform	1	5.8	5.8	0.17	U
74-87-3	Chloromethane	1	5.8	5.8	0.28	U
110-82-7	Cyclohexane	1	12	12	0.80	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.95	U
124-48-1	Dibromochloromethane	1	5.8	5.8	0.41	U
106-93-4	1,2-Dibromoethane	1	5.8	5.8	0.99	U
95-50-1	1,2-Dichlorobenzene	1	5.8	5.8	0.29	U
541-73-1	1,3-Dichlorobenzene	1	5.8	5.8	0.28	U
106-46-7	1,4-Dichlorobenzene	1	5.8	5.8	0.25	U
75-71-8	Dichlorodifluoromethane	1	5.8	5.8	0.39	U
75-34-3	1,1-Dichloroethane	1	5.8	5.8	0.23	U
107-06-2	1,2-Dichloroethane	1	5.8	5.8	0.34	U
75-35-4	1,1-Dichloroethene	1	5.8	5.8	0.43	U
156-59-2	cis-1,2-Dichloroethene	1	5.8	5.8	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	5.8	5.8	0.26	U
78-87-5	1,2-Dichloropropane	1	5.8	5.8	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	5.8	5.8	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	5.8	5.8	0.98	U
100-41-4	Ethylbenzene	1	5.8	5.8	0.15	U
591-78-6	2-Hexanone	1	12	12	3.5	U
98-82-8	Isopropylbenzene	1	5.8	5.8	0.14	U
79-20-9	Methyl Acetate	1	23	23	0.97	U
1634-04-4	Methyl tert-Butyl Ether	1	5.8	5.8	0.27	U
108-87-2	Methylcyclohexane	1	12	12	0.93	U

REVISED
1/24/08 WR

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-08 File ID: 31308.D

Sampled: 11/13/07 14:55 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 13:45

Solids: 85.53 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	23	23	4.6	U
78-93-3	2-Butanone (MEK)	1	7.4	23	2.8	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	5.8	5.8	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.8	5.8	0.24	U
127-18-4	Tetrachloroethene	1	5.8	5.8	0.52	U
108-88-3	Toluene	1	5.8	5.8	0.47	U
87-61-6	1,2,3-Trichlorobenzene	1	23	23	0.24	U
120-82-1	1,2,4-Trichlorobenzene	1	5.8	5.8	0.28	U
71-55-6	1,1,1-Trichloroethane	1	5.8	5.8	0.24	U
79-00-5	1,1,2-Trichloroethane	1	5.8	5.8	0.80	U
79-01-6	Trichloroethene	1	5.8	5.8	0.66	U
75-69-4	Trichlorofluoromethane	1	5.8	5.8	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.8	5.8	0.39	U
75-01-4	Vinyl Chloride	1	5.8	5.8	0.53	U
1330-20-7	Xylene (Total)	1	5.8	5.8	0.68	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.0	105	78 - 121	
1,2-Dichloroethane-d4	40.0	44.0	110	66 - 124	
Toluene-d8	40.0	40.0	100	85 - 115	
4-Bromofluorobenzene	40.0	38.5	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	730293	7.35	794160	7.32	
Chlorobenzene-d5	278017	17.4	316611	17.38	
1,4-Dichlorobenzene-d4	282972	22.44	342648	22.42	

* Values outside of QC limits

REVISED
1/25/08 WR

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-09 File ID: 31309.D

Sampled: 11/13/07 15:05 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 14:18

Solids: 82.73 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	32	24	5.1	
71-43-2	Benzene	1	6.0	6.0	0.15	U
74-97-5	Bromochloromethane	1	24	24	0.15	U
75-27-4	Bromodichloromethane	1	6.0	6.0	0.30	U
75-25-2	Bromoform	1	6.0	6.0	0.59	U
74-83-9	Bromomethane	1	6.0	6.0	1.5	U
75-15-0	Carbon Disulfide	1	3.1	6.0	0.32	J
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.35	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	6.0	6.0	0.18	U
74-87-3	Chloromethane	1	6.0	6.0	0.29	U
110-82-7	Cyclohexane	1	12	12	0.83	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.99	U
124-48-1	Dibromochloromethane	1	6.0	6.0	0.42	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.30	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.40	U
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.23	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.36	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.45	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.27	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.31	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	1.0	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.15	U
79-20-9	Methyl Acetate	1	24	24	1.0	U
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.96	U

REVISED
1/24/08 WR

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-09 File ID: 31309.D

Sampled: 11/13/07 15:05 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 14:18

Solids: 82.73 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.8	U
78-93-3	2-Butanone (MEK)	1	24	24	2.9	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U
100-42-5	Styrene	1	6.0	6.0	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.24	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.53	U
108-88-3	Toluene	1	6.0	6.0	0.49	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.83	U
79-01-6	Trichloroethene	1	6.0	6.0	0.68	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.40	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.55	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.71	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.3	108	78 - 121	
1,2-Dichloroethane-d4	40.0	43.2	108	66 - 124	
Toluene-d8	40.0	40.3	101	85 - 115	
4-Bromofluorobenzene	40.0	38.2	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	708158	7.36	794160	7.32	
Chlorobenzene-d5	272968	17.4	316611	17.38	
1,4-Dichlorobenzene-d4	276466	22.44	342648	22.42	

* Values outside of QC limits

REVISED
11/25/08 WR

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-10 File ID: 31310.D

Sampled: 11/13/07 10:45 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 18:29

Solids: 73.11 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	150	1000	82	J
71-43-2	Benzene	1	68	68	8.1	U
74-97-5	Bromochloromethane	1	68	68	13	U
75-27-4	Bromodichloromethane	1	68	68	13	U
75-25-2	Bromoform	1	68	68	16	U
74-83-9	Bromomethane	1	68	68	13	U
75-15-0	Carbon Disulfide	1	340	340	19	U
56-23-5	Carbon Tetrachloride	1	68	68	10	U
108-90-7	Chlorobenzene	1	68	68	8.2	U
75-00-3	Chloroethane	1	68	68	14	U
67-66-3	Chloroform	1	68	68	4.2	U
74-87-3	Chloromethane	1	68	68	4.1	U
110-82-7	Cyclohexane	1	340	340	9.4	U
96-12-8	1,2-Dibromo-3-chloropropane	1	340	340	20	U
124-48-1	Dibromochloromethane	1	68	68	9.4	U
106-93-4	1,2-Dibromoethane	1	68	68	15	U
95-50-1	1,2-Dichlorobenzene	1	68	68	4.5	U
541-73-1	1,3-Dichlorobenzene	1	68	68	8.2	U
106-46-7	1,4-Dichlorobenzene	1	68	68	9.2	U
75-71-8	Dichlorodifluoromethane	1	68	68	11	U UJ, C
75-34-3	1,1-Dichloroethane	1	68	68	5.2	U
107-06-2	1,2-Dichloroethane	1	68	68	11	U
75-35-4	1,1-Dichloroethene	1	68	68	9.4	U
156-59-2	cis-1,2-Dichloroethene	1	68	68	11	U
156-60-5	trans-1,2-Dichloroethene	1	68	68	11	U
78-87-5	1,2-Dichloropropane	1	68	68	7.1	U
10061-01-5	cis-1,3-Dichloropropene	1	68	68	9.7	U
10061-02-6	trans-1,3-Dichloropropene	1	68	68	11	U
100-41-4	Ethylbenzene	1	68	68	9.0	U
591-78-6	2-Hexanone	1	3400	3400	29	U
98-82-8	Isopropylbenzene	1	68	68	8.5	U
79-20-9	Methyl Acetate	1	180	340	11	J
1634-04-4	Methyl tert-Butyl Ether	1	68	68	6.6	U
108-87-2	Methylcyclohexane	1	340	340	10	U
75-09-2	Methylene Chloride	1	340	340	11	U
78-93-3	2-Butanone (MEK)	1	3400	3400	23	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3400	3400	26	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-10 File ID: 31310.D

Sampled: 11/13/07 10:45 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 18:29

Solids: 73.11 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	68	68	7.4	U
79-34-5	1,1,2,2-Tetrachloroethane	1	68	68	6.8	U
127-18-4	Tetrachloroethene	1	68	68	10	U
108-88-3	Toluene	1	25	68	4.9	J
87-61-6	1,2,3-Trichlorobenzene	1	140	140	9.2	U
120-82-1	1,2,4-Trichlorobenzene	1	140	140	11	U
71-55-6	1,1,1-Trichloroethane	1	68	68	7.5	U
79-00-5	1,1,2-Trichloroethane	1	68	68	14	U
79-01-6	Trichloroethene	1	68	68	12	U
75-69-4	Trichlorofluoromethane	1	68	68	12	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	340	340	9.8	U
75-01-4	Vinyl Chloride	1	68	68	12	U
1330-20-7	Xylene (Total)	1	210	210	24	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	38.0	95	78 - 121	
1,2-Dichloroethane-d4	40.0	41.2	103	66 - 124	
Toluene-d8	40.0	39.0	97	85 - 115	
4-Bromofluorobenzene	40.0	39.0	97	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	425523	5.14	492753	5.14	
Chlorobenzene-d5	386702	8.08	439506	8.08	
1,4-Dichlorobenzene-d4	234323	10.38	277371	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-11 File ID: 31311.D

Sampled: 11/13/07 12:10 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 15:23

Solids: 66.46 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	44	30	6.4	
71-43-2	Benzene	1	7.5	7.5	0.19	U
74-97-5	Bromochloromethane	1	30	30	0.19	U
75-27-4	Bromodichloromethane	1	7.5	7.5	0.37	U
75-25-2	Bromoform	1	7.5	7.5	0.73	U
74-83-9	Bromomethane	1	7.5	7.5	1.8	U
75-15-0	Carbon Disulfide	1	7.5	7.5	0.40	U
56-23-5	Carbon Tetrachloride	1	7.5	7.5	0.43	U
108-90-7	Chlorobenzene	1	7.5	7.5	0.30	U
75-00-3	Chloroethane	1	30	30	0.53	U
67-66-3	Chloroform	1	7.5	7.5	0.22	U
74-87-3	Chloromethane	1	7.5	7.5	0.37	U
110-82-7	Cyclohexane	1	15	15	1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	1	15	15	1.2	U
124-48-1	Dibromochloromethane	1	7.5	7.5	0.53	U
106-93-4	1,2-Dibromoethane	1	7.5	7.5	1.3	U
95-50-1	1,2-Dichlorobenzene	1	7.5	7.5	0.37	U
541-73-1	1,3-Dichlorobenzene	1	7.5	7.5	0.36	U
106-46-7	1,4-Dichlorobenzene	1	7.5	7.5	0.33	U
75-71-8	Dichlorodifluoromethane	1	7.5	7.5	0.50	U
75-34-3	1,1-Dichloroethane	1	7.5	7.5	0.29	U
107-06-2	1,2-Dichloroethane	1	7.5	7.5	0.44	U
75-35-4	1,1-Dichloroethene	1	7.5	7.5	0.56	U
156-59-2	cis-1,2-Dichloroethene	1	7.5	7.5	0.24	U
156-60-5	trans-1,2-Dichloroethene	1	7.5	7.5	0.34	U
78-87-5	1,2-Dichloropropane	1	7.5	7.5	1.4	U
10061-01-5	cis-1,3-Dichloropropene	1	7.5	7.5	0.38	U
10061-02-6	trans-1,3-Dichloropropene	1	7.5	7.5	1.3	U
100-41-4	Ethylbenzene	1	7.5	7.5	0.19	U
591-78-6	2-Hexanone	1	15	15	4.5	U
98-82-8	Isopropylbenzene	1	7.5	7.5	0.19	U
79-20-9	Methyl Acetate	1	2.9	30	1.3	J
1634-04-4	Methyl tert-Butyl Ether	1	7.5	7.5	0.35	U
108-87-2	Methylcyclohexane	1	15	15	1.2	U
75-09-2	Methylene Chloride	1	30	30	5.9	U
78-93-3	2-Butanone (MEK)	1	30	30	3.6	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	15	15	2.8	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-11 File ID: 31311.D

Sampled: 11/13/07 12:10 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 15:23

Solids: 66.46 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	7.5	7.5	0.33	U
79-34-5	1,1,2,2-Tetrachloroethane	1	7.5	7.5	0.30	U
127-18-4	Tetrachloroethene	1	7.5	7.5	0.67	U
108-88-3	Toluene	1	7.5	7.5	0.60	U
87-61-6	1,2,3-Trichlorobenzene	1	30	30	0.31	U
120-82-1	1,2,4-Trichlorobenzene	1	7.5	7.5	0.36	U
71-55-6	1,1,1-Trichloroethane	1	7.5	7.5	0.31	U
79-00-5	1,1,2-Trichloroethane	1	7.5	7.5	1.0	U
79-01-6	Trichloroethene	1	7.5	7.5	0.84	U
75-69-4	Trichlorofluoromethane	1	7.5	7.5	0.32	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroetha ne	1	7.5	7.5	0.50	U
75-01-4	Vinyl Chloride	1	7.5	7.5	0.69	U
1330-20-7	Xylene (Total)	1	7.5	7.5	0.88	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.4	106	78 - 121	
1,2-Dichloroethane-d4	40.0	44.8	112	66 - 124	
Toluene-d8	40.0	38.8	97	85 - 115	
4-Bromofluorobenzene	40.0	37.7	94	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	701203	7.35	794160	7.32	
Chlorobenzene-d5	259895	17.4	316611	17.38	
1,4-Dichlorobenzene-d4	260404	22.44	342648	22.42	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-12 File ID: 31312.D

Sampled: 11/13/07 12:00 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 15:56

Solids: 80.32 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	66	25	5.3	
71-43-2	Benzene	1	6.2	6.2	0.16	U
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.2	6.2	0.31	U
75-25-2	Bromoform	1	6.2	6.2	0.60	U
74-83-9	Bromomethane	1	6.2	6.2	1.5	U
75-15-0	Carbon Disulfide	1	3.6	6.2	0.33	J
56-23-5	Carbon Tetrachloride	1	6.2	6.2	0.36	U
108-90-7	Chlorobenzene	1	6.2	6.2	0.25	U
75-00-3	Chloroethane	1	25	25	0.44	U
67-66-3	Chloroform	1	6.2	6.2	0.18	U
74-87-3	Chloromethane	1	6.2	6.2	0.30	U
110-82-7	Cyclohexane	1	12	12	0.86	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	1.0	U
124-48-1	Dibromochloromethane	1	6.2	6.2	0.44	U
106-93-4	1,2-Dibromoethane	1	6.2	6.2	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.2	6.2	0.31	U
541-73-1	1,3-Dichlorobenzene	1	6.2	6.2	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.2	6.2	0.27	U
75-71-8	Dichlorodifluoromethane	1	6.2	6.2	0.41	U
75-34-3	1,1-Dichloroethane	1	6.2	6.2	0.24	U
107-06-2	1,2-Dichloroethane	1	6.2	6.2	0.37	U
75-35-4	1,1-Dichloroethene	1	6.2	6.2	0.46	U
156-59-2	cis-1,2-Dichloroethene	1	6.2	6.2	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.2	6.2	0.28	U
78-87-5	1,2-Dichloropropane	1	6.2	6.2	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.2	6.2	0.31	U
10061-02-6	trans-1,3-Dichloropropene	1	6.2	6.2	1.0	U
100-41-4	Ethylbenzene	1	6.2	6.2	0.16	U
591-78-6	2-Hexanone	1	12	12	3.7	U
98-82-8	Isopropylbenzene	1	6.2	6.2	0.15	U
79-20-9	Methyl Acetate	1	4.7	25	1.0	J
1634-04-4	Methyl tert-Butyl Ether	1	6.2	6.2	0.29	U
108-87-2	Methylcyclohexane	1	12	12	0.99	U

REVISED
1/24/08 WR

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-12 File ID: 31312.D

Sampled: 11/13/07 12:00 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 15:56

Solids: 80.32 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	25	25	4.9	U
78-93-3	2-Butanone (MEK)	1	8.4	25	3.0	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U
100-42-5	Styrene	1	6.2	6.2	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.2	6.2	0.25	U
127-18-4	Tetrachloroethene	1	6.2	6.2	0.55	U
108-88-3	Toluene	1	6.2	6.2	0.50	U
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.26	U
120-82-1	1,2,4-Trichlorobenzene	1	6.2	6.2	0.30	U
71-55-6	1,1,1-Trichloroethane	1	6.2	6.2	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.2	6.2	0.86	U
79-01-6	Trichloroethene	1	6.2	6.2	0.70	U
75-69-4	Trichlorofluoromethane	1	6.2	6.2	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.2	6.2	0.41	U
75-01-4	Vinyl Chloride	1	6.2	6.2	0.57	U
1330-20-7	Xylene (Total)	1	6.2	6.2	0.73	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.6	109	78 - 121	
1,2-Dichloroethane-d4	40.0	45.8	114	66 - 124	
Toluene-d8	40.0	38.3	96	85 - 115	
4-Bromofluorobenzene	40.0	35.1	88	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	664660	7.37	794160	7.32	
Chlorobenzene-d5	238695	17.4	316611	17.38	
1,4-Dichlorobenzene-d4	205634	22.44	342648	22.42	

* Values outside of QC limits

REVISED
1/25/08 WR

QS03705

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-13 File ID: 31313.D

Sampled: 11/13/07 13:30 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 19:06

Solids: 50.60 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	240	1500	120	J
71-43-2	Benzene	1	99	99	12	U
74-97-5	Bromochloromethane	1	99	99	19	U
75-27-4	Bromodichloromethane	1	99	99	19	U
75-25-2	Bromoform	1	99	99	23	U
74-83-9	Bromomethane	1	99	99	19	U
75-15-0	Carbon Disulfide	1	490	490	28	U
56-23-5	Carbon Tetrachloride	1	99	99	15	U
108-90-7	Chlorobenzene	1	99	99	12	U
75-00-3	Chloroethane	1	99	99	20	U
67-66-3	Chloroform	1	99	99	6.1	U
74-87-3	Chloromethane	1	99	99	5.9	U
110-82-7	Cyclohexane	1	490	490	14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	490	490	29	U
124-48-1	Dibromochloromethane	1	99	99	14	U
106-93-4	1,2-Dibromoethane	1	99	99	22	U
95-50-1	1,2-Dichlorobenzene	1	99	99	6.5	U
541-73-1	1,3-Dichlorobenzene	1	99	99	12	U
106-46-7	1,4-Dichlorobenzene	1	99	99	13	U
75-71-8	Dichlorodifluoromethane	1	99	99	17	U UJ, C
75-34-3	1,1-Dichloroethane	1	99	99	7.5	U
107-06-2	1,2-Dichloroethane	1	99	99	15	U
75-35-4	1,1-Dichloroethene	1	99	99	14	U
156-59-2	cis-1,2-Dichloroethene	1	99	99	16	U
156-60-5	trans-1,2-Dichloroethene	1	99	99	16	U
78-87-5	1,2-Dichloropropane	1	99	99	10	U
10061-01-5	cis-1,3-Dichloropropene	1	99	99	14	U
10061-02-6	trans-1,3-Dichloropropene	1	99	99	15	U
100-41-4	Ethylbenzene	1	99	99	13	U
591-78-6	2-Hexanone	1	4900	4900	42	U
98-82-8	Isopropylbenzene	1	99	99	12	U
79-20-9	Methyl Acetate	1	78	490	16	J
1634-04-4	Methyl tert-Butyl Ether	1	99	99	9.5	U
108-87-2	Methylcyclohexane	1	490	490	15	U
75-09-2	Methylene Chloride	1	490	490	16	U
78-93-3	2-Butanone (MEK)	1	4900	4900	33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	4900	4900	38	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-13 File ID: 31313.D

Sampled: 11/13/07 13:30 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 19:06

Solids: 50.60 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	99	99	11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	99	99	9.9	U
127-18-4	Tetrachloroethene	1	99	99	15	U
108-88-3	Toluene	1	99	99	7.1	U
87-61-6	1,2,3-Trichlorobenzene	1	200	200	13	U
120-82-1	1,2,4-Trichlorobenzene	1	200	200	16	U
71-55-6	1,1,1-Trichloroethane	1	99	99	11	U
79-00-5	1,1,2-Trichloroethane	1	99	99	20	U
79-01-6	Trichloroethene	1	99	99	17	U
75-69-4	Trichlorofluoromethane	1	99	99	18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	490	490	14	U
75-01-4	Vinyl Chloride	1	99	99	17	U
1330-20-7	Xylene (Total)	1	300	300	35	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	38.2	95	78 - 121	
1,2-Dichloroethane-d4	40.0	42.1	105	66 - 124	
Toluene-d8	40.0	40.2	101	85 - 115	
4-Bromofluorobenzene	40.0	39.6	99	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	421679	5.13	492753	5.14	
Chlorobenzene-d5	380729	8.08	439506	8.08	
1,4-Dichlorobenzene-d4	232474	10.38	277371	10.38	

* Values outside of QC limits

00378

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-14 File ID: 31314.D

Sampled: 11/13/07 13:38 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 17:02

Solids: 86.20 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	14	23	4.9	JB,X
71-43-2	Benzene	1	5.8	5.8	0.15	U
74-97-5	Bromochloromethane	1	23	23	0.15	U
75-27-4	Bromodichloromethane	1	5.8	5.8	0.29	U
75-25-2	Bromoform	1	5.8	5.8	0.56	U
74-83-9	Bromomethane	1	5.8	5.8	1.4	U
75-15-0	Carbon Disulfide	1	3.0	5.8	0.31	J
56-23-5	Carbon Tetrachloride	1	5.8	5.8	0.33	U
108-90-7	Chlorobenzene	1	5.8	5.8	0.23	U
75-00-3	Chloroethane	1	23	23	0.41	U
67-66-3	Chloroform	1	5.8	5.8	0.17	U
74-87-3	Chloromethane	1	5.8	5.8	0.28	U
110-82-7	Cyclohexane	1	12	12	0.80	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.95	U
124-48-1	Dibromochloromethane	1	5.8	5.8	0.41	U
106-93-4	1,2-Dibromoethane	1	5.8	5.8	0.98	U
95-50-1	1,2-Dichlorobenzene	1	5.8	5.8	0.28	U
541-73-1	1,3-Dichlorobenzene	1	5.8	5.8	0.28	U
106-46-7	1,4-Dichlorobenzene	1	5.8	5.8	0.25	U
75-71-8	Dichlorodifluoromethane	1	5.8	5.8	0.38	U
75-34-3	1,1-Dichloroethane	1	5.8	5.8	0.23	U
107-06-2	1,2-Dichloroethane	1	5.8	5.8	0.34	U
75-35-4	1,1-Dichloroethene	1	5.8	5.8	0.43	U
156-59-2	cis-1,2-Dichloroethene	1	5.8	5.8	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	5.8	5.8	0.26	U
78-87-5	1,2-Dichloropropane	1	5.8	5.8	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	5.8	5.8	0.29	U
10061-02-6	trans-1,3-Dichloropropene	1	5.8	5.8	0.97	U
100-41-4	Ethylbenzene	1	5.8	5.8	0.15	U
591-78-6	2-Hexanone	1	12	12	3.5	U
98-82-8	Isopropylbenzene	1	5.8	5.8	0.14	U
79-20-9	Methyl Acetate	1	23	23	0.97	U
1634-04-4	Methyl tert-Butyl Ether	1	5.8	5.8	0.27	U
108-87-2	Methylcyclohexane	1	12	12	0.92	U

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1/24/08 WR

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-14 File ID: 31314.D

Sampled: 11/13/07 13:38 Prepared: 11/16/07 08:00 Analyzed: 11/16/07 17:02

Solids: 86.20 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112632 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	23	23	4.6	U
78-93-3	2-Butanone (MEK)	1	23	23	2.8	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	5.8	5.8	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.8	5.8	0.23	U
127-18-4	Tetrachloroethene	1	5.8	5.8	0.51	U
108-88-3	Toluene	1	5.8	5.8	0.47	U
87-61-6	1,2,3-Trichlorobenzene	1	23	23	0.24	U
120-82-1	1,2,4-Trichlorobenzene	1	5.8	5.8	0.28	U
71-55-6	1,1,1-Trichloroethane	1	5.8	5.8	0.24	U
79-00-5	1,1,2-Trichloroethane	1	5.8	5.8	0.80	U
79-01-6	Trichloroethene	1	5.8	5.8	0.65	U
75-69-4	Trichlorofluoromethane	1	5.8	5.8	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.8	5.8	0.38	U
75-01-4	Vinyl Chloride	1	5.8	5.8	0.53	U
1330-20-7	Xylene (Total)	1	5.8	5.8	0.68	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.2	106	78 - 121	
1,2-Dichloroethane-d4	40.0	45.1	113	66 - 124	
Toluene-d8	40.0	40.2	100	85 - 115	
4-Bromofluorobenzene	40.0	37.9	95	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	660612	7.36	794160	7.32	
Chlorobenzene-d5	252297	17.41	316611	17.38	
1,4-Dichlorobenzene-d4	252345	22.44	342648	22.42	

* Values outside of QC limits

REVISED
1/25/08 WR

08393

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-15 File ID: 31315A.D

Sampled: 11/13/07 13:45 Prepared: 11/19/07 07:00 Analyzed: 11/19/07 14:10

Solids: 82.38 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112633 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	83	24	5.1	
71-43-2	Benzene	1	6.1	6.1	0.16	U
74-97-5	Bromochloromethane	1	24	24	0.16	U
75-27-4	Bromodichloromethane	1	6.1	6.1	0.30	U
75-25-2	Bromoform	1	6.1	6.1	0.59	U
74-83-9	Bromomethane	1	6.1	6.1	1.5	U
75-15-0	Carbon Disulfide	1	3.8	6.1	0.32	JB B7 Z
56-23-5	Carbon Tetrachloride	1	6.1	6.1	0.35	U
108-90-7	Chlorobenzene	1	6.1	6.1	0.25	U
75-00-3	Chloroethane	1	24	24	0.43	U
67-66-3	Chloroform	1	6.1	6.1	0.18	U
74-87-3	Chloromethane	1	6.1	6.1	0.29	U
110-82-7	Cyclohexane	1	12	12	0.83	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.99	U
124-48-1	Dibromochloromethane	1	6.1	6.1	0.42	U
106-93-4	1,2-Dibromoethane	1	6.1	6.1	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.1	6.1	0.30	U
541-73-1	1,3-Dichlorobenzene	1	6.1	6.1	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.1	6.1	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.1	6.1	0.40	U
75-34-3	1,1-Dichloroethane	1	6.1	6.1	0.24	U
107-06-2	1,2-Dichloroethane	1	6.1	6.1	0.36	U
75-35-4	1,1-Dichloroethene	1	6.1	6.1	0.45	U
156-59-2	cis-1,2-Dichloroethene	1	6.1	6.1	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.1	6.1	0.27	U
78-87-5	1,2-Dichloropropane	1	6.1	6.1	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.1	6.1	0.31	U
10061-02-6	trans-1,3-Dichloropropene	1	6.1	6.1	1.0	U
100-41-4	Ethylbenzene	1	6.1	6.1	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.1	6.1	0.15	U
79-20-9	Methyl Acetate	1	2.1	24	1.0	J
1634-04-4	Methyl tert-Butyl Ether	1	6.1	6.1	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.97	U
75-09-2	Methylene Chloride	1	24	24	4.8	U
78-93-3	2-Butanone (MEK)	1	12	24	2.9	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-15 File ID: 31315A.D

Sampled: 11/13/07 13:45 Prepared: 11/19/07 07:00 Analyzed: 11/19/07 14:10

Solids: 82.38 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112633 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	6.1	6.1	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.1	6.1	0.25	U
127-18-4	Tetrachloroethene	1	6.1	6.1	0.54	U
108-88-3	Toluene	1	6.1	6.1	0.49	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.1	6.1	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.1	6.1	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.1	6.1	0.83	U
79-01-6	Trichloroethene	1	6.1	6.1	0.68	U
75-69-4	Trichlorofluoromethane	1	6.1	6.1	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.1	6.1	0.40	U
75-01-4	Vinyl Chloride	1	6.1	6.1	0.55	U
1330-20-7	Xylene (Total)	1	6.1	6.1	0.71	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	45.2	113	78 - 121	
1,2-Dichloroethane-d4	40.0	47.1	118	66 - 124	
Toluene-d8	40.0	38.3	96	85 - 115	
4-Bromofluorobenzene	40.0	35.5	89	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	610015	7.36	793126	7.31	
Chlorobenzene-d5	228318	17.41	314333	17.36	
1,4-Dichlorobenzene-d4	210960	22.44	346769	22.41	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-01 File ID: 37701.D

Sampled: 11/14/07 08:00 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 19:43

Solids: 53.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	1400	1400	110	U
71-43-2	Benzene	1	94	94	11	U
74-97-5	Bromochloromethane	1	94	94	18	U
75-27-4	Bromodichloromethane	1	94	94	18	U
75-25-2	Bromoform	1	94	94	22	U
74-83-9	Bromomethane	1	94	94	18	U
75-15-0	Carbon Disulfide	1	470	470	27	U
56-23-5	Carbon Tetrachloride	1	94	94	14	U
108-90-7	Chlorobenzene	1	94	94	11	U
75-00-3	Chloroethane	1	94	94	19	U
67-66-3	Chloroform	1	94	94	5.8	U
74-87-3	Chloromethane	1	94	94	5.7	U
110-82-7	Cyclohexane	1	470	470	13	U
96-12-8	1,2-Dibromo-3-chloropropane	1	470	470	27	U
124-48-1	Dibromochloromethane	1	94	94	13	U
106-93-4	1,2-Dibromoethane	1	94	94	21	U
95-50-1	1,2-Dichlorobenzene	1	94	94	6.2	U
541-73-1	1,3-Dichlorobenzene	1	94	94	11	U
106-46-7	1,4-Dichlorobenzene	1	94	94	13	U
75-71-8	Dichlorodifluoromethane	1	94	94	16	U UJ,C
75-34-3	1,1-Dichloroethane	1	94	94	7.2	U
107-06-2	1,2-Dichloroethane	1	94	94	15	U
75-35-4	1,1-Dichloroethene	1	94	94	13	U
156-59-2	cis-1,2-Dichloroethene	1	94	94	16	U
156-60-5	trans-1,2-Dichloroethene	1	94	94	15	U
78-87-5	1,2-Dichloropropane	1	94	94	9.8	U
10061-01-5	cis-1,3-Dichloropropene	1	94	94	13	U
10061-02-6	trans-1,3-Dichloropropene	1	94	94	15	U
100-41-4	Ethylbenzene	1	94	94	12	U
591-78-6	2-Hexanone	1	4700	4700	40	U
98-82-8	Isopropylbenzene	1	94	94	12	U
79-20-9	Methyl Acetate	1	130	470	16	J
1634-04-4	Methyl tert-Butyl Ether	1	94	94	9.1	U
108-87-2	Methylcyclohexane	1	470	470	14	U
75-09-2	Methylene Chloride	1	470	470	15	U
78-93-3	2-Butanone (MEK)	1	4700	4700	31	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	4700	4700	36	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-01 File ID: 37701.D

Sampled: 11/14/07 08:00 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 19:43

Solids: 53.00 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	94	94	10	U
79-34-5	1,1,2,2-Tetrachloroethane	1	94	94	9.4	U
127-18-4	Tetrachloroethene	1	94	94	14	U
108-88-3	Toluene	1	94	94	6.8	U
87-61-6	1,2,3-Trichlorobenzene	1	190	190	13	U
120-82-1	1,2,4-Trichlorobenzene	1	190	190	15	U
71-55-6	1,1,1-Trichloroethane	1	94	94	10	U
79-00-5	1,1,2-Trichloroethane	1	94	94	19	U
79-01-6	Trichloroethene	1	94	94	16	U
75-69-4	Trichlorofluoromethane	1	94	94	17	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	470	470	14	U
75-01-4	Vinyl Chloride	1	94	94	16	U
1330-20-7	Xylene (Total)	1	280	280	34	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	37.6	94	78 - 121	
1,2-Dichloroethane-d4	40.0	42.4	106	66 - 124	
Toluene-d8	40.0	40.3	101	85 - 115	
4-Bromofluorobenzene	40.0	39.0	98	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	421369	5.13	492753	5.14	
Chlorobenzene-d5	386437	8.08	439506	8.08	
1,4-Dichlorobenzene-d4	232559	10.38	277371	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-02 File ID: 37702.D

Sampled: 11/14/07 08:08 Prepared: 11/20/07 06:00 Analyzed: 11/20/07 12:22

Solids: 87.74 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112634 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	75	23	4.8	
71-43-2	Benzene	1	5.7	5.7	0.15	U
74-97-5	Bromochloromethane	1	23	23	0.15	U
75-27-4	Bromodichloromethane	1	5.7	5.7	0.28	U
75-25-2	Bromoform	1	5.7	5.7	0.55	U
74-83-9	Bromomethane	1	5.7	5.7	1.4	U
75-15-0	Carbon Disulfide	1	5.7	5.7	0.30	U
56-23-5	Carbon Tetrachloride	1	5.7	5.7	0.33	U
108-90-7	Chlorobenzene	1	5.7	5.7	0.23	U
75-00-3	Chloroethane	1	23	23	0.40	U
67-66-3	Chloroform	1	0.21	5.7	0.17	J
74-87-3	Chloromethane	1	5.7	5.7	0.28	U
110-82-7	Cyclohexane	1	11	11	0.78	U
96-12-8	1,2-Dibromo-3-chloropropane	1	11	11	0.93	U
124-48-1	Dibromochloromethane	1	5.7	5.7	0.40	U
106-93-4	1,2-Dibromoethane	1	5.7	5.7	0.96	U
95-50-1	1,2-Dichlorobenzene	1	5.7	5.7	0.28	U
541-73-1	1,3-Dichlorobenzene	1	5.7	5.7	0.27	U
106-46-7	1,4-Dichlorobenzene	1	5.7	5.7	0.25	U
75-71-8	Dichlorodifluoromethane	1	5.7	5.7	0.38	U
75-34-3	1,1-Dichloroethane	1	5.7	5.7	0.22	U
107-06-2	1,2-Dichloroethane	1	5.7	5.7	0.34	U
75-35-4	1,1-Dichloroethene	1	5.7	5.7	0.42	U
156-59-2	cis-1,2-Dichloroethene	1	5.7	5.7	0.18	U
156-60-5	trans-1,2-Dichloroethene	1	5.7	5.7	0.26	U
78-87-5	1,2-Dichloropropane	1	5.7	5.7	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1	5.7	5.7	0.29	U
10061-02-6	trans-1,3-Dichloropropene	1	5.7	5.7	0.95	U
100-41-4	Ethylbenzene	1	5.7	5.7	0.14	U
591-78-6	2-Hexanone	1	11	11	3.4	U
98-82-8	Isopropylbenzene	1	5.7	5.7	0.14	U
79-20-9	Methyl Acetate	1	2.7	23	0.95	J J,C
1634-04-4	Methyl tert-Butyl Ether	1	5.7	5.7	0.27	U
108-87-2	Methylcyclohexane	1	11	11	0.91	U
75-09-2	Methylene Chloride	1	23	23	4.5	U
78-93-3	2-Butanone (MEK)	1	9.4	23	2.8	J J,C
108-10-1	4-Methyl-2-pentanone (MIBK)	1	11	11	2.1	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-02 File ID: 37702.D

Sampled: 11/14/07 08:08 Prepared: 11/20/07 06:00 Analyzed: 11/20/07 12:22

Solids: 87.74 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112634 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	5.7	5.7	0.25	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.7	5.7	0.23	U
127-18-4	Tetrachloroethene	1	5.7	5.7	0.50	U
108-88-3	Toluene	1	5.7	5.7	0.46	U
87-61-6	1,2,3-Trichlorobenzene	1	23	23	0.23	U
120-82-1	1,2,4-Trichlorobenzene	1	5.7	5.7	0.27	U
71-55-6	1,1,1-Trichloroethane	1	5.7	5.7	0.23	U
79-00-5	1,1,2-Trichloroethane	1	5.7	5.7	0.78	U
79-01-6	Trichloroethene	1	5.7	5.7	0.64	U
75-69-4	Trichlorofluoromethane	1	5.7	5.7	0.24	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.7	5.7	0.38	U
75-01-4	Vinyl Chloride	1	5.7	5.7	0.52	U
1330-20-7	Xylene (Total)	1	5.7	5.7	0.67	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.3	108	78 - 121	
1,2-Dichloroethane-d4	40.0	44.2	111	66 - 124	
Toluene-d8	40.0	40.7	102	85 - 115	
4-Bromofluorobenzene	40.0	37.3	93	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	658865	7.37	753034	7.34	
Chlorobenzene-d5	259300	17.41	290826	17.39	
1,4-Dichlorobenzene-d4	262871	22.44	320040	22.43	

* Values outside of QC limits

00423

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-03 File ID: 37703.D

Sampled: 11/14/07 08:25 Prepared: 11/20/07 06:00 Analyzed: 11/20/07 12:56

Solids: 86.53 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112634 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	27	23	4.9	
71-43-2	Benzene	1	0.20	5.8	0.15	J
74-97-5	Bromochloromethane	1	23	23	0.15	U
75-27-4	Bromodichloromethane	1	5.8	5.8	0.29	U
75-25-2	Bromoform	1	5.8	5.8	0.56	U
74-83-9	Bromomethane	1	5.8	5.8	1.4	U
75-15-0	Carbon Disulfide	1	3.1	5.8	0.30	J
56-23-5	Carbon Tetrachloride	1	5.8	5.8	0.33	U
108-90-7	Chlorobenzene	1	5.8	5.8	0.23	U
75-00-3	Chloroethane	1	23	23	0.41	U
67-66-3	Chloroform	1	0.21	5.8	0.17	J
74-87-3	Chloromethane	1	5.8	5.8	0.28	U
110-82-7	Cyclohexane	1	12	12	0.79	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.94	U
124-48-1	Dibromochloromethane	1	5.8	5.8	0.40	U
106-93-4	1,2-Dibromoethane	1	5.8	5.8	0.97	U
95-50-1	1,2-Dichlorobenzene	1	5.8	5.8	0.28	U
541-73-1	1,3-Dichlorobenzene	1	5.8	5.8	0.28	U
106-46-7	1,4-Dichlorobenzene	1	5.8	5.8	0.25	U
75-71-8	Dichlorodifluoromethane	1	5.8	5.8	0.38	U
75-34-3	1,1-Dichloroethane	1	5.8	5.8	0.22	U
107-06-2	1,2-Dichloroethane	1	5.8	5.8	0.34	U
75-35-4	1,1-Dichloroethene	1	5.8	5.8	0.43	U
156-59-2	cis-1,2-Dichloroethene	1	5.8	5.8	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	5.8	5.8	0.26	U
78-87-5	1,2-Dichloropropane	1	5.8	5.8	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	5.8	5.8	0.29	U
10061-02-6	trans-1,3-Dichloropropene	1	5.8	5.8	0.96	U
100-41-4	Ethylbenzene	1	5.8	5.8	0.14	U
591-78-6	2-Hexanone	1	12	12	3.5	U
98-82-8	Isopropylbenzene	1	5.8	5.8	0.14	U
79-20-9	Methyl Acetate	1	23	23	0.96	U
1634-04-4	Methyl tert-Butyl Ether	1	5.8	5.8	0.27	U
108-87-2	Methylcyclohexane	1	12	12	0.92	U

REVISED
1/24/08 WR

00431

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-03 File ID: 37703.D

Sampled: 11/14/07 08:25 Prepared: 11/20/07 06:00 Analyzed: 11/20/07 12:56

Solids: 86.53 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112634 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	23	23	4.6	U
78-93-3	2-Butanone (MEK)	1	23	23	2.8	U UJ, C
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	5.8	5.8	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	5.8	5.8	0.23	U
127-18-4	Tetrachloroethene	1	5.8	5.8	0.51	U
108-88-3	Toluene	1	5.8	5.8	0.46	U
87-61-6	1,2,3-Trichlorobenzene	1	23	23	0.24	U
120-82-1	1,2,4-Trichlorobenzene	1	5.8	5.8	0.28	U
71-55-6	1,1,1-Trichloroethane	1	5.8	5.8	0.24	U
79-00-5	1,1,2-Trichloroethane	1	5.8	5.8	0.79	U
79-01-6	Trichloroethene	1	5.8	5.8	0.65	U
75-69-4	Trichlorofluoromethane	1	5.8	5.8	0.25	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	5.8	5.8	0.38	U
75-01-4	Vinyl Chloride	1	5.8	5.8	0.53	U
1330-20-7	Xylene (Total)	1	5.8	5.8	0.68	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.3	108	78 - 121	
1,2-Dichloroethane-d4	40.0	45.5	114	66 - 124	
Toluene-d8	40.0	38.4	96	85 - 115	
4-Bromofluorobenzene	40.0	34.8	87	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	615299	7.37	753034	7.34	
Chlorobenzene-d5	216089	17.42	290826	17.39	
1,4-Dichlorobenzene-d4	187653	22.44	320040	22.43	

* Values outside of QC limits

REVISED
1/25/08 WE

00432

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-04 File ID: 37704.D

Sampled: 11/14/07 10:10 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 20:20

Solids: 80.92 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	130	930	74	J
71-43-2	Benzene	1	62	62	7.3	U
74-97-5	Bromochloromethane	1	62	62	12	U
75-27-4	Bromodichloromethane	1	62	62	12	U
75-25-2	Bromoform	1	62	62	14	U
74-83-9	Bromomethane	1	62	62	12	U
75-15-0	Carbon Disulfide	1	310	310	18	U
56-23-5	Carbon Tetrachloride	1	62	62	9.4	U
108-90-7	Chlorobenzene	1	62	62	7.4	U
75-00-3	Chloroethane	1	62	62	12	U
67-66-3	Chloroform	1	62	62	3.8	U
74-87-3	Chloromethane	1	62	62	3.7	U
110-82-7	Cyclohexane	1	310	310	8.5	U
96-12-8	1,2-Dibromo-3-chloropropane	1	310	310	18	U
124-48-1	Dibromochloromethane	1	62	62	8.5	U
106-93-4	1,2-Dibromoethane	1	62	62	14	U
95-50-1	1,2-Dichlorobenzene	1	62	62	4.1	U
541-73-1	1,3-Dichlorobenzene	1	62	62	7.4	U
106-46-7	1,4-Dichlorobenzene	1	62	62	8.3	U
75-71-8	Dichlorodifluoromethane	1	62	62	10	U UJ, C
75-34-3	1,1-Dichloroethane	1	62	62	4.7	U
107-06-2	1,2-Dichloroethane	1	62	62	9.5	U
75-35-4	1,1-Dichloroethene	1	62	62	8.5	U
156-59-2	cis-1,2-Dichloroethene	1	62	62	10	U
156-60-5	trans-1,2-Dichloroethene	1	62	62	9.8	U
78-87-5	1,2-Dichloropropane	1	62	62	6.4	U
10061-01-5	cis-1,3-Dichloropropene	1	62	62	8.8	U
10061-02-6	trans-1,3-Dichloropropene	1	62	62	9.6	U
100-41-4	Ethylbenzene	1	62	62	8.2	U
591-78-6	2-Hexanone	1	3100	3100	26	U
98-82-8	Isopropylbenzene	1	62	62	7.7	U
79-20-9	Methyl Acetate	1	170	310	10	J J, F
1634-04-4	Methyl tert-Butyl Ether	1	62	62	5.9	U
108-87-2	Methylcyclohexane	1	310	310	9.1	U
75-09-2	Methylene Chloride	1	310	310	9.9	U
78-93-3	2-Butanone (MEK)	1	3100	3100	20	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3100	3100	24	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-04 File ID: 37704.D

Sampled: 11/14/07 10:10 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 20:20

Solids: 80.92 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	62	62	6.7	U
79-34-5	1,1,2,2-Tetrachloroethane	1	62	62	6.2	U
127-18-4	Tetrachloroethene	1	62	62	9.3	U
108-88-3	Toluene	1	110	62	4.4	
87-61-6	1,2,3-Trichlorobenzene	1	120	120	8.3	U
120-82-1	1,2,4-Trichlorobenzene	1	120	120	10	U
71-55-6	1,1,1-Trichloroethane	1	62	62	6.8	U
79-00-5	1,1,2-Trichloroethane	1	62	62	13	U
79-01-6	Trichloroethene	1	62	62	11	U
75-69-4	Trichlorofluoromethane	1	62	62	11	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	310	310	8.9	U
75-01-4	Vinyl Chloride	1	62	62	11	U
1330-20-7	Xylene (Total)	1	190	190	22	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	38.0	95	78 - 121	
1,2-Dichloroethane-d4	40.0	41.6	104	66 - 124	
Toluene-d8	40.0	39.6	99	85 - 115	
4-Bromofluorobenzene	40.0	39.2	98	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	419836	5.14	492753	5.14	
Chlorobenzene-d5	377539	8.08	439506	8.08	
1,4-Dichlorobenzene-d4	231233	10.38	277371	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-05 File ID: 37705.D

Sampled: 11/14/07 10:23 Prepared: 11/20/07 06:00 Analyzed: 11/20/07 14:02

Solids: 83.40 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112634 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	11	24	5.1	J
71-43-2	Benzene	1	6.0	6.0	0.15	U
74-97-5	Bromochloromethane	1	24	24	0.15	U
75-27-4	Bromodichloromethane	1	6.0	6.0	0.30	U
75-25-2	Bromoform	1	6.0	6.0	0.58	U
74-83-9	Bromomethane	1	6.0	6.0	1.5	U
75-15-0	Carbon Disulfide	1	3.1	6.0	0.32	J
56-23-5	Carbon Tetrachloride	1	6.0	6.0	0.34	U
108-90-7	Chlorobenzene	1	6.0	6.0	0.24	U
75-00-3	Chloroethane	1	24	24	0.42	U
67-66-3	Chloroform	1	6.0	6.0	0.18	U
74-87-3	Chloromethane	1	6.0	6.0	0.29	U
110-82-7	Cyclohexane	1	12	12	0.82	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.98	U
124-48-1	Dibromochloromethane	1	6.0	6.0	0.42	U
106-93-4	1,2-Dibromoethane	1	6.0	6.0	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.0	6.0	0.29	U
541-73-1	1,3-Dichlorobenzene	1	6.0	6.0	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.0	6.0	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.0	6.0	0.40	U
75-34-3	1,1-Dichloroethane	1	6.0	6.0	0.23	U
107-06-2	1,2-Dichloroethane	1	6.0	6.0	0.35	U
75-35-4	1,1-Dichloroethene	1	6.0	6.0	0.44	U
156-59-2	cis-1,2-Dichloroethene	1	6.0	6.0	0.19	U
156-60-5	trans-1,2-Dichloroethene	1	6.0	6.0	0.27	U
78-87-5	1,2-Dichloropropane	1	6.0	6.0	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.0	6.0	0.30	U
10061-02-6	trans-1,3-Dichloropropene	1	6.0	6.0	1.0	U
100-41-4	Ethylbenzene	1	6.0	6.0	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.0	6.0	0.15	U
79-20-9	Methyl Acetate	1	24	24	1.0	U
1634-04-4	Methyl tert-Butyl Ether	1	6.0	6.0	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.95	U

REVISED
1/24/08 WR

00456

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-05 File ID: 37705.D

Sampled: 11/14/07 10:23 Prepared: 11/20/07 06:00 Analyzed: 11/20/07 14:02

Solids: 83.40 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112634 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.7	U
78-93-3	2-Butanone (MEK)	1	24	24	2.9	U UJ, C
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.2	U
100-42-5	Styrene	1	6.0	6.0	0.26	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.0	6.0	0.24	U
127-18-4	Tetrachloroethene	1	6.0	6.0	0.53	U
108-88-3	Toluene	1	6.0	6.0	0.48	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.0	6.0	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.0	6.0	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.0	6.0	0.82	U
79-01-6	Trichloroethene	1	6.0	6.0	0.67	U
75-69-4	Trichlorofluoromethane	1	6.0	6.0	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.0	6.0	0.40	U
75-01-4	Vinyl Chloride	1	6.0	6.0	0.55	U
1330-20-7	Xylene (Total)	1	6.0	6.0	0.70	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.0	110	78 - 121	
1,2-Dichloroethane-d4	40.0	45.9	115	66 - 124	
Toluene-d8	40.0	40.8	102	85 - 115	
4-Bromofluorobenzene	40.0	38.2	96	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	620228	7.37	753034	7.34	
Chlorobenzene-d5	240577	17.42	290826	17.39	
1,4-Dichlorobenzene-d4	239158	22.44	320040	22.43	

* Values outside of QC limits

REVISED
11/25/08 WR

00457

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-06 File ID: 37706.D

Sampled: 11/14/07 10:27 Prepared: 11/20/07 06:00 Analyzed: 11/20/07 14:35

Solids: 80.59 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112634 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	15	25	5.2	J
71-43-2	Benzene	1	6.2	6.2	0.16	U
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.2	6.2	0.31	U
75-25-2	Bromoform	1	6.2	6.2	0.60	U
74-83-9	Bromomethane	1	6.2	6.2	1.5	U
75-15-0	Carbon Disulfide	1	3.2	6.2	0.33	J
56-23-5	Carbon Tetrachloride	1	6.2	6.2	0.36	U
108-90-7	Chlorobenzene	1	6.2	6.2	0.25	U
75-00-3	Chloroethane	1	25	25	0.44	U
67-66-3	Chloroform	1	6.2	6.2	0.18	U
74-87-3	Chloromethane	1	6.2	6.2	0.30	U
110-82-7	Cyclohexane	1	12	12	0.85	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	1.0	U
124-48-1	Dibromochloromethane	1	6.2	6.2	0.43	U
106-93-4	1,2-Dibromoethane	1	6.2	6.2	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.2	6.2	0.30	U
541-73-1	1,3-Dichlorobenzene	1	6.2	6.2	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.2	6.2	0.27	U
75-71-8	Dichlorodifluoromethane	1	6.2	6.2	0.41	U
75-34-3	1,1-Dichloroethane	1	6.2	6.2	0.24	U
107-06-2	1,2-Dichloroethane	1	6.2	6.2	0.37	U
75-35-4	1,1-Dichloroethene	1	6.2	6.2	0.46	U
156-59-2	cis-1,2-Dichloroethene	1	6.2	6.2	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.2	6.2	0.28	U
78-87-5	1,2-Dichloropropane	1	6.2	6.2	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.2	6.2	0.31	U
10061-02-6	trans-1,3-Dichloropropene	1	6.2	6.2	1.0	U
100-41-4	Ethylbenzene	1	6.2	6.2	0.16	U
591-78-6	2-Hexanone	1	12	12	3.7	U
98-82-8	Isopropylbenzene	1	6.2	6.2	0.15	U
79-20-9	Methyl Acetate	1	25	25	1.0	U
1634-04-4	Methyl tert-Butyl Ether	1	6.2	6.2	0.29	U
108-87-2	Methylcyclohexane	1	12	12	0.99	U

REVISED
1/24/08 WR

00464

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-06 File ID: 37706.D

Sampled: 11/14/07 10:27 Prepared: 11/20/07 06:00 Analyzed: 11/20/07 14:35

Solids: 80.59 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112634 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	25	25	4.9	U
78-93-3	2-Butanone (MEK)	1	25	25	3.0	U UJ,C
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U
100-42-5	Styrene	1	6.2	6.2	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.2	6.2	0.25	U
127-18-4	Tetrachloroethene	1	6.2	6.2	0.55	U
108-88-3	Toluene	1	6.2	6.2	0.50	U
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.26	U
120-82-1	1,2,4-Trichlorobenzene	1	6.2	6.2	0.30	U
71-55-6	1,1,1-Trichloroethane	1	6.2	6.2	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.2	6.2	0.85	U
79-01-6	Trichloroethene	1	6.2	6.2	0.70	U
75-69-4	Trichlorofluoromethane	1	6.2	6.2	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.2	6.2	0.41	U
75-01-4	Vinyl Chloride	1	6.2	6.2	0.57	U
1330-20-7	Xylene (Total)	1	6.2	6.2	0.73	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.0	102	78 - 121	
1,2-Dichloroethane-d4	40.0	44.6	111	66 - 124	
Toluene-d8	40.0	39.2	98	85 - 115	
4-Bromofluorobenzene	40.0	39.7	99	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	677818	7.38	753034	7.34	
Chlorobenzene-d5	253062	17.42	290826	17.39	
1,4-Dichlorobenzene-d4	249555	22.45	320040	22.43	

* Values outside of QC limits

REVISED
1/25/08 WR

00465

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-07 File ID: 37707.D

Sampled: 11/14/07 10:00 Prepared: 11/21/07 08:00 Analyzed: 11/21/07 13:10

Solids: 79.15 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112636 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	210	25	5.3	J,C
71-43-2	Benzene	1	6.3	6.3	0.16	U
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.3	6.3	0.31	U
75-25-2	Bromoform	1	6.3	6.3	0.61	U
74-83-9	Bromomethane	1	6.3	6.3	1.5	U
75-15-0	Carbon Disulfide	1	3.4	6.3	0.33	J
56-23-5	Carbon Tetrachloride	1	6.3	6.3	0.36	U
108-90-7	Chlorobenzene	1	6.3	6.3	0.26	U
75-00-3	Chloroethane	1	25	25	0.44	U
67-66-3	Chloroform	1	6.3	6.3	0.19	U
74-87-3	Chloromethane	1	6.3	6.3	0.31	U
110-82-7	Cyclohexane	1	13	13	0.87	U
96-12-8	1,2-Dibromo-3-chloropropane	1	13	13	1.0	U
124-48-1	Dibromochloromethane	1	6.3	6.3	0.44	U
106-93-4	1,2-Dibromoethane	1	6.3	6.3	1.1	U
95-50-1	1,2-Dichlorobenzene	1	6.3	6.3	0.31	U
541-73-1	1,3-Dichlorobenzene	1	6.3	6.3	0.30	U
106-46-7	1,4-Dichlorobenzene	1	6.3	6.3	0.27	U
75-71-8	Dichlorodifluoromethane	1	6.3	6.3	0.42	U
75-34-3	1,1-Dichloroethane	1	6.3	6.3	0.25	U
107-06-2	1,2-Dichloroethane	1	6.3	6.3	0.37	U
75-35-4	1,1-Dichloroethene	1	6.3	6.3	0.47	U
156-59-2	cis-1,2-Dichloroethene	1	6.3	6.3	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.3	6.3	0.29	U
78-87-5	1,2-Dichloropropane	1	6.3	6.3	1.2	U
10061-01-5	cis-1,3-Dichloropropene	1	6.3	6.3	0.32	U
10061-02-6	trans-1,3-Dichloropropene	1	6.3	6.3	1.1	U
100-41-4	Ethylbenzene	1	6.3	6.3	0.16	U
591-78-6	2-Hexanone	1	13	13	3.8	U
98-82-8	Isopropylbenzene	1	6.3	6.3	0.16	U
79-20-9	Methyl Acetate	1	9.6	25	1.1	J J/F
1634-04-4	Methyl tert-Butyl Ether	1	6.3	6.3	0.30	U
108-87-2	Methylcyclohexane	1	13	13	1.0	U

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1/24/08 WR

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-07 File ID: 37707.D

Sampled: 11/14/07 10:00 Prepared: 11/21/07 08:00 Analyzed: 11/21/07 13:10

Solids: 79.15 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112636 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	25	25	5.0	U
78-93-3	2-Butanone (MEK)	1	21	25	3.1	J
108-10-1	4-Methyl-2-pentanone (MIBK)	1	13	13	2.4	U
100-42-5	Styrene	1	6.3	6.3	0.28	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.3	6.3	0.26	U
127-18-4	Tetrachloroethene	1	6.3	6.3	0.56	U
108-88-3	Toluene	1	6.3	6.3	0.51	U
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.26	U
120-82-1	1,2,4-Trichlorobenzene	1	6.3	6.3	0.30	U
71-55-6	1,1,1-Trichloroethane	1	6.3	6.3	0.26	U
79-00-5	1,1,2-Trichloroethane	1	6.3	6.3	0.87	U
79-01-6	Trichloroethene	1	6.3	6.3	0.71	U
75-69-4	Trichlorofluoromethane	1	6.3	6.3	0.27	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.3	6.3	0.42	U
75-01-4	Vinyl Chloride	1	6.3	6.3	0.58	U
1330-20-7	Xylene (Total)	1	6.3	6.3	0.74	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.5	111	78 - 121	
1,2-Dichloroethane-d4	40.0	47.4	119	66 - 124	
Toluene-d8	40.0	39.8	100	85 - 115	
4-Bromofluorobenzene	40.0	37.3	93	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	575013	7.38	748992	7.36	
Chlorobenzene-d5	211080	17.41	300833	17.4	
1,4-Dichlorobenzene-d4	200816	22.45	333930	22.44	

* Values outside of QC limits

REVISED
1/25/08 ORR

00473

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-08 File ID: 37708.D

Sampled: 11/14/07 11:05 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 20:57

Solids: 80.71 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	120	930	74	J
71-43-2	Benzene	1	62	62	7.3	U
74-97-5	Bromochloromethane	1	62	62	12	U
75-27-4	Bromodichloromethane	1	62	62	12	U
75-25-2	Bromoform	1	62	62	14	U
74-83-9	Bromomethane	1	62	62	12	U
75-15-0	Carbon Disulfide	1	310	310	18	U
56-23-5	Carbon Tetrachloride	1	62	62	9.4	U
108-90-7	Chlorobenzene	1	62	62	7.4	U
75-00-3	Chloroethane	1	62	62	13	U
67-66-3	Chloroform	1	62	62	3.8	U
74-87-3	Chloromethane	1	62	62	3.7	U
110-82-7	Cyclohexane	1	310	310	8.5	U
96-12-8	1,2-Dibromo-3-chloropropane	1	310	310	18	U
124-48-1	Dibromochloromethane	1	62	62	8.5	U
106-93-4	1,2-Dibromoethane	1	62	62	14	U
95-50-1	1,2-Dichlorobenzene	1	62	62	4.1	U
541-73-1	1,3-Dichlorobenzene	1	62	62	7.4	U
106-46-7	1,4-Dichlorobenzene	1	62	62	8.3	U
75-71-8	Dichlorodifluoromethane	1	62	62	10	U UJ,C
75-34-3	1,1-Dichloroethane	1	62	62	4.7	U
107-06-2	1,2-Dichloroethane	1	62	62	9.5	U
75-35-4	1,1-Dichloroethene	1	62	62	8.5	U
156-59-2	cis-1,2-Dichloroethene	1	62	62	10	U
156-60-5	trans-1,2-Dichloroethene	1	62	62	9.8	U
78-87-5	1,2-Dichloropropane	1	62	62	6.4	U
10061-01-5	cis-1,3-Dichloropropene	1	62	62	8.8	U
10061-02-6	trans-1,3-Dichloropropene	1	62	62	9.7	U
100-41-4	Ethylbenzene	1	62	62	8.2	U
591-78-6	2-Hexanone	1	3100	3100	26	U
98-82-8	Isopropylbenzene	1	62	62	7.7	U
79-20-9	Methyl Acetate	1	160	310	10	J
1634-04-4	Methyl tert-Butyl Ether	1	62	62	5.9	U
108-87-2	Methylcyclohexane	1	310	310	9.2	U
75-09-2	Methylene Chloride	1	310	310	9.9	U
78-93-3	2-Butanone (MEK)	1	3100	3100	20	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	3100	3100	24	U

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-08 File ID: 37708.D

Sampled: 11/14/07 11:05 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 20:57

Solids: 80.71 Preparation: 5030B Aqueous Purge & Initial/Final: 10 g / 500 mL

QC Batch: 0714335 Sequence: 7112645 Calibration: 7K26010 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
100-42-5	Styrene	1	62	62	6.7	U
79-34-5	1,1,2,2-Tetrachloroethane	1	62	62	6.2	U
127-18-4	Tetrachloroethene	1	62	62	9.3	U
108-88-3	Toluene	1	62	62	4.5	U
87-61-6	1,2,3-Trichlorobenzene	1	120	120	8.3	U
120-82-1	1,2,4-Trichlorobenzene	1	120	120	10	U
71-55-6	1,1,1-Trichloroethane	1	62	62	6.8	U
79-00-5	1,1,2-Trichloroethane	1	62	62	13	U
79-01-6	Trichloroethene	1	62	62	11	U
75-69-4	Trichlorofluoromethane	1	62	62	11	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	310	310	8.9	U
75-01-4	Vinyl Chloride	1	62	62	11	U
1330-20-7	Xylene (Total)	1	190	190	22	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	37.5	94	78 - 121	
1,2-Dichloroethane-d4	40.0	42.3	106	66 - 124	
Toluene-d8	40.0	40.0	100	85 - 115	
4-Bromofluorobenzene	40.0	38.8	97	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	415011	5.13	492753	5.14	
Chlorobenzene-d5	380862	8.08	439506	8.08	
1,4-Dichlorobenzene-d4	231138	10.38	277371	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-09 File ID: 37709.D

Sampled: 11/14/07 11:15 Prepared: 11/20/07 06:00 Analyzed: 11/20/07 16:14

Solids: 82.15 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112634 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	51	24	5.1	
71-43-2	Benzene	1	6.1	6.1	0.16	U
74-97-5	Bromochloromethane	1	24	24	0.16	U
75-27-4	Bromodichloromethane	1	6.1	6.1	0.30	U
75-25-2	Bromoform	1	6.1	6.1	0.59	U
74-83-9	Bromomethane	1	6.1	6.1	1.5	U
75-15-0	Carbon Disulfide	1	3.2	6.1	0.32	J
56-23-5	Carbon Tetrachloride	1	6.1	6.1	0.35	U
108-90-7	Chlorobenzene	1	6.1	6.1	0.25	U
75-00-3	Chloroethane	1	24	24	0.43	U
67-66-3	Chloroform	1	0.22	6.1	0.18	J
74-87-3	Chloromethane	1	6.1	6.1	0.30	U
110-82-7	Cyclohexane	1	12	12	0.84	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	0.99	U
124-48-1	Dibromochloromethane	1	6.1	6.1	0.43	U
106-93-4	1,2-Dibromoethane	1	6.1	6.1	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.1	6.1	0.30	U
541-73-1	1,3-Dichlorobenzene	1	6.1	6.1	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.1	6.1	0.26	U
75-71-8	Dichlorodifluoromethane	1	6.1	6.1	0.40	U
75-34-3	1,1-Dichloroethane	1	6.1	6.1	0.24	U
107-06-2	1,2-Dichloroethane	1	6.1	6.1	0.36	U
75-35-4	1,1-Dichloroethene	1	6.1	6.1	0.45	U
156-59-2	cis-1,2-Dichloroethene	1	6.1	6.1	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.1	6.1	0.28	U
78-87-5	1,2-Dichloropropane	1	6.1	6.1	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.1	6.1	0.31	U
10061-02-6	trans-1,3-Dichloropropene	1	6.1	6.1	1.0	U
100-41-4	Ethylbenzene	1	6.1	6.1	0.15	U
591-78-6	2-Hexanone	1	12	12	3.6	U
98-82-8	Isopropylbenzene	1	6.1	6.1	0.15	U
79-20-9	Methyl Acetate	1	4.6	24	1.0	J J, C
1634-04-4	Methyl tert-Butyl Ether	1	6.1	6.1	0.28	U
108-87-2	Methylcyclohexane	1	12	12	0.97	U

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ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-09 File ID: 37709.D

Sampled: 11/14/07 11:15 Prepared: 11/20/07 06:00 Analyzed: 11/20/07 16:14

Solids: 82.15 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112634 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	24	24	4.8	U
78-93-3	2-Butanone (MEK)	1	24	24	2.9	U UJ/C
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U
100-42-5	Styrene	1	6.1	6.1	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.1	6.1	0.25	U
127-18-4	Tetrachloroethene	1	6.1	6.1	0.54	U
108-88-3	Toluene	1	6.1	6.1	0.49	U
87-61-6	1,2,3-Trichlorobenzene	1	24	24	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.1	6.1	0.29	U
71-55-6	1,1,1-Trichloroethane	1	6.1	6.1	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.1	6.1	0.84	U
79-01-6	Trichloroethene	1	6.1	6.1	0.68	U
75-69-4	Trichlorofluoromethane	1	6.1	6.1	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.1	6.1	0.40	U
75-01-4	Vinyl Chloride	1	6.1	6.1	0.56	U
1330-20-7	Xylene (Total)	1	6.1	6.1	0.71	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	43.9	110	78 - 121	
1,2-Dichloroethane-d4	40.0	45.3	113	66 - 124	
Toluene-d8	40.0	40.3	101	85 - 115	
4-Bromofluorobenzene	40.0	36.9	92	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	634494	7.37	753034	7.34	
Chlorobenzene-d5	249685	17.42	290826	17.39	
1,4-Dichlorobenzene-d4	236838	22.45	320040	22.43	

* Values outside of QC limits

REVISED
M25/08 WR

00496

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-10 File ID: 37710.D

Sampled: 11/14/07 11:20 Prepared: 11/21/07 08:00 Analyzed: 11/21/07 14:16

Solids: 81.09 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112636 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
67-64-1	Acetone	1	52	25	5.2	B, Z
71-43-2	Benzene	1	6.2	6.2	0.16	U
74-97-5	Bromochloromethane	1	25	25	0.16	U
75-27-4	Bromodichloromethane	1	6.2	6.2	0.31	U
75-25-2	Bromoform	1	6.2	6.2	0.60	U
74-83-9	Bromomethane	1	6.2	6.2	1.5	U
75-15-0	Carbon Disulfide	1	3.2	6.2	0.32	J
56-23-5	Carbon Tetrachloride	1	6.2	6.2	0.35	U
108-90-7	Chlorobenzene	1	6.2	6.2	0.25	U
75-00-3	Chloroethane	1	25	25	0.43	U
67-66-3	Chloroform	1	0.20	6.2	0.18	J
74-87-3	Chloromethane	1	6.2	6.2	0.30	U
110-82-7	Cyclohexane	1	12	12	0.85	U
96-12-8	1,2-Dibromo-3-chloropropane	1	12	12	1.0	U
124-48-1	Dibromochloromethane	1	6.2	6.2	0.43	U
106-93-4	1,2-Dibromoethane	1	6.2	6.2	1.0	U
95-50-1	1,2-Dichlorobenzene	1	6.2	6.2	0.30	U
541-73-1	1,3-Dichlorobenzene	1	6.2	6.2	0.29	U
106-46-7	1,4-Dichlorobenzene	1	6.2	6.2	0.27	U
75-71-8	Dichlorodifluoromethane	1	6.2	6.2	0.41	U
75-34-3	1,1-Dichloroethane	1	6.2	6.2	0.24	U
107-06-2	1,2-Dichloroethane	1	6.2	6.2	0.36	U
75-35-4	1,1-Dichloroethene	1	6.2	6.2	0.46	U
156-59-2	cis-1,2-Dichloroethene	1	6.2	6.2	0.20	U
156-60-5	trans-1,2-Dichloroethene	1	6.2	6.2	0.28	U
78-87-5	1,2-Dichloropropane	1	6.2	6.2	1.1	U
10061-01-5	cis-1,3-Dichloropropene	1	6.2	6.2	0.31	U
10061-02-6	trans-1,3-Dichloropropene	1	6.2	6.2	1.0	U
100-41-4	Ethylbenzene	1	6.2	6.2	0.15	U
591-78-6	2-Hexanone	1	12	12	3.7	U
98-82-8	Isopropylbenzene	1	6.2	6.2	0.15	U
79-20-9	Methyl Acetate	1	25	25	1.0	U
1634-04-4	Methyl tert-Butyl Ether	1	6.2	6.2	0.29	U
108-87-2	Methylcyclohexane	1	12	12	0.98	U

REVISED
1/24/08 WR

00504

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-10 File ID: 37710.D

Sampled: 11/14/07 11:20 Prepared: 11/21/07 08:00 Analyzed: 11/21/07 14:16

Solids: 81.09 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

QC Batch: 0714321 Sequence: 7112636 Calibration: 7K26005 Instrument: 139

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	25	25	4.9	U
78-93-3	2-Butanone (MEK)	1	25	25	3.0	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	12	12	2.3	U
100-42-5	Styrene	1	6.2	6.2	0.27	U
79-34-5	1,1,2,2-Tetrachloroethane	1	6.2	6.2	0.25	U
127-18-4	Tetrachloroethene	1	6.2	6.2	0.55	U
108-88-3	Toluene	1	6.2	6.2	0.50	U
87-61-6	1,2,3-Trichlorobenzene	1	25	25	0.25	U
120-82-1	1,2,4-Trichlorobenzene	1	6.2	6.2	0.30	U
71-55-6	1,1,1-Trichloroethane	1	6.2	6.2	0.25	U
79-00-5	1,1,2-Trichloroethane	1	6.2	6.2	0.85	U
79-01-6	Trichloroethene	1	6.2	6.2	0.69	U
75-69-4	Trichlorofluoromethane	1	6.2	6.2	0.26	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	6.2	6.2	0.41	U
75-01-4	Vinyl Chloride	1	6.2	6.2	0.56	U
1330-20-7	Xylene (Total)	1	6.2	6.2	0.72	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	44.9	112	78 - 121	
1,2-Dichloroethane-d4	40.0	46.1	115	66 - 124	
Toluene-d8	40.0	40.4	101	85 - 115	
4-Bromofluorobenzene	40.0	37.6	94	85 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	605220	7.37	748992	7.36	
Chlorobenzene-d5	239784	17.41	300833	17.4	
1,4-Dichlorobenzene-d4	232738	22.45	333930	22.44	

* Values outside of QC limits

REVISED
1/25/08 WR

00585

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711377-23 File ID: 37723.D

Sampled: 11/14/07 16:00 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 16:01

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0714339 Sequence: 7112649 Calibration: 7K26012 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U UJ/C
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711377-23 File ID: 37723.D

Sampled: 11/14/07 16:00 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 16:01

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0714339 Sequence: 7112649 Calibration: 7K26012 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	1.0	1.0	0.072	U
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.4	101	85 - 115	
1,2-Dichloroethane-d4	40.0	41.0	102	70 - 120	
Toluene-d8	40.0	40.0	100	85 - 120	
4-Bromofluorobenzene	40.0	38.7	97	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	464090	5.14	492753	5.14	
Chlorobenzene-d5	420700	8.08	439506	8.08	
1,4-Dichlorobenzene-d4	248091	10.38	277371	10.38	

* Values outside of QC limits

00514

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711377-24 File ID: 37724.D

Sampled: 11/14/07 00:00 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 16:38

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0714339 Sequence: 7112649 Calibration: 7K26012 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U UJ,C
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U

00518

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711377-24 File ID: 37724.D

Sampled: 11/14/07 00:00 Prepared: 11/23/07 12:00 Analyzed: 11/23/07 16:38

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0714339 Sequence: 7112649 Calibration: 7K26012 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	1.0	1.0	0.072	U
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.4	101	85 - 115	
1,2-Dichloroethane-d4	40.0	41.0	103	70 - 120	
Toluene-d8	40.0	39.1	98	85 - 120	
4-Bromofluorobenzene	40.0	39.0	97	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	454603	5.14	492753	5.14	
Chlorobenzene-d5	411606	8.08	439506	8.08	
1,4-Dichlorobenzene-d4	243819	10.38	277371	10.38	

* Values outside of QC limits

SAMPLE ID SUMMARY

USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-42

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35SB3A	0711293-01
EQBK-1	0711313-01
35SB4A	0711313-03
DUP-1	0711313-04
35SB1A	0711313-05
35SB2A	0711313-06
35SB6A	0711313-07
35SB6B	0711313-08
35SB6C	0711313-09
35SB9A	0711313-10
35SB9B	0711313-11
35SB9C	0711313-12
35SB10A	0711313-13
35SB10B	0711313-14
35SB10C	0711313-15
35SB7A	0711377-01
35SB7B	0711377-02
35SB7C	0711377-03
35SB5A	0711377-04
35SB5B	0711377-05
35SB5C	0711377-06
DUP-2	0711377-07
35SB8A	0711377-08
35SB8B	0711377-09
35SB8C	0711377-10
EQBK-2	0711377-23

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB3A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711293-01 File ID: 71129301.D

Sampled: 11/12/07 16:06 Prepared: 11/26/07 07:13 Analyzed: 11/29/07 22:19

Solids: 90.68 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 2 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	190	190	4.4	U
208-96-8	Acenaphthylene	5	190	190	6.6	U
98-86-2	Acetophenone	5	1900	1900	74	U
120-12-7	Anthracene	5	190	190	4.7	U
1912-24-9	Atrazine	5	1900	1900	16	U
100-52-7	Benzaldehyde	5	1900	1900	290	U
56-55-3	Benzo(a)anthracene	5	22	190	5.9	J
50-32-8	Benzo(a)pyrene	5	18	190	11	J
205-99-2	Benzo(b)fluoranthene	5	29	190	9.4	J
207-08-9	Benzo(k)fluoranthene	5	18	190	7.9	J
191-24-2	Benzo(g,h,i)perylene	5	740	740	25	U
92-52-4	1,1'-Biphenyl	5	1900	1900	5.1	U
101-55-3	4-Bromophenyl Phenyl Ether	5	1900	1900	14	U
85-68-7	Butyl Benzyl Phthalate	5	1900	1900	23	U
105-60-2	Caprolactam	5	3600	3600	250	U
86-74-8	Carbazole	5	7.4	1900	5.5	J
59-50-7	4-Chloro-3-methylphenol	5	1900	1900	20	U
106-47-8	4-Chloroaniline	5	1900	1900	220	U
111-91-1	Bis(2-chloroethoxy)methane	5	1900	1900	8.8	U
111-44-4	Bis(2-chloroethyl) Ether	5	1900	1900	9.9	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	1900	1900	3.5	U
91-58-7	2-Chloronaphthalene	5	1900	1900	4.8	U
95-57-8	2-Chlorophenol	5	1900	1900	4.2	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	1900	1900	4.9	U
218-01-9	Chrysene	5	15	190	5.2	J
53-70-3	Dibenz(a,h)anthracene	5	740	740	5.9	U
132-64-9	Dibenzofuran	5	1900	1900	2.9	U
84-74-2	Di-n-butyl Phthalate	5	59	1900	13	J
91-94-1	3,3'-Dichlorobenzidine	5	3600	3600	860	U
120-83-2	2,4-Dichlorophenol	5	1900	1900	73	U
84-66-2	Diethyl Phthalate	5	7.4	1900	4.1	J
105-67-9	2,4-Dimethylphenol	5	1900	1900	63	U
131-11-3	Dimethyl Phthalate	5	1900	1900	3.7	U
534-52-1	4,6-Dinitro-2-methylphenol	5	1900	1900	400	U
51-28-5	2,4-Dinitrophenol	5	3600	3600	370	U
121-14-2	2,4-Dinitrotoluene	5	1900	1900	150	U
606-20-2	2,6-Dinitrotoluene	5	1900	1900	18	U

: 00873

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB3A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711293-01 File ID: 71129301.D

Sampled: 11/12/07 16:06 Prepared: 11/26/07 07:13 Analyzed: 11/29/07 22:19

Solids: 90.68 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 2 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	1900	1900	110	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	55	1900	14	J
206-44-0	Fluoranthene	5	190	190	41	U
86-73-7	Fluorene	5	190	190	3.1	U
118-74-1	Hexachlorobenzene	5	1900	1900	8.8	U
87-68-3	Hexachlorobutadiene	5	1900	1900	7.6	U
77-47-4	Hexachlorocyclopentadiene	5	1900	1900	43	U
67-72-1	Hexachloroethane	5	1900	1900	8.8	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	740	740	7.7	U
78-59-1	Isophorone	5	1900	1900	4.4	U
91-57-6	2-Methylnaphthalene	5	1900	1900	5.3	U
95-48-7	2-Methylphenol	5	1900	1900	90	U
106-44-5	4-Methylphenol	5	1900	1900	100	U
91-20-3	Naphthalene	5	3.7	190	2.6	J
88-74-4	2-Nitroaniline	5	1900	1900	150	U
99-09-2	3-Nitroaniline	5	1900	1900	120	U
100-01-6	4-Nitroaniline	5	1900	1900	250	U
98-95-3	Nitrobenzene	5	1900	1900	16	U
100-02-7	4-Nitrophenol	5	3600	3600	120	U
88-75-5	2-Nitrophenol	5	1900	1900	130	U
86-30-6	N-Nitroso-diphenylamine	5	1900	1900	8.8	U
621-64-7	N-Nitroso-di-n-propylamine	5	1900	1900	7.9	U
87-86-5	Pentachlorophenol	5	3600	3600	41	U
85-01-8	Phenanthrene	5	190	190	40	U
108-95-2	Phenol	5	1900	1900	7.7	U
129-00-0	Pyrene	5	18	190	3.5	J
95-94-3	1,2,4,5-Tetrachlorobenzene	5	1900	1900	8.8	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	1900	1900	180	U
88-06-2	2,4,6-Trichlorophenol	5	1900	1900	51	U
95-95-4	2,4,5-Trichlorophenol	5	1900	1900	66	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	735	471	64	35 - 105	D
Phenol-d6	735	452	62	40 - 100	D
Nitrobenzene-d5	371	287	77	35 - 100	D
2-Fluorobiphenyl	368	268	73	45 - 105	D
2,4,6-Tribromophenol	739	493	67	35 - 125	D
o-Terphenyl	371	276	74	30 - 125	D

20874

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB3A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711293-01 File ID: 71129301.D

Sampled: 11/12/07 16:06 Prepared: 11/26/07 07:13 Analyzed: 11/29/07 22:19

Solids: 90.70 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 2 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	300005	7.88	279890	7.88	
Naphthalene-d8	950664	10.63	882137	10.64	
Acenaphthene-d10	515708	14.77	474013	14.78	
Phenanthrene-d10	783081	18.15	689559	18.15	
Chrysene-d12	614090	21.71	575934	21.71	
Perylene-d12	376054	23.49	538509	23.5	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711313-01 File ID: 71131301.D

Sampled: 11/13/07 16:00 Prepared: 11/19/07 07:02 Analyzed: 11/26/07 12:40

Solids: Preparation: 3510C Liquid-Liquid Extr Initial/Final: 1060 mL / 1 mL

QC Batch: 0714041 Sequence: 7112784 Calibration: 7K27035 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	0.066	5.0	0.043	J B7E
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.051	U
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	0.038	5.0	0.029	J
105-60-2	Caprolactam	1	5.0	5.0	0.14	U R,I
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	2.5	5.0	0.38	JB B7E
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	0.038	5.0	0.034	J
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

00896

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711313-01 File ID: 71131301.D

Sampled: 11/13/07 16:00 Prepared: 11/19/07 07:02 Analyzed: 11/26/07 12:40

Solids: Preparation: 3510C Liquid-Liquid Extr Initial/Final: 1060 mL / 1 mL

QC Batch: 0714041 Sequence: 7112784 Calibration: 7K27035 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	5.0	5.0	0.41	U
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	5.0	5.0	0.031	U
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.028	0.50	0.023	J
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	18.9	6.36	34	20 - 110	
Phenol-d6	18.9	4.25	23	10 - 115	
Nitrobenzene-d5	9.53	5.85	61	40 - 110	
2-Fluorobiphenyl	9.43	5.37	57	50 - 110	
2,4,6-Tribromophenol	19.0	10.8	57	40 - 125	
o-Terphenyl	9.53	6.32	66	50 - 135	

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711313-01 File ID: 71131301.D

Sampled: 11/13/07 16:00 Prepared: 11/19/07 07:02 Analyzed: 11/26/07 12:40

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0714041 Sequence: 7112784 Calibration: 7K27035 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	318159	7.69	238783	7.69	
Naphthalene-d8	1261724	10.43	925469	10.44	
Acenaphthene-d10	670919	14.56	498299	14.56	
Phenanthrene-d10	913428	17.98	688673	17.98	
Chrysene-d12	690543	21.57	512595	21.58	
Perylene-d12	492718	23.3	402396	23.3	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-03 File ID: 71131303.D

Sampled: 11/13/07 07:50 Prepared: 11/26/07 07:13 Analyzed: 11/29/07 22:54

Solids: 83.32 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	100	100	2.4	U
208-96-8	Acenaphthylene	5	100	100	3.6	U
98-86-2	Acetophenone	5	1000	1000	40	U
120-12-7	Anthracene	5	100	100	2.6	U
1912-24-9	Atrazine	5	1000	1000	8.9	U
100-52-7	Benzaldehyde	5	1000	1000	160	U
56-55-3	Benzo(a)anthracene	5	8.0	100	3.2	J
50-32-8	Benzo(a)pyrene	5	100	100	6.2	U
205-99-2	Benzo(b)fluoranthene	5	100	100	5.1	U
207-08-9	Benzo(k)fluoranthene	5	100	100	4.3	U
191-24-2	Benzo(g,h,i)perylene	5	400	400	14	U
92-52-4	1,1'-Biphenyl	5	1000	1000	2.8	U
101-55-3	4-Bromophenyl Phenyl Ether	5	1000	1000	7.5	U
85-68-7	Butyl Benzyl Phthalate	5	1000	1000	13	U
105-60-2	Caprolactam	5	2000	2000	140	U
86-74-8	Carbazole	5	1000	1000	3.0	U
59-50-7	4-Chloro-3-methylphenol	5	1000	1000	11	U
106-47-8	4-Chloroaniline	5	1000	1000	120	U
111-91-1	Bis(2-chloroethoxy)methane	5	1000	1000	4.8	U
111-44-4	Bis(2-chloroethyl) Ether	5	1000	1000	5.4	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	1000	1000	1.9	U
91-58-7	2-Chloronaphthalene	5	1000	1000	2.6	U
95-57-8	2-Chlorophenol	5	1000	1000	2.3	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	1000	1000	2.7	U
218-01-9	Chrysene	5	6.0	100	2.9	J
53-70-3	Dibenz(a,h)anthracene	5	400	400	3.2	U
132-64-9	Dibenzofuran	5	1000	1000	1.6	U
84-74-2	Di-n-butyl Phthalate	5	12	1000	7.2	J
91-94-1	3,3'-Dichlorobenzidine	5	2000	2000	470	U
120-83-2	2,4-Dichlorophenol	5	1000	1000	39	U
84-66-2	Diethyl Phthalate	5	4.0	1000	2.2	J
105-67-9	2,4-Dimethylphenol	5	1000	1000	34	U
131-11-3	Dimethyl Phthalate	5	1000	1000	2.0	U
534-52-1	4,6-Dinitro-2-methylphenol	5	1000	1000	220	U
51-28-5	2,4-Dinitrophenol	5	2000	2000	200	U
121-14-2	2,4-Dinitrotoluene	5	1000	1000	79	U
606-20-2	2,6-Dinitrotoluene	5	1000	1000	9.7	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-03 File ID: 71131303.D

Sampled: 11/13/07 07:50 Prepared: 11/26/07 07:13 Analyzed: 11/29/07 22:54

Solids: 83.32 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	1000	1000	59	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	16	1000	7.8	J
206-44-0	Fluoranthene	5	100	100	23	U
86-73-7	Fluorene	5	100	100	1.7	U
118-74-1	Hexachlorobenzene	5	1000	1000	4.8	U
87-68-3	Hexachlorobutadiene	5	1000	1000	4.1	U
77-47-4	Hexachlorocyclopentadiene	5	1000	1000	24	U
67-72-1	Hexachloroethane	5	1000	1000	4.8	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	400	400	4.2	U
78-59-1	Isophorone	5	1000	1000	2.4	U
91-57-6	2-Methylnaphthalene	5	1000	1000	2.9	U
95-48-7	2-Methylphenol	5	1000	1000	49	U
106-44-5	4-Methylphenol	5	1000	1000	55	U
91-20-3	Naphthalene	5	100	100	1.4	U
88-74-4	2-Nitroaniline	5	1000	1000	79	U
99-09-2	3-Nitroaniline	5	1000	1000	66	U
100-01-6	4-Nitroaniline	5	1000	1000	140	U
98-95-3	Nitrobenzene	5	1000	1000	8.9	U
100-02-7	4-Nitrophenol	5	2000	2000	67	U
88-75-5	2-Nitrophenol	5	1000	1000	73	U
86-30-6	N-Nitroso-diphenylamine	5	1000	1000	4.8	U
621-64-7	N-Nitroso-di-n-propylamine	5	1000	1000	4.3	U
87-86-5	Pentachlorophenol	5	2000	2000	22	U
85-01-8	Phenanthrene	5	100	100	22	U
108-95-2	Phenol	5	1000	1000	4.2	U
129-00-0	Pyrene	5	8.0	100	1.9	J
95-94-3	1,2,4,5-Tetrachlorobenzene	5	1000	1000	4.8	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	1000	1000	98	U
88-06-2	2,4,6-Trichlorophenol	5	1000	1000	28	U
95-95-4	2,4,5-Trichlorophenol	5	1000	1000	36	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	800	436	54	35 - 105	D
Phenol-d6	800	442	55	40 - 100	D
Nitrobenzene-d5	404	250	62	35 - 100	D
2-Fluorobiphenyl	400	266	67	45 - 105	D
2,4,6-Tribromophenol	804	408	51	35 - 125	D
o-Terphenyl	404	264	65	30 - 125	D

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-03 File ID: 71131303.D

Sampled: 11/13/07 07:50 Prepared: 11/26/07 07:13 Analyzed: 11/29/07 22:54

Solids: 83.30 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	231562	7.88	279890	7.88	
Naphthalene-d8	728095	10.63	882137	10.64	
Acenaphthene-d10	369107	14.77	474013	14.78	
Phenanthrene-d10	526423	18.15	689559	18.15	
Chrysene-d12	420246	21.71	575934	21.71	
Perylene-d12	310697	23.49	538509	23.5	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-04 File ID: 71131304.D

Sampled: 11/13/07 08:00 Prepared: 11/26/07 07:13 Analyzed: 12/05/07 15:02

Solids: 83.87 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120563 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	100	100	2.4	U
208-96-8	Acenaphthylene	5	100	100	3.6	U
98-86-2	Acetophenone	5	1000	1000	40	U
120-12-7	Anthracene	5	100	100	2.5	U
1912-24-9	Atrazine	5	1000	1000	8.9	U
100-52-7	Benzaldehyde	5	1000	1000	160	U
56-55-3	Benzo(a)anthracene	5	7.9	100	3.2	J
50-32-8	Benzo(a)pyrene	5	7.9	100	6.1	J
205-99-2	Benzo(b)fluoranthene	5	16	100	5.1	J
207-08-9	Benzo(k)fluoranthene	5	100	100	4.3	U
191-24-2	Benzo(g,h,i)perylene	5	400	400	14	U
92-52-4	1,1'-Biphenyl	5	1000	1000	2.7	U
101-55-3	4-Bromophenyl Phenyl Ether	5	1000	1000	7.5	U
85-68-7	Butyl Benzyl Phthalate	5	1000	1000	13	U
105-60-2	Caprolactam	5	2000	2000	140	U
86-74-8	Carbazole	5	1000	1000	3.0	U
59-50-7	4-Chloro-3-methylphenol	5	1000	1000	11	U
106-47-8	4-Chloroaniline	5	1000	1000	120	U
111-91-1	Bis(2-chloroethoxy)methane	5	1000	1000	4.8	U
111-44-4	Bis(2-chloroethyl) Ether	5	1000	1000	5.4	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	1000	1000	1.9	U
91-58-7	2-Chloronaphthalene	5	1000	1000	2.6	U
95-57-8	2-Chlorophenol	5	1000	1000	2.3	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	1000	1000	2.7	U
218-01-9	Chrysene	5	7.9	100	2.8	J
53-70-3	Dibenz(a,h)anthracene	5	400	400	3.2	U
132-64-9	Dibenzofuran	5	1000	1000	1.6	U
84-74-2	Di-n-butyl Phthalate	5	9.9	1000	7.2	J
91-94-1	3,3'-Dichlorobenzidine	5	2000	2000	470	U
120-83-2	2,4-Dichlorophenol	5	1000	1000	39	U
84-66-2	Diethyl Phthalate	5	4.0	1000	2.2	J
105-67-9	2,4-Dimethylphenol	5	1000	1000	34	U
131-11-3	Dimethyl Phthalate	5	1000	1000	2.0	U
534-52-1	4,6-Dinitro-2-methylphenol	5	1000	1000	220	U
51-28-5	2,4-Dinitrophenol	5	2000	2000	200	U
121-14-2	2,4-Dinitrotoluene	5	1000	1000	79	U
606-20-2	2,6-Dinitrotoluene	5	1000	1000	9.7	U

00929

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-04 File ID: 71131304.D

Sampled: 11/13/07 08:00 Prepared: 11/26/07 07:13 Analyzed: 12/05/07 15:02

Solids: 83.87 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120563 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	1000	1000	59	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	16	1000	7.7	J
206-44-0	Fluoranthene	5	100	100	22	U
86-73-7	Fluorene	5	100	100	1.7	U
118-74-1	Hexachlorobenzene	5	1000	1000	4.7	U
87-68-3	Hexachlorobutadiene	5	1000	1000	4.1	U
77-47-4	Hexachlorocyclopentadiene	5	1000	1000	23	U
67-72-1	Hexachloroethane	5	1000	1000	4.8	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	400	400	4.2	U
78-59-1	Isophorone	5	1000	1000	2.4	U
91-57-6	2-Methylnaphthalene	5	1000	1000	2.8	U
95-48-7	2-Methylphenol	5	1000	1000	48	U
106-44-5	4-Methylphenol	5	1000	1000	54	U
91-20-3	Naphthalene	5	100	100	1.4	U
88-74-4	2-Nitroaniline	5	1000	1000	79	U
99-09-2	3-Nitroaniline	5	1000	1000	66	U
100-01-6	4-Nitroaniline	5	1000	1000	140	U
98-95-3	Nitrobenzene	5	1000	1000	8.9	U
100-02-7	4-Nitrophenol	5	2000	2000	67	U
88-75-5	2-Nitrophenol	5	1000	1000	73	U
86-30-6	N-Nitroso-diphenylamine	5	1000	1000	4.8	U
621-64-7	N-Nitroso-di-n-propylamine	5	1000	1000	4.3	U
87-86-5	Pentachlorophenol	5	2000	2000	22	U
85-01-8	Phenanthrene	5	100	100	22	U
108-95-2	Phenol	5	1000	1000	4.2	U
129-00-0	Pyrene	5	7.9	100	1.9	J
95-94-3	1,2,4,5-Tetrachlorobenzene	5	1000	1000	4.8	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	1000	1000	97	U
88-06-2	2,4,6-Trichlorophenol	5	1000	1000	27	U
95-95-4	2,4,5-Trichlorophenol	5	1000	1000	36	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	795	423	53	35 - 105	D
Phenol-d6	795	411	52	40 - 100	D
Nitrobenzene-d5	401	229	57	35 - 100	D
2-Fluorobiphenyl	397	274	69	45 - 105	D
2,4,6-Tribromophenol	799	433	54	35 - 125	D
o-Terphenyl	401	270	67	30 - 125	D

: 00930

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-04 File ID: 71131304.D

Sampled: 11/13/07 08:00 Prepared: 11/26/07 07:13 Analyzed: 12/05/07 15:02

Solids: 83.90 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120563 Calibration: 7K30001 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	269228	7.71	256460	7.72	
Naphthalene-d8	837055	10.44	798702	10.45	
Acenaphthene-d10	442516	14.57	430089	14.57	
Phenanthrene-d10	613072	17.98	597515	17.99	
Chrysene-d12	483104	21.57	485669	21.58	
Perylene-d12	299776	23.29	422444	23.3	

* Values outside of QC limits

: 00931

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB1A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-05 File ID: 71131305.D

Sampled: 11/13/07 08:25 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 00:03

Solids: 85.52 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	99	99	2.3	U
208-96-8	Acenaphthylene	5	99	99	3.5	U
98-86-2	Acetophenone	5	990	990	39	U
120-12-7	Anthracene	5	99	99	2.5	U
1912-24-9	Atrazine	5	990	990	8.7	U
100-52-7	Benzaldehyde	5	310	990	150	J
56-55-3	Benzo(a)anthracene	5	3.9	99	3.1	J
50-32-8	Benzo(a)pyrene	5	99	99	6.0	U
205-99-2	Benzo(b)fluoranthene	5	99	99	5.0	U
207-08-9	Benzo(k)fluoranthene	5	99	99	4.2	U
191-24-2	Benzo(g,h,i)perylene	5	390	390	13	U
92-52-4	1,1'-Biphenyl	5	990	990	2.7	U
101-55-3	4-Bromophenyl Phenyl Ether	5	990	990	7.3	U
85-68-7	Butyl Benzyl Phthalate	5	990	990	12	U
105-60-2	Caprolactam	5	1900	1900	130	U
86-74-8	Carbazole	5	990	990	2.9	U
59-50-7	4-Chloro-3-methylphenol	5	990	990	10	U
106-47-8	4-Chloroaniline	5	990	990	110	U
111-91-1	Bis(2-chloroethoxy)methane	5	990	990	4.7	U
111-44-4	Bis(2-chloroethyl) Ether	5	990	990	5.3	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	990	990	1.8	U
91-58-7	2-Chloronaphthalene	5	990	990	2.5	U
95-57-8	2-Chlorophenol	5	990	990	2.2	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	990	990	2.6	U
218-01-9	Chrysene	5	99	99	2.8	U
53-70-3	Dibenz(a,h)anthracene	5	390	390	3.1	U
132-64-9	Dibenzofuran	5	990	990	1.5	U
84-74-2	Di-n-butyl Phthalate	5	53	990	7.0	J
91-94-1	3,3´-Dichlorobenzidine	5	1900	1900	460	U
120-83-2	2,4-Dichlorophenol	5	990	990	38	U
84-66-2	Diethyl Phthalate	5	990	990	2.2	U
105-67-9	2,4-Dimethylphenol	5	990	990	33	U
131-11-3	Dimethyl Phthalate	5	990	990	2.0	U
534-52-1	4,6-Dinitro-2-methylphenol	5	990	990	210	U
51-28-5	2,4-Dinitrophenol	5	1900	1900	190	U
121-14-2	2,4-Dinitrotoluene	5	990	990	77	U
606-20-2	2,6-Dinitrotoluene	5	990	990	9.5	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB1A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-05 File ID: 71131305.D

Sampled: 11/13/07 08:25 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 00:03

Solids: 85.52 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	990	990	57	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	990	990	7.6	U
206-44-0	Fluoranthene	5	99	99	22	U
86-73-7	Fluorene	5	99	99	1.6	U
118-74-1	Hexachlorobenzene	5	990	990	4.7	U
87-68-3	Hexachlorobutadiene	5	990	990	4.0	U
77-47-4	Hexachlorocyclopentadiene	5	990	990	23	U
67-72-1	Hexachloroethane	5	990	990	4.7	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	390	390	4.1	U
78-59-1	Isophorone	5	990	990	2.3	U
91-57-6	2-Methylnaphthalene	5	990	990	2.8	U
95-48-7	2-Methylphenol	5	990	990	47	U
106-44-5	4-Methylphenol	5	990	990	53	U
91-20-3	Naphthalene	5	99	99	1.4	U
88-74-4	2-Nitroaniline	5	990	990	77	U
99-09-2	3-Nitroaniline	5	990	990	64	U
100-01-6	4-Nitroaniline	5	990	990	130	U
98-95-3	Nitrobenzene	5	990	990	8.7	U
100-02-7	4-Nitrophenol	5	1900	1900	65	U
88-75-5	2-Nitrophenol	5	990	990	71	U
86-30-6	N-Nitroso-diphenylamine	5	990	990	4.7	U
621-64-7	N-Nitroso-di-n-propylamine	5	990	990	4.2	U
87-86-5	Pentachlorophenol	5	1900	1900	22	U
85-01-8	Phenanthrene	5	99	99	21	U
108-95-2	Phenol	5	990	990	4.1	U
129-00-0	Pyrene	5	1.9	99	1.9	J
95-94-3	1,2,4,5-Tetrachlorobenzene	5	990	990	4.7	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	990	990	95	U
88-06-2	2,4,6-Trichlorophenol	5	990	990	27	U
95-95-4	2,4,5-Trichlorophenol	5	990	990	35	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	780	591	76	35 - 105	D
Phenol-d6	780	604	77	40 - 100	D
Nitrobenzene-d5	394	325	83	35 - 100	D
2-Fluorobiphenyl	390	351	90	45 - 105	D
2,4,6-Tribromophenol	783	569	73	35 - 125	D
o-Terphenyl	394	366	93	30 - 125	D

: 00958

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB1A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-05 File ID: 71131305.D

Sampled: 11/13/07 08:25 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 00:03

Solids: 85.50 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	330108	7.89	279890	7.88	
Naphthalene-d8	1037696	10.64	882137	10.64	
Acenaphthene-d10	548566	14.77	474013	14.78	
Phenanthrene-d10	740185	18.15	689559	18.15	
Chrysene-d12	572310	21.71	575934	21.71	
Perylene-d12	388752	23.49	538509	23.5	

* Values outside of QC limits

00951

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB2A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-06 File ID: 71131306.D

Sampled: 11/13/07 09:20 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 00:38

Solids: 83.07 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 5 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	510	510	12	U
208-96-8	Acenaphthylene	5	510	510	18	U
98-86-2	Acetophenone	5	5100	5100	200	U
120-12-7	Anthracene	5	510	510	13	U
1912-24-9	Atrazine	5	5100	5100	45	U
100-52-7	Benzaldehyde	5	5100	5100	790	U
56-55-3	Benzo(a)anthracene	5	30	510	16	J
50-32-8	Benzo(a)pyrene	5	510	510	31	U
205-99-2	Benzo(b)fluoranthene	5	510	510	26	U
207-08-9	Benzo(k)fluoranthene	5	510	510	22	U
191-24-2	Benzo(g,h,i)perylene	5	2000	2000	69	U
92-52-4	1,1'-Biphenyl	5	5100	5100	14	U
101-55-3	4-Bromophenyl Phenyl Ether	5	5100	5100	38	U
85-68-7	Butyl Benzyl Phthalate	5	5100	5100	63	U
105-60-2	Caprolactam	5	9900	9900	690	U
86-74-8	Carbazole	5	5100	5100	15	U
59-50-7	4-Chloro-3-methylphenol	5	5100	5100	54	U
106-47-8	4-Chloroaniline	5	5100	5100	590	U
111-91-1	Bis(2-chloroethoxy)methane	5	5100	5100	24	U
111-44-4	Bis(2-chloroethyl) Ether	5	5100	5100	27	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	5100	5100	9.4	U
91-58-7	2-Chloronaphthalene	5	5100	5100	13	U
95-57-8	2-Chlorophenol	5	5100	5100	12	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	5100	5100	13	U
218-01-9	Chrysene	5	20	510	14	J
53-70-3	Dibenz(a,h)anthracene	5	2000	2000	16	U
132-64-9	Dibenzofuran	5	5100	5100	7.9	U
84-74-2	Di-n-butyl Phthalate	5	130	5100	36	J
91-94-1	3,3'-Dichlorobenzidine	5	9900	9900	2400	U
120-83-2	2,4-Dichlorophenol	5	5100	5100	200	U
84-66-2	Diethyl Phthalate	5	30	5100	11	J
105-67-9	2,4-Dimethylphenol	5	5100	5100	170	U
131-11-3	Dimethyl Phthalate	5	5100	5100	10	U
534-52-1	4,6-Dinitro-2-methylphenol	5	5100	5100	1100	U
51-28-5	2,4-Dinitrophenol	5	9900	9900	1000	U
121-14-2	2,4-Dinitrotoluene	5	5100	5100	400	U
606-20-2	2,6-Dinitrotoluene	5	5100	5100	49	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB2A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-06 File ID: 71131306.D

Sampled: 11/13/07 09:20 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 00:38

Solids: 83.07 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 5 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	5100	5100	300	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	110	5100	39	J
206-44-0	Fluoranthene	5	510	510	110	U
86-73-7	Fluorene	5	510	510	8.4	U
118-74-1	Hexachlorobenzene	5	5100	5100	24	U
87-68-3	Hexachlorobutadiene	5	5100	5100	21	U
77-47-4	Hexachlorocyclopentadiene	5	5100	5100	120	U
67-72-1	Hexachloroethane	5	5100	5100	24	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	2000	2000	21	U
78-59-1	Isophorone	5	5100	5100	12	U
91-57-6	2-Methylnaphthalene	5	5100	5100	14	U
95-48-7	2-Methylphenol	5	5100	5100	240	U
106-44-5	4-Methylphenol	5	5100	5100	270	U
91-20-3	Naphthalene	5	510	510	7.0	U
88-74-4	2-Nitroaniline	5	5100	5100	400	U
99-09-2	3-Nitroaniline	5	5100	5100	330	U
100-01-6	4-Nitroaniline	5	5100	5100	690	U
98-95-3	Nitrobenzene	5	5100	5100	45	U
100-02-7	4-Nitrophenol	5	9900	9900	340	U
88-75-5	2-Nitrophenol	5	5100	5100	370	U
86-30-6	N-Nitroso-diphenylamine	5	5100	5100	24	U
621-64-7	N-Nitroso-di-n-propylamine	5	5100	5100	21	U
87-86-5	Pentachlorophenol	5	9900	9900	110	U
85-01-8	Phenanthrene	5	510	510	110	U
108-95-2	Phenol	5	5100	5100	21	U
129-00-0	Pyrene	5	20	510	9.5	J
95-94-3	1,2,4,5-Tetrachlorobenzene	5	5100	5100	24	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	5100	5100	490	U
88-06-2	2,4,6-Trichlorophenol	5	5100	5100	140	U
95-95-4	2,4,5-Trichlorophenol	5	5100	5100	180	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	803	602	75	35 - 105	D
Phenol-d6	803	582	72	40 - 100	D
Nitrobenzene-d5	405	291	72	35 - 100	D
2-Fluorobiphenyl	401	351	88	45 - 105	D
2,4,6-Tribromophenol	807	482	60	35 - 125	D
o-Terphenyl	405	391	97	30 - 125	D

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB2A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42 4MD
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0711313-06
File ID: 71131306.D
Sampled: 11/13/07 09:20
Prepared: 11/26/07 07:13
Analyzed: 11/30/07 00:38
Solids: 83.10
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 5 mL
QC Batch: 0714308
Sequence: 7113008
Calibration: 7K30001
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	315348	7.88	279890	7.88	
Naphthalene-d8	976018	10.64	882137	10.64	
Acenaphthene-d10	523107	14.77	474013	14.78	
Phenanthrene-d10	703084	18.15	689559	18.15	
Chrysene-d12	571231	21.71	575934	21.71	
Perylene-d12	465659	23.5	538509	23.5	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-07 File ID: 71131307.D

Sampled: 11/13/07 14:45 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 01:12

Solids: 58.85 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 10 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	1400	1400	34	U
208-96-8	Acenaphthylene	5	1400	1400	51	U
98-86-2	Acetophenone	5	14000	14000	570	U
120-12-7	Anthracene	5	1400	1400	36	U
1912-24-9	Atrazine	5	14000	14000	130	U
100-52-7	Benzaldehyde	5	4600	14000	2200	J
56-55-3	Benzo(a)anthracene	5	57	1400	46	J
50-32-8	Benzo(a)pyrene	5	1400	1400	88	U
205-99-2	Benzo(b)fluoranthene	5	1400	1400	72	U
207-08-9	Benzo(k)fluoranthene	5	1400	1400	61	U
191-24-2	Benzo(g,h,i)perylene	5	5700	5700	190	U
92-52-4	1,1'-Biphenyl	5	14000	14000	39	U
101-55-3	4-Bromophenyl Phenyl Ether	5	14000	14000	110	U
85-68-7	Butyl Benzyl Phthalate	5	14000	14000	180	U
105-60-2	Caprolactam	5	28000	28000	1900	U
86-74-8	Carbazole	5	14000	14000	42	U
59-50-7	4-Chloro-3-methylphenol	5	14000	14000	150	U
106-47-8	4-Chloroaniline	5	14000	14000	1700	U
111-91-1	Bis(2-chloroethoxy)methane	5	14000	14000	68	U
111-44-4	Bis(2-chloroethyl) Ether	5	14000	14000	76	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	14000	14000	27	U
91-58-7	2-Chloronaphthalene	5	14000	14000	37	U
95-57-8	2-Chlorophenol	5	14000	14000	33	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	14000	14000	38	U
218-01-9	Chrysene	5	57	1400	40	J
53-70-3	Dibenz(a,h)anthracene	5	5700	5700	46	U
132-64-9	Dibenzofuran	5	14000	14000	22	U
84-74-2	Di-n-butyl Phthalate	5	650	14000	100	J
91-94-1	3,3'-Dichlorobenzidine	5	28000	28000	6700	U
120-83-2	2,4-Dichlorophenol	5	14000	14000	560	U
84-66-2	Diethyl Phthalate	5	14000	14000	32	U
105-67-9	2,4-Dimethylphenol	5	14000	14000	480	U
131-11-3	Dimethyl Phthalate	5	14000	14000	29	U
534-52-1	4,6-Dinitro-2-methylphenol	5	14000	14000	3100	U
51-28-5	2,4-Dinitrophenol	5	28000	28000	2800	U
121-14-2	2,4-Dinitrotoluene	5	14000	14000	1100	U
606-20-2	2,6-Dinitrotoluene	5	14000	14000	140	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-07 File ID: 71131307.D

Sampled: 11/13/07 14:45 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 01:12

Solids: 58.85 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 10 mL

QC Batch: 0714308 Sequence: 7113008 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	14000	14000	830	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	540	14000	110	J
206-44-0	Fluoranthene	5	1400	1400	320	U
86-73-7	Fluorene	5	1400	1400	24	U
118-74-1	Hexachlorobenzene	5	14000	14000	68	U
87-68-3	Hexachlorobutadiene	5	14000	14000	59	U
77-47-4	Hexachlorocyclopentadiene	5	14000	14000	330	U
67-72-1	Hexachloroethane	5	14000	14000	68	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	5700	5700	59	U
78-59-1	Isophorone	5	14000	14000	34	U
91-57-6	2-Methylnaphthalene	5	14000	14000	41	U
95-48-7	2-Methylphenol	5	14000	14000	690	U
106-44-5	4-Methylphenol	5	14000	14000	770	U
91-20-3	Naphthalene	5	1400	1400	20	U
88-74-4	2-Nitroaniline	5	14000	14000	1100	U
99-09-2	3-Nitroaniline	5	14000	14000	930	U
100-01-6	4-Nitroaniline	5	14000	14000	2000	U
98-95-3	Nitrobenzene	5	14000	14000	130	U
100-02-7	4-Nitrophenol	5	28000	28000	950	U
88-75-5	2-Nitrophenol	5	14000	14000	1000	U
86-30-6	N-Nitroso-diphenylamine	5	250	14000	68	J
621-64-7	N-Nitroso-di-n-propylamine	5	14000	14000	61	U
87-86-5	Pentachlorophenol	5	28000	28000	310	U
85-01-8	Phenanthrene	5	1400	1400	310	U
108-95-2	Phenol	5	14000	14000	59	U
129-00-0	Pyrene	5	57	1400	27	J
95-94-3	1,2,4,5-Tetrachlorobenzene	5	14000	14000	68	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	14000	14000	1400	U
88-06-2	2,4,6-Trichlorophenol	5	14000	14000	390	U
95-95-4	2,4,5-Trichlorophenol	5	14000	14000	510	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	1130	651	58	35 - 105	D
Phenol-d6	1130	595	53	40 - 100	D
Nitrobenzene-d5	572	651	114	35 - 100	D
2-Fluorobiphenyl	566	340	60	45 - 105	D
2,4,6-Tribromophenol	1140	481	42	35 - 125	D
o-Terphenyl	572	397	69	30 - 125	D

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB6A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42 4MD
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0711313-07
File ID: 71131307.D
Sampled: 11/13/07 14:45
Prepared: 11/26/07 07:13
Analyzed: 11/30/07 01:12
Solids: 58.85
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 10 mL
QC Batch: 0714308
Sequence: 7113008
Calibration: 7K30001
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	252985	7.88	352297	7.88	
Naphthalene-d8	801864	10.64	1360191	10.64	
Acenaphthene-d10	418932	14.77	688052	14.77	
Phenanthrene-d10	588634	18.15	877652	18.15	
Chrysene-d12	444705	21.71	661733	21.71	
Perylene-d12	283189	23.49	555528	23.49	

* Values outside of QC limits

: 00584

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-08 File ID: 71131308.D

Sampled: 11/13/07 14:55 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 11:38

Solids: 85.53 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	99	99	2.3	U
208-96-8	Acenaphthylene	5	99	99	3.5	U
98-86-2	Acetophenone	5	990	990	39	U
120-12-7	Anthracene	5	99	99	2.5	U
1912-24-9	Atrazine	5	990	990	8.7	U
100-52-7	Benzaldehyde	5	990	990	150	U
56-55-3	Benzo(a)anthracene	5	99	99	3.1	U
50-32-8	Benzo(a)pyrene	5	99	99	6.0	U
205-99-2	Benzo(b)fluoranthene	5	99	99	5.0	U
207-08-9	Benzo(k)fluoranthene	5	99	99	4.2	U
191-24-2	Benzo(g,h,i)perylene	5	390	390	13	U
92-52-4	1,1'-Biphenyl	5	990	990	2.7	U
101-55-3	4-Bromophenyl Phenyl Ether	5	990	990	7.3	U
85-68-7	Butyl Benzyl Phthalate	5	990	990	12	U
105-60-2	Caprolactam	5	1900	1900	130	U
86-74-8	Carbazole	5	990	990	2.9	U
59-50-7	4-Chloro-3-methylphenol	5	990	990	10	U
106-47-8	4-Chloroaniline	5	990	990	110	U
111-91-1	Bis(2-chloroethoxy)methane	5	990	990	4.7	U
111-44-4	Bis(2-chloroethyl) Ether	5	990	990	5.3	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	990	990	1.8	U
91-58-7	2-Chloronaphthalene	5	990	990	2.5	U
95-57-8	2-Chlorophenol	5	990	990	2.2	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	990	990	2.6	U
218-01-9	Chrysene	5	99	99	2.8	U
53-70-3	Dibenz(a,h)anthracene	5	390	390	3.1	U
132-64-9	Dibenzofuran	5	990	990	1.5	U
84-74-2	Di-n-butyl Phthalate	5	990	990	7.0	U
91-94-1	3,3'-Dichlorobenzidine	5	1900	1900	460	U
120-83-2	2,4-Dichlorophenol	5	990	990	38	U
84-66-2	Diethyl Phthalate	5	990	990	2.2	U
105-67-9	2,4-Dimethylphenol	5	990	990	33	U
131-11-3	Dimethyl Phthalate	5	990	990	2.0	U
534-52-1	4,6-Dinitro-2-methylphenol	5	990	990	210	U
51-28-5	2,4-Dinitrophenol	5	1900	1900	190	U
121-14-2	2,4-Dinitrotoluene	5	990	990	77	U
606-20-2	2,6-Dinitrotoluene	5	990	990	9.5	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-08 File ID: 71131308.D

Sampled: 11/13/07 14:55 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 11:38

Solids: 85.53 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	990	990	57	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	9.7	990	7.6	J
206-44-0	Fluoranthene	5	99	99	22	U
86-73-7	Fluorene	5	99	99	1.6	U
118-74-1	Hexachlorobenzene	5	990	990	4.7	U
87-68-3	Hexachlorobutadiene	5	990	990	4.0	U
77-47-4	Hexachlorocyclopentadiene	5	990	990	23	U
67-72-1	Hexachloroethane	5	990	990	4.7	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	390	390	4.1	U
78-59-1	Isophorone	5	990	990	2.3	U
91-57-6	2-Methylnaphthalene	5	990	990	2.8	U
95-48-7	2-Methylphenol	5	990	990	47	U
106-44-5	4-Methylphenol	5	990	990	53	U
91-20-3	Naphthalene	5	99	99	1.4	U
88-74-4	2-Nitroaniline	5	990	990	77	U
99-09-2	3-Nitroaniline	5	990	990	64	U
100-01-6	4-Nitroaniline	5	990	990	130	U
98-95-3	Nitrobenzene	5	990	990	8.7	U
100-02-7	4-Nitrophenol	5	1900	1900	65	U
88-75-5	2-Nitrophenol	5	990	990	71	U
86-30-6	N-Nitroso-diphenylamine	5	990	990	4.7	U
621-64-7	N-Nitroso-di-n-propylamine	5	990	990	4.2	U
87-86-5	Pentachlorophenol	5	1900	1900	22	U
85-01-8	Phenanthrene	5	99	99	21	U
108-95-2	Phenol	5	990	990	4.1	U
129-00-0	Pyrene	5	99	99	1.9	U
95-94-3	1,2,4,5-Tetrachlorobenzene	5	990	990	4.7	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	990	990	95	U
88-06-2	2,4,6-Trichlorophenol	5	990	990	27	U
95-95-4	2,4,5-Trichlorophenol	5	990	990	35	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	779	573	73	35 - 105	D
Phenol-d6	779	563	72	40 - 100	D
Nitrobenzene-d5	394	277	70	35 - 100	D
2-Fluorobiphenyl	390	329	85	45 - 105	D
2,4,6-Tribromophenol	783	497	63	35 - 125	D
o-Terphenyl	394	376	96	30 - 125	D

: 01002

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-08 File ID: 71131308.D

Sampled: 11/13/07 14:55 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 11:38

Solids: 85.50 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	278208	7.89	260996	7.89	
Naphthalene-d8	878275	10.64	834410	10.64	
Acenaphthene-d10	487052	14.77	466177	14.77	
Phenanthrene-d10	704173	18.15	675648	18.15	
Chrysene-d12	573233	21.71	554264	21.71	
Perylene-d12	485239	23.49	471548	23.5	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-09 File ID: 71131309.D

Sampled: 11/13/07 15:05 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 12:11

Solids: 82.73 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	100	100	2.4	U
208-96-8	Acenaphthylene	5	100	100	3.6	U
98-86-2	Acetophenone	5	1000	1000	41	U
120-12-7	Anthracene	5	100	100	2.6	U
1912-24-9	Atrazine	5	1000	1000	9.0	U
100-52-7	Benzaldehyde	5	1000	1000	160	U
56-55-3	Benzo(a)anthracene	5	100	100	3.2	U
50-32-8	Benzo(a)pyrene	5	100	100	6.2	U
205-99-2	Benzo(b)fluoranthene	5	100	100	5.1	U
207-08-9	Benzo(k)fluoranthene	5	100	100	4.3	U
191-24-2	Benzo(g,h,i)perylene	5	400	400	14	U
92-52-4	1,1'-Biphenyl	5	1000	1000	2.8	U
101-55-3	4-Bromophenyl Phenyl Ether	5	1000	1000	7.6	U
85-68-7	Butyl Benzyl Phthalate	5	1000	1000	13	U
105-60-2	Caprolactam	5	2000	2000	140	U
86-74-8	Carbazole	5	1000	1000	3.0	U
59-50-7	4-Chloro-3-methylphenol	5	1000	1000	11	U
106-47-8	4-Chloroaniline	5	1000	1000	120	U
111-91-1	Bis(2-chloroethoxy)methane	5	1000	1000	4.8	U
111-44-4	Bis(2-chloroethyl) Ether	5	1000	1000	5.4	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	1000	1000	1.9	U
91-58-7	2-Chloronaphthalene	5	1000	1000	2.6	U
95-57-8	2-Chlorophenol	5	1000	1000	2.3	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	1000	1000	2.7	U
218-01-9	Chrysene	5	100	100	2.9	U
53-70-3	Dibenz(a,h)anthracene	5	400	400	3.2	U
132-64-9	Dibenzofuran	5	1000	1000	1.6	U
84-74-2	Di-n-butyl Phthalate	5	16	1000	7.3	J
91-94-1	3,3'-Dichlorobenzidine	5	2000	2000	470	U
120-83-2	2,4-Dichlorophenol	5	1000	1000	40	U
84-66-2	Diethyl Phthalate	5	1000	1000	2.2	U
105-67-9	2,4-Dimethylphenol	5	1000	1000	34	U
131-11-3	Dimethyl Phthalate	5	1000	1000	2.0	U
534-52-1	4,6-Dinitro-2-methylphenol	5	1000	1000	220	U
51-28-5	2,4-Dinitrophenol	5	2000	2000	200	U
121-14-2	2,4-Dinitrotoluene	5	1000	1000	80	U
606-20-2	2,6-Dinitrotoluene	5	1000	1000	9.8	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-09 File ID: 71131309.D

Sampled: 11/13/07 15:05 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 12:11

Solids: 82.73 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	1000	1000	59	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	20	1000	7.9	J
206-44-0	Fluoranthene	5	100	100	23	U
86-73-7	Fluorene	5	100	100	1.7	U
118-74-1	Hexachlorobenzene	5	1000	1000	4.8	U
87-68-3	Hexachlorobutadiene	5	1000	1000	4.2	U
77-47-4	Hexachlorocyclopentadiene	5	1000	1000	24	U
67-72-1	Hexachloroethane	5	1000	1000	4.8	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	400	400	4.2	U
78-59-1	Isophorone	5	1000	1000	2.4	U
91-57-6	2-Methylnaphthalene	5	1000	1000	2.9	U
95-48-7	2-Methylphenol	5	1000	1000	49	U
106-44-5	4-Methylphenol	5	1000	1000	55	U
91-20-3	Naphthalene	5	100	100	1.4	U
88-74-4	2-Nitroaniline	5	1000	1000	80	U
99-09-2	3-Nitroaniline	5	1000	1000	66	U
100-01-6	4-Nitroaniline	5	1000	1000	140	U
98-95-3	Nitrobenzene	5	1000	1000	9.0	U
100-02-7	4-Nitrophenol	5	2000	2000	68	U
88-75-5	2-Nitrophenol	5	1000	1000	74	U
86-30-6	N-Nitroso-diphenylamine	5	1000	1000	4.8	U
621-64-7	N-Nitroso-di-n-propylamine	5	1000	1000	4.3	U
87-86-5	Pentachlorophenol	5	2000	2000	22	U
85-01-8	Phenanthrene	5	100	100	22	U
108-95-2	Phenol	5	1000	1000	4.2	U
129-00-0	Pyrene	5	100	100	1.9	U
95-94-3	1,2,4,5-Tetrachlorobenzene	5	1000	1000	4.8	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	1000	1000	99	U
88-06-2	2,4,6-Trichlorophenol	5	1000	1000	28	U
95-95-4	2,4,5-Trichlorophenol	5	1000	1000	36	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	806	637	79	35 - 105	D
Phenol-d6	806	627	78	40 - 100	D
Nitrobenzene-d5	407	306	75	35 - 100	D
2-Fluorobiphenyl	403	359	89	45 - 105	D
2,4,6-Tribromophenol	810	562	69	35 - 125	D
o-Terphenyl	407	385	95	30 - 125	D

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-09 File ID: 71131309.D

Sampled: 11/13/07 15:05 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 12:11

Solids: 82.70 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	282119	7.88	260996	7.89	
Naphthalene-d8	895980	10.63	834410	10.64	
Acenaphthene-d10	511069	14.77	466177	14.77	
Phenanthrene-d10	744500	18.15	675648	18.15	
Chrysene-d12	579264	21.71	554264	21.71	
Perylene-d12	446658	23.49	471548	23.5	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-10 File ID: 71131310.D

Sampled: 11/13/07 10:45 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 12:46

Solids: 73.11 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 10 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	1200	1200	27	U UL,S
208-96-8	Acenaphthylene	5	1200	1200	41	U
98-86-2	Acetophenone	5	12000	12000	460	U
120-12-7	Anthracene	5	1200	1200	29	U
1912-24-9	Atrazine	5	12000	12000	100	U
100-52-7	Benzaldehyde	5	12000	12000	1800	U UL,S
56-55-3	Benzo(a)anthracene	5	46	1200	37	J L,S
50-32-8	Benzo(a)pyrene	5	1200	1200	70	U UL,S
205-99-2	Benzo(b)fluoranthene	5	1200	1200	58	U
207-08-9	Benzo(k)fluoranthene	5	1200	1200	49	U
191-24-2	Benzo(g,h,i)perylene	5	4600	4600	160	U
92-52-4	1,1'-Biphenyl	5	12000	12000	31	U
101-55-3	4-Bromophenyl Phenyl Ether	5	12000	12000	85	U
85-68-7	Butyl Benzyl Phthalate	5	12000	12000	140	U
105-60-2	Caprolactam	5	23000	23000	1600	U
86-74-8	Carbazole	5	12000	12000	34	U
59-50-7	4-Chloro-3-methylphenol	5	12000	12000	120	U
106-47-8	4-Chloroaniline	5	12000	12000	1300	U
111-91-1	Bis(2-chloroethoxy)methane	5	12000	12000	55	U
111-44-4	Bis(2-chloroethyl) Ether	5	12000	12000	62	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	12000	12000	21	U
91-58-7	2-Chloronaphthalene	5	12000	12000	30	U
95-57-8	2-Chlorophenol	5	12000	12000	26	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	12000	12000	31	U
218-01-9	Chrysene	5	1200	1200	33	U
53-70-3	Dibenz(a,h)anthracene	5	4600	4600	37	U
132-64-9	Dibenzofuran	5	12000	12000	18	U UL,S
84-74-2	Di-n-butyl Phthalate	5	460	12000	82	J L,S
91-94-1	3,3'-Dichlorobenzidine	5	23000	23000	5400	U UL,S
120-83-2	2,4-Dichlorophenol	5	12000	12000	450	U
84-66-2	Diethyl Phthalate	5	12000	12000	25	U
105-67-9	2,4-Dimethylphenol	5	12000	12000	390	U
131-11-3	Dimethyl Phthalate	5	12000	12000	23	U
534-52-1	4,6-Dinitro-2-methylphenol	5	12000	12000	2500	U
51-28-5	2,4-Dinitrophenol	5	23000	23000	2300	U
121-14-2	2,4-Dinitrotoluene	5	12000	12000	900	U
606-20-2	2,6-Dinitrotoluene	5	12000	12000	110	U UL,S

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-10 File ID: 71131310.D

Sampled: 11/13/07 10:45 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 12:46

Solids: 73.11 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 10 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	12000	12000	670	U UL,S
117-81-7	Bis(2-ethylhexyl) Phthalate	5	160	12000	89	J L,S
206-44-0	Fluoranthene	5	1200	1200	260	U UL,S
86-73-7	Fluorene	5	1200	1200	19	U
118-74-1	Hexachlorobenzene	5	12000	12000	54	U
87-68-3	Hexachlorobutadiene	5	12000	12000	47	U
77-47-4	Hexachlorocyclopentadiene	5	12000	12000	270	U
67-72-1	Hexachloroethane	5	12000	12000	55	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	4600	4600	48	U
78-59-1	Isophorone	5	12000	12000	27	U
91-57-6	2-Methylnaphthalene	5	12000	12000	33	U
95-48-7	2-Methylphenol	5	12000	12000	560	U
106-44-5	4-Methylphenol	5	12000	12000	620	U
91-20-3	Naphthalene	5	1200	1200	16	U
88-74-4	2-Nitroaniline	5	12000	12000	900	U
99-09-2	3-Nitroaniline	5	12000	12000	750	U
100-01-6	4-Nitroaniline	5	12000	12000	1600	U
98-95-3	Nitrobenzene	5	12000	12000	100	U
100-02-7	4-Nitrophenol	5	23000	23000	770	U
88-75-5	2-Nitrophenol	5	12000	12000	830	U
86-30-6	N-Nitroso-diphenylamine	5	12000	12000	55	U
621-64-7	N-Nitroso-di-n-propylamine	5	12000	12000	49	U
87-86-5	Pentachlorophenol	5	23000	23000	250	U
85-01-8	Phenanthrene	5	1200	1200	250	U
108-95-2	Phenol	5	12000	12000	48	U UL,S
129-00-0	Pyrene	5	46	1200	22	J L,S
95-94-3	1,2,4,5-Tetrachlorobenzene	5	12000	12000	55	U UL,S
58-90-2	2,3,4,6-Tetrachlorophenol	5	12000	12000	1100	U
88-06-2	2,4,6-Trichlorophenol	5	12000	12000	310	U
95-95-4	2,4,5-Trichlorophenol	5	12000	12000	410	U UL,S

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	912	0.00		35 - 105	*
Phenol-d6	912	0.00		40 - 100	*
Nitrobenzene-d5	461	0.00		35 - 100	*
2-Fluorobiphenyl	456	0.00		45 - 105	*
2,4,6-Tribromophenol	916	0.00		35 - 125	*
o-Terphenyl	461	0.00		30 - 125	*

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-10 File ID: 71131310.D

Sampled: 11/13/07 10:45 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 12:46

Solids: 73.10 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 10 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	319297	7.89	260996	7.89	
Naphthalene-d8	1026551	10.64	834410	10.64	
Acenaphthene-d10	553479	14.77	466177	14.77	
Phenanthrene-d10	795903	18.15	675648	18.15	
Chrysene-d12	650812	21.71	554264	21.71	
Perylene-d12	474663	23.49	471548	23.5	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-11 File ID: 71131311.D

Sampled: 11/13/07 12:10 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 13:21

Solids: 66.46 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	130	130	3.0	U
208-96-8	Acenaphthylene	5	130	130	4.5	U
98-86-2	Acetophenone	5	1300	1300	51	U
120-12-7	Anthracene	5	130	130	3.2	U
1912-24-9	Atrazine	5	1300	1300	11	U
100-52-7	Benzaldehyde	5	1300	1300	200	U
56-55-3	Benzo(a)anthracene	5	5.0	130	4.0	J
50-32-8	Benzo(a)pyrene	5	130	130	7.7	U
205-99-2	Benzo(b)fluoranthene	5	130	130	6.4	U
207-08-9	Benzo(k)fluoranthene	5	130	130	5.4	U
191-24-2	Benzo(g,h,i)perylene	5	500	500	17	U
92-52-4	1,1'-Biphenyl	5	1300	1300	3.5	U
101-55-3	4-Bromophenyl Phenyl Ether	5	1300	1300	9.4	U
85-68-7	Butyl Benzyl Phthalate	5	1300	1300	16	U
105-60-2	Caprolactam	5	2500	2500	170	U
86-74-8	Carbazole	5	1300	1300	3.7	U
59-50-7	4-Chloro-3-methylphenol	5	1300	1300	13	U
106-47-8	4-Chloroaniline	5	1300	1300	150	U
111-91-1	Bis(2-chloroethoxy)methane	5	1300	1300	6.0	U
111-44-4	Bis(2-chloroethyl) Ether	5	1300	1300	6.8	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	1300	1300	2.4	U
91-58-7	2-Chloronaphthalene	5	1300	1300	3.3	U
95-57-8	2-Chlorophenol	5	1300	1300	2.9	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	1300	1300	3.4	U
218-01-9	Chrysene	5	130	130	3.6	U
53-70-3	Dibenz(a,h)anthracene	5	500	500	4.0	U
132-64-9	Dibenzofuran	5	1300	1300	2.0	U
84-74-2	Di-n-butyl Phthalate	5	28	1300	9.0	J
91-94-1	3,3´-Dichlorobenzidine	5	2500	2500	590	U
120-83-2	2,4-Dichlorophenol	5	1300	1300	50	U
84-66-2	Diethyl Phthalate	5	1300	1300	2.8	U
105-67-9	2,4-Dimethylphenol	5	1300	1300	43	U
131-11-3	Dimethyl Phthalate	5	1300	1300	2.6	U
534-52-1	4,6-Dinitro-2-methylphenol	5	1300	1300	270	U
51-28-5	2,4-Dinitrophenol	5	2500	2500	250	U
121-14-2	2,4-Dinitrotoluene	5	1300	1300	99	U
606-20-2	2,6-Dinitrotoluene	5	1300	1300	12	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-11 File ID: 71131311.D

Sampled: 11/13/07 12:10 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 13:21

Solids: 66.46 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	1300	1300	74	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	18	1300	9.8	J
206-44-0	Fluoranthene	5	130	130	28	U
86-73-7	Fluorene	5	130	130	2.1	U
118-74-1	Hexachlorobenzene	5	1300	1300	6.0	U
87-68-3	Hexachlorobutadiene	5	1300	1300	5.2	U
77-47-4	Hexachlorocyclopentadiene	5	1300	1300	30	U
67-72-1	Hexachloroethane	5	1300	1300	6.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	500	500	5.3	U
78-59-1	Isophorone	5	1300	1300	3.0	U
91-57-6	2-Methylnaphthalene	5	1300	1300	3.6	U
95-48-7	2-Methylphenol	5	1300	1300	61	U
106-44-5	4-Methylphenol	5	1300	1300	68	U
91-20-3	Naphthalene	5	130	130	1.8	U
88-74-4	2-Nitroaniline	5	1300	1300	99	U
99-09-2	3-Nitroaniline	5	1300	1300	83	U
100-01-6	4-Nitroaniline	5	1300	1300	170	U
98-95-3	Nitrobenzene	5	1300	1300	11	U
100-02-7	4-Nitrophenol	5	2500	2500	84	U
88-75-5	2-Nitrophenol	5	1300	1300	92	U
86-30-6	N-Nitroso-diphenylamine	5	1300	1300	6.0	U
621-64-7	N-Nitroso-di-n-propylamine	5	1300	1300	5.4	U
87-86-5	Pentachlorophenol	5	2500	2500	28	U
85-01-8	Phenanthrene	5	130	130	27	U
108-95-2	Phenol	5	1300	1300	5.3	U
129-00-0	Pyrene	5	2.5	130	2.4	J
95-94-3	1,2,4,5-Tetrachlorobenzene	5	1300	1300	6.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	1300	1300	120	U
88-06-2	2,4,6-Trichlorophenol	5	1300	1300	35	U
95-95-4	2,4,5-Trichlorophenol	5	1300	1300	45	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	1000	700	70	35 - 105	D
Phenol-d6	1000	680	68	40 - 100	D
Nitrobenzene-d5	507	349	69	35 - 100	D
2-Fluorobiphenyl	502	391	78	45 - 105	D
2,4,6-Tribromophenol	1010	594	59	35 - 125	D
o-Terphenyl	507	436	86	30 - 125	D

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB9B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42 4MD
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0711313-11
File ID: 71131311.D
Sampled: 11/13/07 12:10
Prepared: 11/26/07 07:13
Analyzed: 11/30/07 13:21
Solids: 66.50
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
QC Batch: 0714308
Sequence: 7120431
Calibration: 7K30001
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	292376	7.89	260996	7.89	
Naphthalene-d8	921775	10.64	834410	10.64	
Acenaphthene-d10	517540	14.77	466177	14.77	
Phenanthrene-d10	722306	18.15	675648	18.15	
Chrysene-d12	556358	21.71	554264	21.71	
Perylene-d12	362532	23.49	471548	23.5	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-12 File ID: 71131312.D

Sampled: 11/13/07 12:00 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 13:57

Solids: 80.32 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	110	110	2.5	U
208-96-8	Acenaphthylene	5	110	110	3.7	U
98-86-2	Acetophenone	5	1100	1100	42	U
120-12-7	Anthracene	5	110	110	2.7	U
1912-24-9	Atrazine	5	1100	1100	9.3	U
100-52-7	Benzaldehyde	5	1100	1100	160	U
56-55-3	Benzo(a)anthracene	5	6.2	110	3.3	J
50-32-8	Benzo(a)pyrene	5	110	110	6.4	U
205-99-2	Benzo(b)fluoranthene	5	110	110	5.3	U
207-08-9	Benzo(k)fluoranthene	5	110	110	4.5	U
191-24-2	Benzo(g,h,i)perylene	5	420	420	14	U
92-52-4	1,1'-Biphenyl	5	1100	1100	2.9	U
101-55-3	4-Bromophenyl Phenyl Ether	5	1100	1100	7.8	U
85-68-7	Butyl Benzyl Phthalate	5	1100	1100	13	U
105-60-2	Caprolactam	5	2100	2100	140	U
86-74-8	Carbazole	5	1100	1100	3.1	U
59-50-7	4-Chloro-3-methylphenol	5	1100	1100	11	U
106-47-8	4-Chloroaniline	5	1100	1100	120	U
111-91-1	Bis(2-chloroethoxy)methane	5	1100	1100	5.0	U
111-44-4	Bis(2-chloroethyl) Ether	5	1100	1100	5.6	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	1100	1100	1.9	U
91-58-7	2-Chloronaphthalene	5	1100	1100	2.7	U
95-57-8	2-Chlorophenol	5	1100	1100	2.4	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	1100	1100	2.8	U
218-01-9	Chrysene	5	4.2	110	3.0	J
53-70-3	Dibenz(a,h)anthracene	5	420	420	3.3	U
132-64-9	Dibenzofuran	5	1100	1100	1.6	U
84-74-2	Di-n-butyl Phthalate	5	66	1100	7.5	J
91-94-1	3,3'-Dichlorobenzidine	5	2100	2100	490	U
120-83-2	2,4-Dichlorophenol	5	1100	1100	41	U
84-66-2	Diethyl Phthalate	5	4.2	1100	2.3	J
105-67-9	2,4-Dimethylphenol	5	1100	1100	35	U
131-11-3	Dimethyl Phthalate	5	1100	1100	2.1	U
534-52-1	4,6-Dinitro-2-methylphenol	5	1100	1100	230	U
51-28-5	2,4-Dinitrophenol	5	2100	2100	210	U
121-14-2	2,4-Dinitrotoluene	5	1100	1100	82	U
606-20-2	2,6-Dinitrotoluene	5	1100	1100	10	U

: 01054

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-12 File ID: 71131312.D

Sampled: 11/13/07 12:00 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 13:57

Solids: 80.32 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	1100	1100	61	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	56	1100	8.1	J
206-44-0	Fluoranthene	5	110	110	23	U
86-73-7	Fluorene	5	110	110	1.7	U
118-74-1	Hexachlorobenzene	5	1100	1100	5.0	U
87-68-3	Hexachlorobutadiene	5	1100	1100	4.3	U
77-47-4	Hexachlorocyclopentadiene	5	1100	1100	24	U
67-72-1	Hexachloroethane	5	1100	1100	5.0	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	420	420	4.4	U
78-59-1	Isophorone	5	1100	1100	2.5	U
91-57-6	2-Methylnaphthalene	5	1100	1100	3.0	U
95-48-7	2-Methylphenol	5	1100	1100	51	U
106-44-5	4-Methylphenol	5	1100	1100	57	U
91-20-3	Naphthalene	5	110	110	1.5	U
88-74-4	2-Nitroaniline	5	1100	1100	82	U
99-09-2	3-Nitroaniline	5	1100	1100	68	U
100-01-6	4-Nitroaniline	5	1100	1100	140	U
98-95-3	Nitrobenzene	5	1100	1100	9.3	U
100-02-7	4-Nitrophenol	5	2100	2100	70	U
88-75-5	2-Nitrophenol	5	1100	1100	76	U
86-30-6	N-Nitroso-diphenylamine	5	8.3	1100	5.0	J
621-64-7	N-Nitroso-di-n-propylamine	5	1100	1100	4.4	U
87-86-5	Pentachlorophenol	5	2100	2100	23	U
85-01-8	Phenanthrene	5	110	110	23	U
108-95-2	Phenol	5	1100	1100	4.4	U
129-00-0	Pyrene	5	4.2	110	2.0	J
95-94-3	1,2,4,5-Tetrachlorobenzene	5	1100	1100	5.0	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	1100	1100	100	U
88-06-2	2,4,6-Trichlorophenol	5	1100	1100	29	U
95-95-4	2,4,5-Trichlorophenol	5	1100	1100	37	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	830	552	66	35 - 105	D
Phenol-d6	830	527	64	40 - 100	D
Nitrobenzene-d5	419	313	75	35 - 100	D
2-Fluorobiphenyl	415	320	77	45 - 105	D
2,4,6-Tribromophenol	834	546	65	35 - 125	D
o-Terphenyl	419	340	81	30 - 125	D

: 01055

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB9C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42 4MD
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0711313-12
File ID: 71131312.D
Sampled: 11/13/07 12:00
Prepared: 11/26/07 07:13
Analyzed: 11/30/07 13:57
Solids: 80.30
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
QC Batch: 0714308
Sequence: 7120431
Calibration: 7K30001
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	303450	7.89	260996	7.89	
Naphthalene-d8	931358	10.64	834410	10.64	
Acenaphthene-d10	505576	14.77	466177	14.77	
Phenanthrene-d10	726346	18.15	675648	18.15	
Chrysene-d12	538054	21.71	554264	21.71	
Perylene-d12	325963	23.49	471548	23.5	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-13 File ID: 71131313.D

Sampled: 11/13/07 13:30 Prepared: 11/26/07 07:13 Analyzed: 12/02/07 02:34

Solids: 50.60 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 10 mL

QC Batch: 0714308 Sequence: 7120467 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	50	17000	17000	400	U
208-96-8	Acenaphthylene	50	17000	17000	590	U
98-86-2	Acetophenone	50	170000	170000	6600	U
120-12-7	Anthracene	50	17000	17000	420	U
1912-24-9	Atrazine	50	170000	170000	1500	U
100-52-7	Benzaldehyde	50	170000	170000	26000	U
56-55-3	Benzo(a)anthracene	50	17000	17000	530	U
50-32-8	Benzo(a)pyrene	50	17000	17000	1000	U
205-99-2	Benzo(b)fluoranthene	50	17000	17000	840	U
207-08-9	Benzo(k)fluoranthene	50	17000	17000	710	U
191-24-2	Benzo(g,h,i)perylene	50	66000	66000	2300	U
92-52-4	1,1'-Biphenyl	50	170000	170000	450	U
101-55-3	4-Bromophenyl Phenyl Ether	50	170000	170000	1200	U
85-68-7	Butyl Benzyl Phthalate	50	170000	170000	2100	U
105-60-2	Caprolactam	50	330000	330000	23000	U
86-74-8	Carbazole	50	170000	170000	490	U
59-50-7	4-Chloro-3-methylphenol	50	170000	170000	1800	U
106-47-8	4-Chloroaniline	50	170000	170000	19000	U
111-91-1	Bis(2-chloroethoxy)methane	50	170000	170000	790	U
111-44-4	Bis(2-chloroethyl) Ether	50	170000	170000	890	U
108-60-1	Bis(2-chloroisopropyl) Ether	50	170000	170000	310	U
91-58-7	2-Chloronaphthalene	50	170000	170000	430	U
95-57-8	2-Chlorophenol	50	170000	170000	380	U
7005-72-3	4-Chlorophenyl Phenyl Ether	50	170000	170000	440	U
218-01-9	Chrysene	50	17000	17000	470	U
53-70-3	Dibenz(a,h)anthracene	50	66000	66000	530	U
132-64-9	Dibenzofuran	50	170000	170000	260	U
84-74-2	Di-n-butyl Phthalate	50	1300	170000	1200	J
91-94-1	3,3´-Dichlorobenzidine	50	330000	330000	77000	U
120-83-2	2,4-Dichlorophenol	50	170000	170000	6500	U
84-66-2	Diethyl Phthalate	50	170000	170000	370	U
105-67-9	2,4-Dimethylphenol	50	170000	170000	5600	U
131-11-3	Dimethyl Phthalate	50	170000	170000	330	U
534-52-1	4,6-Dinitro-2-methylphenol	50	170000	170000	36000	U
51-28-5	2,4-Dinitrophenol	50	330000	330000	33000	U
121-14-2	2,4-Dinitrotoluene	50	170000	170000	13000	U
606-20-2	2,6-Dinitrotoluene	50	170000	170000	1600	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-13 File ID: 71131313.D

Sampled: 11/13/07 13:30 Prepared: 11/26/07 07:13 Analyzed: 12/02/07 02:34

Solids: 50.60 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 10 mL

QC Batch: 0714308 Sequence: 7120467 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	50	170000	170000	9700	U
117-81-7	Bis(2-ethylhexyl) Phthalate	50	170000	170000	1300	U
206-44-0	Fluoranthene	50	17000	17000	3700	U
86-73-7	Fluorene	50	17000	17000	280	U
118-74-1	Hexachlorobenzene	50	170000	170000	790	U
87-68-3	Hexachlorobutadiene	50	170000	170000	680	U
77-47-4	Hexachlorocyclopentadiene	50	170000	170000	3900	U
67-72-1	Hexachloroethane	50	170000	170000	790	U
193-39-5	Indeno(1,2,3-cd)pyrene	50	66000	66000	690	U
78-59-1	Isophorone	50	170000	170000	400	U
91-57-6	2-Methylnaphthalene	50	170000	170000	470	U
95-48-7	2-Methylphenol	50	170000	170000	8000	U
106-44-5	4-Methylphenol	50	170000	170000	9000	U
91-20-3	Naphthalene	50	17000	17000	230	U
88-74-4	2-Nitroaniline	50	170000	170000	13000	U
99-09-2	3-Nitroaniline	50	170000	170000	11000	U
100-01-6	4-Nitroaniline	50	170000	170000	23000	U
98-95-3	Nitrobenzene	50	170000	170000	1500	U
100-02-7	4-Nitrophenol	50	330000	330000	11000	U
88-75-5	2-Nitrophenol	50	170000	170000	12000	U
86-30-6	N-Nitroso-diphenylamine	50	170000	170000	790	U
621-64-7	N-Nitroso-di-n-propylamine	50	170000	170000	700	U
87-86-5	Pentachlorophenol	50	330000	330000	3600	U
85-01-8	Phenanthrene	50	17000	17000	3600	U
108-95-2	Phenol	50	170000	170000	690	U
129-00-0	Pyrene	50	17000	17000	310	U
95-94-3	1,2,4,5-Tetrachlorobenzene	50	170000	170000	790	U
58-90-2	2,3,4,6-Tetrachlorophenol	50	170000	170000	16000	U
88-06-2	2,4,6-Trichlorophenol	50	170000	170000	4500	U
95-95-4	2,4,5-Trichlorophenol	50	170000	170000	5900	U

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	313682	7.8	263301	7.79	
Naphthalene-d8	1008257	10.53	841238	10.54	
Acenaphthene-d10	547312	14.66	462970	14.67	
Phenanthrene-d10	768732	18.07	659422	18.07	
Chrysene-d12	637099	21.63	468710	21.64	
Perylene-d12	481318	23.38	430543	23.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-14 File ID: 71131314.D

Sampled: 11/13/07 13:38 Prepared: 11/26/07 07:13 Analyzed: 12/02/07 01:59

Solids: 86.20 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120467 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	99	99	2.3	U
208-96-8	Acenaphthylene	5	99	99	3.5	U
98-86-2	Acetophenone	5	990	990	39	U
120-12-7	Anthracene	5	99	99	2.5	U
1912-24-9	Atrazine	5	990	990	8.6	U
100-52-7	Benzaldehyde	5	990	990	150	U
56-55-3	Benzo(a)anthracene	5	99	99	3.1	U
50-32-8	Benzo(a)pyrene	5	99	99	6.0	U
205-99-2	Benzo(b)fluoranthene	5	99	99	4.9	U
207-08-9	Benzo(k)fluoranthene	5	99	99	4.2	U
191-24-2	Benzo(g,h,i)perylene	5	390	390	13	U
92-52-4	1,1'-Biphenyl	5	990	990	2.7	U
101-55-3	4-Bromophenyl Phenyl Ether	5	990	990	7.3	U
85-68-7	Butyl Benzyl Phthalate	5	990	990	12	U
105-60-2	Caprolactam	5	1900	1900	130	U
86-74-8	Carbazole	5	990	990	2.9	U
59-50-7	4-Chloro-3-methylphenol	5	990	990	10	U
106-47-8	4-Chloroaniline	5	990	990	110	U
111-91-1	Bis(2-chloroethoxy)methane	5	990	990	4.6	U
111-44-4	Bis(2-chloroethyl) Ether	5	990	990	5.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	990	990	1.8	U
91-58-7	2-Chloronaphthalene	5	990	990	2.5	U
95-57-8	2-Chlorophenol	5	990	990	2.2	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	990	990	2.6	U
218-01-9	Chrysene	5	99	99	2.8	U
53-70-3	Dibenz(a,h)anthracene	5	390	390	3.1	U
132-64-9	Dibenzofuran	5	990	990	1.5	U
84-74-2	Di-n-butyl Phthalate	5	990	990	7.0	U
91-94-1	3,3'-Dichlorobenzidine	5	1900	1900	450	U
120-83-2	2,4-Dichlorophenol	5	990	990	38	U
84-66-2	Diethyl Phthalate	5	990	990	2.2	U
105-67-9	2,4-Dimethylphenol	5	990	990	33	U
131-11-3	Dimethyl Phthalate	5	990	990	2.0	U
534-52-1	4,6-Dinitro-2-methylphenol	5	990	990	210	U
51-28-5	2,4-Dinitrophenol	5	1900	1900	190	U
121-14-2	2,4-Dinitrotoluene	5	990	990	77	U
606-20-2	2,6-Dinitrotoluene	5	990	990	9.4	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-14 File ID: 71131314.D

Sampled: 11/13/07 13:38 Prepared: 11/26/07 07:13 Analyzed: 12/02/07 01:59

Solids: 86.20 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120467 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	990	990	57	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	15	990	7.5	J
206-44-0	Fluoranthene	5	99	99	22	U
86-73-7	Fluorene	5	99	99	1.6	U
118-74-1	Hexachlorobenzene	5	990	990	4.6	U
87-68-3	Hexachlorobutadiene	5	990	990	4.0	U
77-47-4	Hexachlorocyclopentadiene	5	990	990	23	U
67-72-1	Hexachloroethane	5	990	990	4.6	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	390	390	4.1	U
78-59-1	Isophorone	5	990	990	2.3	U
91-57-6	2-Methylnaphthalene	5	990	990	2.8	U
95-48-7	2-Methylphenol	5	990	990	47	U
106-44-5	4-Methylphenol	5	990	990	53	U
91-20-3	Naphthalene	5	99	99	1.4	U
88-74-4	2-Nitroaniline	5	990	990	77	U
99-09-2	3-Nitroaniline	5	990	990	64	U
100-01-6	4-Nitroaniline	5	990	990	130	U
98-95-3	Nitrobenzene	5	990	990	8.6	U
100-02-7	4-Nitrophenol	5	1900	1900	65	U
88-75-5	2-Nitrophenol	5	990	990	71	U
86-30-6	N-Nitroso-diphenylamine	5	990	990	4.6	U
621-64-7	N-Nitroso-di-n-propylamine	5	990	990	4.1	U
87-86-5	Pentachlorophenol	5	1900	1900	21	U
85-01-8	Phenanthrene	5	99	99	21	U
108-95-2	Phenol	5	990	990	4.1	U
129-00-0	Pyrene	5	1.9	99	1.8	J
95-94-3	1,2,4,5-Tetrachlorobenzene	5	990	990	4.6	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	990	990	95	U
88-06-2	2,4,6-Trichlorophenol	5	990	990	27	U
95-95-4	2,4,5-Trichlorophenol	5	990	990	35	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	773	526	68	35 - 105	D
Phenol-d6	773	545	70	40 - 100	D
Nitrobenzene-d5	391	288	74	35 - 100	D
2-Fluorobiphenyl	387	327	84	45 - 105	D
2,4,6-Tribromophenol	777	555	71	35 - 125	D
o-Terphenyl	391	379	97	30 - 125	D

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-14 File ID: 71131314.D

Sampled: 11/13/07 13:38 Prepared: 11/26/07 07:13 Analyzed: 12/02/07 01:59

Solids: 86.20 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120467 Calibration: 7K30001 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	306514	7.79	263301	7.79	
Naphthalene-d8	948976	10.53	841238	10.54	
Acenaphthene-d10	541151	14.66	462970	14.67	
Phenanthrene-d10	775478	18.06	659422	18.07	
Chrysene-d12	597393	21.64	468710	21.64	
Perylene-d12	406532	23.38	430543	23.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-15 File ID: 71131315.D

Sampled: 11/13/07 13:45 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 15:41

Solids: 82.38 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	100	100	2.4	U
208-96-8	Acenaphthylene	5	100	100	3.6	U
98-86-2	Acetophenone	5	1000	1000	41	U
120-12-7	Anthracene	5	100	100	2.6	U
1912-24-9	Atrazine	5	1000	1000	9.0	U
100-52-7	Benzaldehyde	5	1000	1000	160	U
56-55-3	Benzo(a)anthracene	5	6.1	100	3.3	J
50-32-8	Benzo(a)pyrene	5	100	100	6.3	U
205-99-2	Benzo(b)fluoranthene	5	100	100	5.2	U
207-08-9	Benzo(k)fluoranthene	5	100	100	4.3	U
191-24-2	Benzo(g,h,i)perylene	5	410	410	14	U
92-52-4	1,1'-Biphenyl	5	1000	1000	2.8	U
101-55-3	4-Bromophenyl Phenyl Ether	5	1000	1000	7.6	U
85-68-7	Butyl Benzyl Phthalate	5	1000	1000	13	U
105-60-2	Caprolactam	5	2000	2000	140	U
86-74-8	Carbazole	5	1000	1000	3.0	U
59-50-7	4-Chloro-3-methylphenol	5	1000	1000	11	U
106-47-8	4-Chloroaniline	5	1000	1000	120	U
111-91-1	Bis(2-chloroethoxy)methane	5	1000	1000	4.9	U
111-44-4	Bis(2-chloroethyl) Ether	5	1000	1000	5.5	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	1000	1000	1.9	U
91-58-7	2-Chloronaphthalene	5	1000	1000	2.6	U
95-57-8	2-Chlorophenol	5	1000	1000	2.3	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	1000	1000	2.7	U
218-01-9	Chrysene	5	8.1	100	2.9	J
53-70-3	Dibenz(a,h)anthracene	5	410	410	3.3	U
132-64-9	Dibenzofuran	5	1000	1000	1.6	U
84-74-2	Di-n-butyl Phthalate	5	120	1000	7.3	J
91-94-1	3,3'-Dichlorobenzidine	5	2000	2000	480	U
120-83-2	2,4-Dichlorophenol	5	1000	1000	40	U
84-66-2	Diethyl Phthalate	5	4.0	1000	2.3	J
105-67-9	2,4-Dimethylphenol	5	1000	1000	35	U
131-11-3	Dimethyl Phthalate	5	1000	1000	2.1	U
534-52-1	4,6-Dinitro-2-methylphenol	5	1000	1000	220	U
51-28-5	2,4-Dinitrophenol	5	2000	2000	200	U
121-14-2	2,4-Dinitrotoluene	5	1000	1000	80	U
606-20-2	2,6-Dinitrotoluene	5	1000	1000	9.8	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-15 File ID: 71131315.D

Sampled: 11/13/07 13:45 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 15:41

Solids: 82.38 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	1000	1000	60	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	45	1000	7.9	J
206-44-0	Fluoranthene	5	100	100	23	U
86-73-7	Fluorene	5	100	100	1.7	U
118-74-1	Hexachlorobenzene	5	1000	1000	4.8	U
87-68-3	Hexachlorobutadiene	5	1000	1000	4.2	U
77-47-4	Hexachlorocyclopentadiene	5	1000	1000	24	U
67-72-1	Hexachloroethane	5	1000	1000	4.9	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	410	410	4.2	U
78-59-1	Isophorone	5	1000	1000	2.4	U
91-57-6	2-Methylnaphthalene	5	1000	1000	2.9	U
95-48-7	2-Methylphenol	5	1000	1000	49	U
106-44-5	4-Methylphenol	5	1000	1000	55	U
91-20-3	Naphthalene	5	100	100	1.4	U
88-74-4	2-Nitroaniline	5	1000	1000	80	U
99-09-2	3-Nitroaniline	5	1000	1000	67	U
100-01-6	4-Nitroaniline	5	1000	1000	140	U
98-95-3	Nitrobenzene	5	1000	1000	9.0	U
100-02-7	4-Nitrophenol	5	2000	2000	68	U
88-75-5	2-Nitrophenol	5	1000	1000	74	U
86-30-6	N-Nitroso-diphenylamine	5	16	1000	4.9	J
621-64-7	N-Nitroso-di-n-propylamine	5	1000	1000	4.3	U
87-86-5	Pentachlorophenol	5	2000	2000	22	U
85-01-8	Phenanthrene	5	100	100	22	U
108-95-2	Phenol	5	1000	1000	4.2	U
129-00-0	Pyrene	5	10	100	1.9	J
95-94-3	1,2,4,5-Tetrachlorobenzene	5	1000	1000	4.9	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	1000	1000	99	U
88-06-2	2,4,6-Trichlorophenol	5	1000	1000	28	U
95-95-4	2,4,5-Trichlorophenol	5	1000	1000	36	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	809	301	37	35 - 105	D
Phenol-d6	809	312	38	40 - 100	D
Nitrobenzene-d5	409	180	44	35 - 100	D
2-Fluorobiphenyl	405	180	44	45 - 105	D
2,4,6-Tribromophenol	813	281	35	35 - 125	D
o-Terphenyl	409	190	47	30 - 125	D

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-15 File ID: 71131315.D

Sampled: 11/13/07 13:45 Prepared: 11/26/07 07:13 Analyzed: 11/30/07 15:41

Solids: 82.38 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714308 Sequence: 7120431 Calibration: 7K30001 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	328260	7.89	362960	7.89	
Naphthalene-d8	1002839	10.63	1387616	10.64	
Acenaphthene-d10	555166	14.77	719956	14.77	
Phenanthrene-d10	767964	18.15	999434	18.15	
Chrysene-d12	546106	21.71	754586	21.71	
Perylene-d12	289067	23.49	583601	23.49	*

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-01 File ID: 71137701.D

Sampled: 11/14/07 08:00 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 03:08

Solids: 53.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 12 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	25	9600	9600	230	U
208-96-8	Acenaphthylene	25	9600	9600	340	U
98-86-2	Acetophenone	25	96000	96000	3800	U
120-12-7	Anthracene	25	9600	9600	240	U
1912-24-9	Atrazine	25	96000	96000	840	U
100-52-7	Benzaldehyde	25	96000	96000	15000	U
56-55-3	Benzo(a)anthracene	25	9600	9600	300	U
50-32-8	Benzo(a)pyrene	25	9600	9600	580	U
205-99-2	Benzo(b)fluoranthene	25	9600	9600	480	U
207-08-9	Benzo(k)fluoranthene	25	9600	9600	410	U
191-24-2	Benzo(g,h,i)perylene	25	38000	38000	1300	U
92-52-4	1,1'-Biphenyl	25	96000	96000	260	U
101-55-3	4-Bromophenyl Phenyl Ether	25	96000	96000	710	U
85-68-7	Butyl Benzyl Phthalate	25	96000	96000	1200	U
105-60-2	Caprolactam	25	190000	190000	13000	U
86-74-8	Carbazole	25	96000	96000	280	U
59-50-7	4-Chloro-3-methylphenol	25	96000	96000	1000	U
106-47-8	4-Chloroaniline	25	96000	96000	11000	U
111-91-1	Bis(2-chloroethoxy)methane	25	96000	96000	450	U
111-44-4	Bis(2-chloroethyl) Ether	25	96000	96000	510	U
108-60-1	Bis(2-chloroisopropyl) Ether	25	96000	96000	180	U
91-58-7	2-Chloronaphthalene	25	96000	96000	240	U
95-57-8	2-Chlorophenol	25	96000	96000	220	U
7005-72-3	4-Chlorophenyl Phenyl Ether	25	96000	96000	250	U
218-01-9	Chrysene	25	9600	9600	270	U
53-70-3	Dibenz(a,h)anthracene	25	38000	38000	300	U
132-64-9	Dibenzofuran	25	96000	96000	150	U
84-74-2	Di-n-butyl Phthalate	25	3800	96000	680	J
91-94-1	3,3´-Dichlorobenzidine	25	190000	190000	44000	U
120-83-2	2,4-Dichlorophenol	25	96000	96000	3700	U
84-66-2	Diethyl Phthalate	25	96000	96000	210	U
105-67-9	2,4-Dimethylphenol	25	96000	96000	3200	U
131-11-3	Dimethyl Phthalate	25	96000	96000	190	U
534-52-1	4,6-Dinitro-2-methylphenol	25	96000	96000	21000	U
51-28-5	2,4-Dinitrophenol	25	190000	190000	19000	U
121-14-2	2,4-Dinitrotoluene	25	96000	96000	7500	U
606-20-2	2,6-Dinitrotoluene	25	96000	96000	920	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-01 File ID: 71137701.D

Sampled: 11/14/07 08:00 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 03:08

Solids: 53.00 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 12 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	25	96000	96000	5600	U
117-81-7	Bis(2-ethylhexyl) Phthalate	25	96000	96000	740	U
206-44-0	Fluoranthene	25	9600	9600	2100	U
86-73-7	Fluorene	25	9600	9600	160	U
118-74-1	Hexachlorobenzene	25	96000	96000	450	U
87-68-3	Hexachlorobutadiene	25	96000	96000	390	U
77-47-4	Hexachlorocyclopentadiene	25	96000	96000	2200	U
67-72-1	Hexachloroethane	25	96000	96000	450	U
193-39-5	Indeno(1,2,3-cd)pyrene	25	38000	38000	400	U
78-59-1	Isophorone	25	96000	96000	230	U
91-57-6	2-Methylnaphthalene	25	96000	96000	270	U
95-48-7	2-Methylphenol	25	96000	96000	4600	U
106-44-5	4-Methylphenol	25	96000	96000	5200	U
91-20-3	Naphthalene	25	9600	9600	130	U
88-74-4	2-Nitroaniline	25	96000	96000	7500	U
99-09-2	3-Nitroaniline	25	96000	96000	6200	U
100-01-6	4-Nitroaniline	25	96000	96000	13000	U
98-95-3	Nitrobenzene	25	96000	96000	840	U
100-02-7	4-Nitrophenol	25	190000	190000	6300	U
88-75-5	2-Nitrophenol	25	96000	96000	6900	U
86-30-6	N-Nitroso-diphenylamine	25	96000	96000	450	U
621-64-7	N-Nitroso-di-n-propylamine	25	96000	96000	400	U
87-86-5	Pentachlorophenol	25	190000	190000	2100	U
85-01-8	Phenanthrene	25	9600	9600	2000	U
108-95-2	Phenol	25	96000	96000	400	U
129-00-0	Pyrene	25	190	9600	180	J
95-94-3	1,2,4,5-Tetrachlorobenzene	25	96000	96000	450	U
58-90-2	2,3,4,6-Tetrachlorophenol	25	96000	96000	9200	U
88-06-2	2,4,6-Trichlorophenol	25	96000	96000	2600	U
95-95-4	2,4,5-Trichlorophenol	25	96000	96000	3400	U

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	309070	7.8	263301	7.79	
Naphthalene-d8	983041	10.53	841238	10.54	
Acenaphthene-d10	541385	14.66	462970	14.67	
Phenanthrene-d10	777243	18.06	659422	18.07	
Chrysene-d12	634348	21.64	468710	21.64	
Perylene-d12	490416	23.38	430543	23.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-02 File ID: 71137702.D

Sampled: 11/14/07 08:08 Prepared: 11/28/07 07:07 Analyzed: 11/30/07 19:09

Solids: 87.74 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120441 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	19	19	0.46	U
208-96-8	Acenaphthylene	1	19	19	0.68	U
98-86-2	Acetophenone	1	190	190	7.7	U
120-12-7	Anthracene	1	19	19	0.49	U
1912-24-9	Atrazine	1	190	190	1.7	U
100-52-7	Benzaldehyde	1	190	190	30	U
56-55-3	Benzo(a)anthracene	1	1.9	19	0.61	J
50-32-8	Benzo(a)pyrene	1	19	19	1.2	U
205-99-2	Benzo(b)fluoranthene	1	1.1	19	0.97	J
207-08-9	Benzo(k)fluoranthene	1	1.9	19	0.82	J
191-24-2	Benzo(g,h,i)perylene	1	76	76	2.6	U
92-52-4	1,1'-Biphenyl	1	190	190	0.52	U
101-55-3	4-Bromophenyl Phenyl Ether	1	190	190	1.4	U
85-68-7	Butyl Benzyl Phthalate	1	190	190	2.4	U
105-60-2	Caprolactam	1	380	380	26	U
86-74-8	Carbazole	1	190	190	0.57	U
59-50-7	4-Chloro-3-methylphenol	1	190	190	2.0	U
106-47-8	4-Chloroaniline	1	190	190	22	U
111-91-1	Bis(2-chloroethoxy)methane	1	190	190	0.91	U
111-44-4	Bis(2-chloroethyl) Ether	1	190	190	1.0	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	190	190	0.36	U
91-58-7	2-Chloronaphthalene	1	190	190	0.49	U
95-57-8	2-Chlorophenol	1	190	190	0.44	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	190	190	0.51	U
218-01-9	Chrysene	1	19	19	0.54	U
53-70-3	Dibenz(a,h)anthracene	1	76	76	0.61	U
132-64-9	Dibenzofuran	1	190	190	0.30	U
84-74-2	Di-n-butyl Phthalate	1	12	190	1.4	J
91-94-1	3,3´-Dichlorobenzidine	1	380	380	89	U
120-83-2	2,4-Dichlorophenol	1	190	190	7.5	U
84-66-2	Diethyl Phthalate	1	1.9	190	0.42	J
105-67-9	2,4-Dimethylphenol	1	190	190	6.5	U
131-11-3	Dimethyl Phthalate	1	190	190	0.39	U
534-52-1	4,6-Dinitro-2-methylphenol	1	190	190	41	U
51-28-5	2,4-Dinitrophenol	1	380	380	38	U
121-14-2	2,4-Dinitrotoluene	1	190	190	15	U
606-20-2	2,6-Dinitrotoluene	1	190	190	1.8	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-02 File ID: 71137702.D

Sampled: 11/14/07 08:08 Prepared: 11/28/07 07:07 Analyzed: 11/30/07 19:09

Solids: 87.74 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120441 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	190	190	11	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	11	190	1.5	J B,E
206-44-0	Fluoranthene	1	19	19	4.3	U
86-73-7	Fluorene	1	19	19	0.32	U
118-74-1	Hexachlorobenzene	1	190	190	0.91	U
87-68-3	Hexachlorobutadiene	1	190	190	0.79	U
77-47-4	Hexachlorocyclopentadiene	1	190	190	4.5	U
67-72-1	Hexachloroethane	1	190	190	0.91	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	76	76	0.80	U
78-59-1	Isophorone	1	190	190	0.46	U
91-57-6	2-Methylnaphthalene	1	190	190	0.54	U
95-48-7	2-Methylphenol	1	190	190	9.3	U
106-44-5	4-Methylphenol	1	190	190	10	U
91-20-3	Naphthalene	1	0.76	19	0.27	J
88-74-4	2-Nitroaniline	1	190	190	15	U
99-09-2	3-Nitroaniline	1	190	190	13	U
100-01-6	4-Nitroaniline	1	190	190	26	U
98-95-3	Nitrobenzene	1	190	190	1.7	U
100-02-7	4-Nitrophenol	1	380	380	13	U
88-75-5	2-Nitrophenol	1	190	190	14	U
86-30-6	N-Nitroso-diphenylamine	1	190	190	0.91	U
621-64-7	N-Nitroso-di-n-propylamine	1	190	190	0.81	U
87-86-5	Pentachlorophenol	1	380	380	4.2	U
85-01-8	Phenanthrene	1	19	19	4.1	U
108-95-2	Phenol	1	190	190	0.80	U
129-00-0	Pyrene	1	1.1	19	0.36	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	190	190	0.91	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	190	190	19	U
88-06-2	2,4,6-Trichlorophenol	1	190	190	5.2	U
95-95-4	2,4,5-Trichlorophenol	1	190	190	6.8	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	760	593	78	35 - 105	
Phenol-d6	760	608	80	40 - 100	
Nitrobenzene-d5	384	325	85	35 - 100	
2-Fluorobiphenyl	380	344	90	45 - 105	
2,4,6-Tribromophenol	764	585	77	35 - 125	
o-Terphenyl	384	373	97	30 - 125	

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB7B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42 4MD
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0711377-02
File ID: 71137702.D
Sampled: 11/14/07 08:08
Prepared: 11/28/07 07:07
Analyzed: 11/30/07 19:09
Solids: 87.70
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
QC Batch: 0714466
Sequence: 7120441
Calibration: 7K30001
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	310937	7.88	260996	7.89	
Naphthalene-d8	980128	10.63	834410	10.64	
Acenaphthene-d10	544805	14.77	466177	14.77	
Phenanthrene-d10	720288	18.15	675648	18.15	
Chrysene-d12	574808	21.71	554264	21.71	
Perylene-d12	434563	23.49	471548	23.5	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-03 File ID: 71137703.D

Sampled: 11/14/07 08:25 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 00:50

Solids: 86.53 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	98	98	2.3	U UL,S
208-96-8	Acenaphthylene	5	98	98	3.5	U
98-86-2	Acetophenone	5	980	980	39	U
120-12-7	Anthracene	5	98	98	2.5	U
1912-24-9	Atrazine	5	980	980	8.6	U
100-52-7	Benzaldehyde	5	980	980	150	U UL,S
56-55-3	Benzo(a)anthracene	5	7.7	98	3.1	J L,S
50-32-8	Benzo(a)pyrene	5	98	98	6.0	U UL,S
205-99-2	Benzo(b)fluoranthene	5	15	98	4.9	J L,S
207-08-9	Benzo(k)fluoranthene	5	5.8	98	4.1	J L,S
191-24-2	Benzo(g,h,i)perylene	5	390	390	13	U UL,S
92-52-4	1,1'-Biphenyl	5	980	980	2.7	U
101-55-3	4-Bromophenyl Phenyl Ether	5	980	980	7.2	U
85-68-7	Butyl Benzyl Phthalate	5	980	980	12	U
105-60-2	Caprolactam	5	1900	1900	130	U
86-74-8	Carbazole	5	980	980	2.9	U
59-50-7	4-Chloro-3-methylphenol	5	980	980	10	U
106-47-8	4-Chloroaniline	5	980	980	110	U
111-91-1	Bis(2-chloroethoxy)methane	5	980	980	4.6	U
111-44-4	Bis(2-chloroethyl) Ether	5	980	980	5.2	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	980	980	1.8	U
91-58-7	2-Chloronaphthalene	5	980	980	2.5	U
95-57-8	2-Chlorophenol	5	980	980	2.2	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	980	980	2.6	U UL,S
218-01-9	Chrysene	5	7.7	98	2.8	J L,S
53-70-3	Dibenz(a,h)anthracene	5	390	390	3.1	U UL,S
132-64-9	Dibenzofuran	5	980	980	1.5	U UL,S
84-74-2	Di-n-butyl Phthalate	5	54	980	6.9	J L,S
91-94-1	3,3'-Dichlorobenzidine	5	1900	1900	450	U UL,S
120-83-2	2,4-Dichlorophenol	5	980	980	38	U UL,S
84-66-2	Diethyl Phthalate	5	3.9	980	2.1	J L,S
105-67-9	2,4-Dimethylphenol	5	980	980	33	U UL,S
131-11-3	Dimethyl Phthalate	5	980	980	2.0	U
534-52-1	4,6-Dinitro-2-methylphenol	5	980	980	210	U
51-28-5	2,4-Dinitrophenol	5	1900	1900	190	U
121-14-2	2,4-Dinitrotoluene	5	980	980	76	U
606-20-2	2,6-Dinitrotoluene	5	980	980	9.4	U UL,S

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-03 File ID: 71137703.D

Sampled: 11/14/07 08:25 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 00:50

Solids: 86.50 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	980	980	57	U UL,S
117-81-7	Bis(2-ethylhexyl) Phthalate	5	48	980	7.5	J B7E
206-44-0	Fluoranthene	5	98	98	22	U UL,S
86-73-7	Fluorene	5	98	98	1.6	U
118-74-1	Hexachlorobenzene	5	980	980	4.6	U
87-68-3	Hexachlorobutadiene	5	980	980	4.0	U
77-47-4	Hexachlorocyclopentadiene	5	980	980	23	U
67-72-1	Hexachloroethane	5	980	980	4.6	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	390	390	4.0	U
78-59-1	Isophorone	5	980	980	2.3	U
91-57-6	2-Methylnaphthalene	5	980	980	2.8	U
95-48-7	2-Methylphenol	5	980	980	47	U
106-44-5	4-Methylphenol	5	980	980	53	U UL,S
91-20-3	Naphthalene	5	1.9	98	1.3	J L,S
88-74-4	2-Nitroaniline	5	980	980	76	U UL,S
99-09-2	3-Nitroaniline	5	980	980	64	U
100-01-6	4-Nitroaniline	5	980	980	130	U
98-95-3	Nitrobenzene	5	980	980	8.6	U
100-02-7	4-Nitrophenol	5	1900	1900	65	U
88-75-5	2-Nitrophenol	5	980	980	71	U UL,S
86-30-6	N-Nitroso-diphenylamine	5	9.6	980	4.6	J L,S
621-64-7	N-Nitroso-di-n-propylamine	5	980	980	4.1	U UL,S
87-86-5	Pentachlorophenol	5	91	1900	21	J L,S
85-01-8	Phenanthrene	5	98	98	21	U UL,S
108-95-2	Phenol	5	980	980	4.0	U UL,S
129-00-0	Pyrene	5	9.6	98	1.8	J L,S
95-94-3	1,2,4,5-Tetrachlorobenzene	5	980	980	4.6	U UL,S
58-90-2	2,3,4,6-Tetrachlorophenol	5	980	980	94	U
88-06-2	2,4,6-Trichlorophenol	5	980	980	27	U
95-95-4	2,4,5-Trichlorophenol	5	980	980	35	U UL,S

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	317910	7.8	263301	7.79	
Naphthalene-d8	997790	10.53	841238	10.54	
Acenaphthene-d10	535867	14.66	462970	14.67	
Phenanthrene-d10	778083	18.06	659422	18.07	
Chrysene-d12	559529	21.63	468710	21.64	
Perylene-d12	276286	23.38	430543	23.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-04 File ID: 71137704.D

Sampled: 11/14/07 10:10 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 03:43

Solids: 80.92 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 12 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	25	6300	6300	150	U
208-96-8	Acenaphthylene	25	6300	6300	220	U
98-86-2	Acetophenone	25	63000	63000	2500	U
120-12-7	Anthracene	25	6300	6300	160	U
1912-24-9	Atrazine	25	63000	63000	550	U
100-52-7	Benzaldehyde	25	63000	63000	9700	U
56-55-3	Benzo(a)anthracene	25	6300	6300	200	U
50-32-8	Benzo(a)pyrene	25	6300	6300	380	U
205-99-2	Benzo(b)fluoranthene	25	6300	6300	310	U
207-08-9	Benzo(k)fluoranthene	25	6300	6300	270	U
191-24-2	Benzo(g,h,i)perylene	25	25000	25000	850	U
92-52-4	1,1'-Biphenyl	25	63000	63000	170	U
101-55-3	4-Bromophenyl Phenyl Ether	25	63000	63000	460	U
85-68-7	Butyl Benzyl Phthalate	25	63000	63000	780	U
105-60-2	Caprolactam	25	120000	120000	8500	U
86-74-8	Carbazole	25	63000	63000	180	U
59-50-7	4-Chloro-3-methylphenol	25	63000	63000	660	U
106-47-8	4-Chloroaniline	25	63000	63000	7300	U
111-91-1	Bis(2-chloroethoxy)methane	25	63000	63000	300	U
111-44-4	Bis(2-chloroethyl) Ether	25	63000	63000	330	U
108-60-1	Bis(2-chloroisopropyl) Ether	25	63000	63000	120	U
91-58-7	2-Chloronaphthalene	25	63000	63000	160	U
95-57-8	2-Chlorophenol	25	63000	63000	140	U
7005-72-3	4-Chlorophenyl Phenyl Ether	25	63000	63000	170	U
218-01-9	Chrysene	25	6300	6300	180	U
53-70-3	Dibenz(a,h)anthracene	25	25000	25000	200	U
132-64-9	Dibenzofuran	25	63000	63000	98	U
84-74-2	Di-n-butyl Phthalate	25	4700	63000	440	J
91-94-1	3,3'-Dichlorobenzidine	25	120000	120000	29000	U
120-83-2	2,4-Dichlorophenol	25	63000	63000	2400	U
84-66-2	Diethyl Phthalate	25	63000	63000	140	U
105-67-9	2,4-Dimethylphenol	25	63000	63000	2100	U
131-11-3	Dimethyl Phthalate	25	63000	63000	130	U
534-52-1	4,6-Dinitro-2-methylphenol	25	63000	63000	13000	U
51-28-5	2,4-Dinitrophenol	25	120000	120000	12000	U
121-14-2	2,4-Dinitrotoluene	25	63000	63000	4900	U
606-20-2	2,6-Dinitrotoluene	25	63000	63000	600	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-04 File ID: 71137704.D

Sampled: 11/14/07 10:10 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 03:43

Solids: 80.90 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 12 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	25	63000	63000	3600	U
117-81-7	Bis(2-ethylhexyl) Phthalate	25	63000	63000	480	U
206-44-0	Fluoranthene	25	6300	6300	1400	U
86-73-7	Fluorene	25	6300	6300	100	U
118-74-1	Hexachlorobenzene	25	63000	63000	300	U
87-68-3	Hexachlorobutadiene	25	63000	63000	260	U
77-47-4	Hexachlorocyclopentadiene	25	63000	63000	1500	U
67-72-1	Hexachloroethane	25	63000	63000	300	U
193-39-5	Indeno(1,2,3-cd)pyrene	25	25000	25000	260	U
78-59-1	Isophorone	25	63000	63000	150	U
91-57-6	2-Methylnaphthalene	25	63000	63000	180	U
95-48-7	2-Methylphenol	25	63000	63000	3000	U
106-44-5	4-Methylphenol	25	63000	63000	3400	U
91-20-3	Naphthalene	25	6300	6300	86	U
88-74-4	2-Nitroaniline	25	63000	63000	4900	U
99-09-2	3-Nitroaniline	25	63000	63000	4100	U
100-01-6	4-Nitroaniline	25	63000	63000	8500	U
98-95-3	Nitrobenzene	25	63000	63000	550	U
100-02-7	4-Nitrophenol	25	120000	120000	4200	U
88-75-5	2-Nitrophenol	25	63000	63000	4500	U
86-30-6	N-Nitroso-diphenylamine	25	63000	63000	300	U
621-64-7	N-Nitroso-di-n-propylamine	25	63000	63000	260	U
87-86-5	Pentachlorophenol	25	120000	120000	1400	U
85-01-8	Phenanthrene	25	6300	6300	1300	U
108-95-2	Phenol	25	63000	63000	260	U
129-00-0	Pyrene	25	6300	6300	120	U
95-94-3	1,2,4,5-Tetrachlorobenzene	25	63000	63000	300	U
58-90-2	2,3,4,6-Tetrachlorophenol	25	63000	63000	6000	U
88-06-2	2,4,6-Trichlorophenol	25	63000	63000	1700	U
95-95-4	2,4,5-Trichlorophenol	25	63000	63000	2200	U

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	306732	7.79	263301	7.79	
Naphthalene-d8	986788	10.53	841238	10.54	
Acenaphthene-d10	529850	14.66	462970	14.67	
Phenanthrene-d10	721634	18.06	659422	18.07	
Chrysene-d12	596938	21.63	468710	21.64	
Perylene-d12	445963	23.38	430543	23.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-05 File ID: 71137705.D

Sampled: 11/14/07 10:23 Prepared: 11/28/07 07:07 Analyzed: 11/30/07 20:19

Solids: 83.40 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120441 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	20	20	0.48	U
208-96-8	Acenaphthylene	1	20	20	0.72	U
98-86-2	Acetophenone	1	200	200	8.1	U
120-12-7	Anthracene	1	20	20	0.51	U
1912-24-9	Atrazine	1	200	200	1.8	U
100-52-7	Benzaldehyde	1	200	200	31	U
56-55-3	Benzo(a)anthracene	1	0.80	20	0.64	J
50-32-8	Benzo(a)pyrene	1	20	20	1.2	U
205-99-2	Benzo(b)fluoranthene	1	20	20	1.0	U
207-08-9	Benzo(k)fluoranthene	1	20	20	0.86	U
191-24-2	Benzo(g,h,i)perylene	1	80	80	2.7	U
92-52-4	1,1'-Biphenyl	1	200	200	0.55	U
101-55-3	4-Bromophenyl Phenyl Ether	1	200	200	1.5	U
85-68-7	Butyl Benzyl Phthalate	1	3.2	200	2.5	J
105-60-2	Caprolactam	1	400	400	27	U
86-74-8	Carbazole	1	200	200	0.60	U
59-50-7	4-Chloro-3-methylphenol	1	200	200	2.1	U
106-47-8	4-Chloroaniline	1	200	200	24	U
111-91-1	Bis(2-chloroethoxy)methane	1	200	200	0.96	U
111-44-4	Bis(2-chloroethyl) Ether	1	200	200	1.1	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	200	200	0.38	U
91-58-7	2-Chloronaphthalene	1	200	200	0.52	U
95-57-8	2-Chlorophenol	1	200	200	0.46	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	200	200	0.54	U
218-01-9	Chrysene	1	20	20	0.57	U
53-70-3	Dibenz(a,h)anthracene	1	80	80	0.64	U
132-64-9	Dibenzofuran	1	200	200	0.32	U
84-74-2	Di-n-butyl Phthalate	1	8.8	200	1.4	J
91-94-1	3,3'-Dichlorobenzidine	1	400	400	94	U
120-83-2	2,4-Dichlorophenol	1	200	200	7.9	U
84-66-2	Diethyl Phthalate	1	2.0	200	0.45	J
105-67-9	2,4-Dimethylphenol	1	200	200	6.8	U
131-11-3	Dimethyl Phthalate	1	200	200	0.41	U
534-52-1	4,6-Dinitro-2-methylphenol	1	200	200	44	U
51-28-5	2,4-Dinitrophenol	1	400	400	40	U
121-14-2	2,4-Dinitrotoluene	1	200	200	16	U
606-20-2	2,6-Dinitrotoluene	1	200	200	1.9	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-05 File ID: 71137705.D

Sampled: 11/14/07 10:23 Prepared: 11/28/07 07:07 Analyzed: 11/30/07 20:19

Solids: 83.40 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120441 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	200	200	12	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	14	200	1.6	J B,Z
206-44-0	Fluoranthene	1	20	20	4.5	U
86-73-7	Fluorene	1	20	20	0.34	U
118-74-1	Hexachlorobenzene	1	200	200	0.95	U
87-68-3	Hexachlorobutadiene	1	200	200	0.83	U
77-47-4	Hexachlorocyclopentadiene	1	200	200	4.7	U
67-72-1	Hexachloroethane	1	200	200	0.96	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	80	80	0.84	U
78-59-1	Isophorone	1	200	200	0.48	U
91-57-6	2-Methylnaphthalene	1	200	200	0.57	U
95-48-7	2-Methylphenol	1	200	200	9.7	U
106-44-5	4-Methylphenol	1	200	200	11	U
91-20-3	Naphthalene	1	20	20	0.28	U
88-74-4	2-Nitroaniline	1	200	200	16	U
99-09-2	3-Nitroaniline	1	200	200	13	U
100-01-6	4-Nitroaniline	1	200	200	28	U
98-95-3	Nitrobenzene	1	200	200	1.8	U
100-02-7	4-Nitrophenol	1	400	400	13	U
88-75-5	2-Nitrophenol	1	200	200	15	U
86-30-6	N-Nitroso-diphenylamine	1	200	200	0.96	U
621-64-7	N-Nitroso-di-n-propylamine	1	200	200	0.85	U
87-86-5	Pentachlorophenol	1	400	400	4.4	U
85-01-8	Phenanthrene	1	20	20	4.3	U
108-95-2	Phenol	1	200	200	0.84	U
129-00-0	Pyrene	1	0.40	20	0.38	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	200	200	0.96	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	200	200	20	U
88-06-2	2,4,6-Trichlorophenol	1	200	200	5.5	U
95-95-4	2,4,5-Trichlorophenol	1	200	200	7.2	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	799	623	78	35 - 105	
Phenol-d6	799	639	80	40 - 100	
Nitrobenzene-d5	404	333	83	35 - 100	
2-Fluorobiphenyl	400	356	89	45 - 105	
2,4,6-Tribromophenol	803	587	73	35 - 125	
o-Terphenyl	404	369	91	30 - 125	

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-05 File ID: 71137705.D

Sampled: 11/14/07 10:23 Prepared: 11/28/07 07:07 Analyzed: 11/30/07 20:19

Solids: 83.40 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120441 Calibration: 7K30001 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	293561	7.88	260996	7.89	
Naphthalene-d8	932912	10.64	834410	10.64	
Acenaphthene-d10	524721	14.77	466177	14.77	
Phenanthrene-d10	714216	18.15	675648	18.15	
Chrysene-d12	524947	21.71	554264	21.71	
Perylene-d12	366783	23.49	471548	23.5	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-06 File ID: 71137706.D

Sampled: 11/14/07 10:27 Prepared: 11/28/07 07:07 Analyzed: 11/30/07 20:53

Solids: 80.59 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120441 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	21	21	0.50	U
208-96-8	Acenaphthylene	1	21	21	0.74	U
98-86-2	Acetophenone	1	210	210	8.3	U
120-12-7	Anthracene	1	21	21	0.53	U
1912-24-9	Atrazine	1	210	210	1.8	U
100-52-7	Benzaldehyde	1	210	210	33	U
56-55-3	Benzo(a)anthracene	1	1.2	21	0.67	J
50-32-8	Benzo(a)pyrene	1	21	21	1.3	U
205-99-2	Benzo(b)fluoranthene	1	21	21	1.1	U
207-08-9	Benzo(k)fluoranthene	1	21	21	0.89	U
191-24-2	Benzo(g,h,i)perylene	1	83	83	2.8	U
92-52-4	1,1'-Biphenyl	1	210	210	0.57	U
101-55-3	4-Bromophenyl Phenyl Ether	1	210	210	1.6	U
85-68-7	Butyl Benzyl Phthalate	1	210	210	2.6	U
105-60-2	Caprolactam	1	410	410	28	U
86-74-8	Carbazole	1	210	210	0.62	U
59-50-7	4-Chloro-3-methylphenol	1	210	210	2.2	U
106-47-8	4-Chloroaniline	1	210	210	24	U
111-91-1	Bis(2-chloroethoxy)methane	1	210	210	0.99	U
111-44-4	Bis(2-chloroethyl) Ether	1	210	210	1.1	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	210	210	0.39	U
91-58-7	2-Chloronaphthalene	1	210	210	0.54	U
95-57-8	2-Chlorophenol	1	210	210	0.48	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	210	210	0.56	U
218-01-9	Chrysene	1	21	21	0.59	U
53-70-3	Dibenz(a,h)anthracene	1	83	83	0.67	U
132-64-9	Dibenzofuran	1	210	210	0.33	U
84-74-2	Di-n-butyl Phthalate	1	4.1	210	1.5	J
91-94-1	3,3'-Dichlorobenzidine	1	410	410	97	U
120-83-2	2,4-Dichlorophenol	1	210	210	8.2	U
84-66-2	Diethyl Phthalate	1	1.2	210	0.46	J
105-67-9	2,4-Dimethylphenol	1	210	210	7.1	U
131-11-3	Dimethyl Phthalate	1	210	210	0.42	U
534-52-1	4,6-Dinitro-2-methylphenol	1	210	210	45	U
51-28-5	2,4-Dinitrophenol	1	410	410	41	U
121-14-2	2,4-Dinitrotoluene	1	210	210	16	U
606-20-2	2,6-Dinitrotoluene	1	210	210	2.0	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-06 File ID: 71137706.D

Sampled: 11/14/07 10:27 Prepared: 11/28/07 07:07 Analyzed: 11/30/07 20:53

Solids: 80.59 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120441 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	210	210	12	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	16	210	1.6	J B,Z
206-44-0	Fluoranthene	1	21	21	4.7	U
86-73-7	Fluorene	1	21	21	0.35	U
118-74-1	Hexachlorobenzene	1	210	210	0.99	U
87-68-3	Hexachlorobutadiene	1	210	210	0.85	U
77-47-4	Hexachlorocyclopentadiene	1	210	210	4.9	U
67-72-1	Hexachloroethane	1	210	210	0.99	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	83	83	0.87	U
78-59-1	Isophorone	1	210	210	0.50	U
91-57-6	2-Methylnaphthalene	1	210	210	0.59	U
95-48-7	2-Methylphenol	1	210	210	10	U
106-44-5	4-Methylphenol	1	210	210	11	U
91-20-3	Naphthalene	1	0.41	21	0.29	J
88-74-4	2-Nitroaniline	1	210	210	16	U
99-09-2	3-Nitroaniline	1	210	210	14	U
100-01-6	4-Nitroaniline	1	210	210	29	U
98-95-3	Nitrobenzene	1	210	210	1.8	U
100-02-7	4-Nitrophenol	1	410	410	14	U
88-75-5	2-Nitrophenol	1	210	210	15	U
86-30-6	N-Nitroso-diphenylamine	1	210	210	0.99	U
621-64-7	N-Nitroso-di-n-propylamine	1	210	210	0.88	U
87-86-5	Pentachlorophenol	1	410	410	4.6	U
85-01-8	Phenanthrene	1	21	21	4.5	U
108-95-2	Phenol	1	210	210	0.87	U
129-00-0	Pyrene	1	1.2	21	0.39	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	210	210	0.99	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	210	210	20	U
88-06-2	2,4,6-Trichlorophenol	1	210	210	5.7	U
95-95-4	2,4,5-Trichlorophenol	1	210	210	7.4	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	827	601	73	35 - 105	
Phenol-d6	827	637	77	40 - 100	
Nitrobenzene-d5	418	342	82	35 - 100	
2-Fluorobiphenyl	414	367	89	45 - 105	
2,4,6-Tribromophenol	831	567	68	35 - 125	
o-Terphenyl	418	392	94	30 - 125	

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB5C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42 4MD
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0711377-06
File ID: 71137706.D
Sampled: 11/14/07 10:27
Prepared: 11/28/07 07:07
Analyzed: 11/30/07 20:53
Solids: 80.60
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
QC Batch: 0714466
Sequence: 7120441
Calibration: 7K30001
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	297382	7.88	260996	7.89	
Naphthalene-d8	941053	10.63	834410	10.64	
Acenaphthene-d10	512770	14.77	466177	14.77	
Phenanthrene-d10	695890	18.15	675648	18.15	
Chrysene-d12	517259	21.71	554264	21.71	
Perylene-d12	375510	23.49	471548	23.5	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-07 File ID: 71137707.D

Sampled: 11/14/07 10:00 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 04:18

Solids: 79.15 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 14 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	25	7500	7500	180	U
208-96-8	Acenaphthylene	25	7500	7500	270	U
98-86-2	Acetophenone	25	75000	75000	3000	U
120-12-7	Anthracene	25	7500	7500	190	U
1912-24-9	Atrazine	25	75000	75000	660	U
100-52-7	Benzaldehyde	25	75000	75000	12000	U
56-55-3	Benzo(a)anthracene	25	7500	7500	240	U
50-32-8	Benzo(a)pyrene	25	7500	7500	460	U
205-99-2	Benzo(b)fluoranthene	25	7500	7500	380	U
207-08-9	Benzo(k)fluoranthene	25	7500	7500	320	U
191-24-2	Benzo(g,h,i)perylene	25	30000	30000	1000	U
92-52-4	1,1'-Biphenyl	25	75000	75000	200	U
101-55-3	4-Bromophenyl Phenyl Ether	25	75000	75000	550	U
85-68-7	Butyl Benzyl Phthalate	25	75000	75000	930	U
105-60-2	Caprolactam	25	150000	150000	10000	U
86-74-8	Carbazole	25	75000	75000	220	U
59-50-7	4-Chloro-3-methylphenol	25	75000	75000	790	U
106-47-8	4-Chloroaniline	25	75000	75000	8700	U
111-91-1	Bis(2-chloroethoxy)methane	25	75000	75000	350	U
111-44-4	Bis(2-chloroethyl) Ether	25	75000	75000	400	U
108-60-1	Bis(2-chloroisopropyl) Ether	25	75000	75000	140	U
91-58-7	2-Chloronaphthalene	25	75000	75000	190	U
95-57-8	2-Chlorophenol	25	75000	75000	170	U
7005-72-3	4-Chlorophenyl Phenyl Ether	25	75000	75000	200	U
218-01-9	Chrysene	25	7500	7500	210	U
53-70-3	Dibenz(a,h)anthracene	25	30000	30000	240	U
132-64-9	Dibenzofuran	25	75000	75000	120	U
84-74-2	Di-n-butyl Phthalate	25	5000	75000	530	J
91-94-1	3,3´-Dichlorobenzidine	25	150000	150000	35000	U
120-83-2	2,4-Dichlorophenol	25	75000	75000	2900	U
84-66-2	Diethyl Phthalate	25	75000	75000	160	U
105-67-9	2,4-Dimethylphenol	25	75000	75000	2500	U
131-11-3	Dimethyl Phthalate	25	75000	75000	150	U
534-52-1	4,6-Dinitro-2-methylphenol	25	75000	75000	16000	U
51-28-5	2,4-Dinitrophenol	25	150000	150000	15000	U
121-14-2	2,4-Dinitrotoluene	25	75000	75000	5800	U
606-20-2	2,6-Dinitrotoluene	25	75000	75000	720	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-07 File ID: 71137707.D

Sampled: 11/14/07 10:00 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 04:18

Solids: 79.20 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 14 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	25	75000	75000	4300	U
117-81-7	Bis(2-ethylhexyl) Phthalate	25	75000	75000	570	U
206-44-0	Fluoranthene	25	7500	7500	1700	U
86-73-7	Fluorene	25	7500	7500	120	U
118-74-1	Hexachlorobenzene	25	75000	75000	350	U
87-68-3	Hexachlorobutadiene	25	75000	75000	300	U
77-47-4	Hexachlorocyclopentadiene	25	75000	75000	1700	U
67-72-1	Hexachloroethane	25	75000	75000	350	U
193-39-5	Indeno(1,2,3-cd)pyrene	25	30000	30000	310	U
78-59-1	Isophorone	25	75000	75000	180	U
91-57-6	2-Methylnaphthalene	25	75000	75000	210	U
95-48-7	2-Methylphenol	25	75000	75000	3600	U
106-44-5	4-Methylphenol	25	75000	75000	4000	U
91-20-3	Naphthalene	25	7500	7500	100	U
88-74-4	2-Nitroaniline	25	75000	75000	5800	U
99-09-2	3-Nitroaniline	25	75000	75000	4900	U
100-01-6	4-Nitroaniline	25	75000	75000	10000	U
98-95-3	Nitrobenzene	25	75000	75000	660	U
100-02-7	4-Nitrophenol	25	150000	150000	4900	U
88-75-5	2-Nitrophenol	25	75000	75000	5400	U
86-30-6	N-Nitroso-diphenylamine	25	75000	75000	350	U
621-64-7	N-Nitroso-di-n-propylamine	25	75000	75000	320	U
87-86-5	Pentachlorophenol	25	150000	150000	1600	U
85-01-8	Phenanthrene	25	7500	7500	1600	U
108-95-2	Phenol	25	75000	75000	310	U
129-00-0	Pyrene	25	7500	7500	140	U
95-94-3	1,2,4,5-Tetrachlorobenzene	25	75000	75000	350	U
58-90-2	2,3,4,6-Tetrachlorophenol	25	75000	75000	7200	U
88-06-2	2,4,6-Trichlorophenol	25	75000	75000	2000	U
95-95-4	2,4,5-Trichlorophenol	25	75000	75000	2700	U

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	315908	7.79	263301	7.79	
Naphthalene-d8	979599	10.53	841238	10.54	
Acenaphthene-d10	525034	14.66	462970	14.67	
Phenanthrene-d10	743042	18.06	659422	18.07	
Chrysene-d12	609399	21.64	468710	21.64	
Perylene-d12	456998	23.38	430543	23.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-08 File ID: 71137708.D

Sampled: 11/14/07 11:05 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 04:52

Solids: 80.71 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 5 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	25	2600	2600	62	U
208-96-8	Acenaphthylene	25	2600	2600	93	U
98-86-2	Acetophenone	25	26000	26000	1000	U
120-12-7	Anthracene	25	2600	2600	66	U
1912-24-9	Atrazine	25	26000	26000	230	U
100-52-7	Benzaldehyde	25	26000	26000	4100	U
56-55-3	Benzo(a)anthracene	25	100	2600	83	J
50-32-8	Benzo(a)pyrene	25	2600	2600	160	U
205-99-2	Benzo(b)fluoranthene	25	2600	2600	130	U
207-08-9	Benzo(k)fluoranthene	25	2600	2600	110	U
191-24-2	Benzo(g,h,i)perylene	25	10000	10000	350	U
92-52-4	1,1'-Biphenyl	25	26000	26000	71	U
101-55-3	4-Bromophenyl Phenyl Ether	25	26000	26000	190	U
85-68-7	Butyl Benzyl Phthalate	25	26000	26000	330	U
105-60-2	Caprolactam	25	51000	51000	3500	U
86-74-8	Carbazole	25	26000	26000	77	U
59-50-7	4-Chloro-3-methylphenol	25	26000	26000	280	U
106-47-8	4-Chloroaniline	25	26000	26000	3000	U
111-91-1	Bis(2-chloroethoxy)methane	25	26000	26000	120	U
111-44-4	Bis(2-chloroethyl) Ether	25	26000	26000	140	U
108-60-1	Bis(2-chloroisopropyl) Ether	25	26000	26000	48	U
91-58-7	2-Chloronaphthalene	25	26000	26000	67	U
95-57-8	2-Chlorophenol	25	26000	26000	59	U
7005-72-3	4-Chlorophenyl Phenyl Ether	25	26000	26000	69	U
218-01-9	Chrysene	25	2600	2600	74	U
53-70-3	Dibenz(a,h)anthracene	25	10000	10000	83	U
132-64-9	Dibenzofuran	25	26000	26000	41	U
84-74-2	Di-n-butyl Phthalate	25	210	26000	190	J
91-94-1	3,3'-Dichlorobenzidine	25	51000	51000	12000	U
120-83-2	2,4-Dichlorophenol	25	26000	26000	1000	U
84-66-2	Diethyl Phthalate	25	26000	26000	58	U
105-67-9	2,4-Dimethylphenol	25	26000	26000	880	U
131-11-3	Dimethyl Phthalate	25	26000	26000	53	U
534-52-1	4,6-Dinitro-2-methylphenol	25	26000	26000	5600	U
51-28-5	2,4-Dinitrophenol	25	51000	51000	5100	U
121-14-2	2,4-Dinitrotoluene	25	26000	26000	2000	U
606-20-2	2,6-Dinitrotoluene	25	26000	26000	250	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-08 File ID: 71137708.D

Sampled: 11/14/07 11:05 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 04:52

Solids: 80.70 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 5 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	25	26000	26000	1500	U
117-81-7	Bis(2-ethylhexyl) Phthalate	25	26000	26000	200	U
206-44-0	Fluoranthene	25	2600	2600	580	U
86-73-7	Fluorene	25	2600	2600	43	U
118-74-1	Hexachlorobenzene	25	26000	26000	120	U
87-68-3	Hexachlorobutadiene	25	26000	26000	110	U
77-47-4	Hexachlorocyclopentadiene	25	26000	26000	610	U
67-72-1	Hexachloroethane	25	26000	26000	120	U
193-39-5	Indeno(1,2,3-cd)pyrene	25	10000	10000	110	U
78-59-1	Isophorone	25	26000	26000	62	U
91-57-6	2-Methylnaphthalene	25	26000	26000	74	U
95-48-7	2-Methylphenol	25	26000	26000	1300	U
106-44-5	4-Methylphenol	25	26000	26000	1400	U
91-20-3	Naphthalene	25	2600	2600	36	U
88-74-4	2-Nitroaniline	25	26000	26000	2000	U
99-09-2	3-Nitroaniline	25	26000	26000	1700	U
100-01-6	4-Nitroaniline	25	26000	26000	3600	U
98-95-3	Nitrobenzene	25	26000	26000	230	U
100-02-7	4-Nitrophenol	25	51000	51000	1700	U
88-75-5	2-Nitrophenol	25	26000	26000	1900	U
86-30-6	N-Nitroso-diphenylamine	25	26000	26000	120	U
621-64-7	N-Nitroso-di-n-propylamine	25	26000	26000	110	U
87-86-5	Pentachlorophenol	25	51000	51000	570	U
85-01-8	Phenanthrene	25	2600	2600	560	U
108-95-2	Phenol	25	26000	26000	110	U
129-00-0	Pyrene	25	52	2600	49	J
95-94-3	1,2,4,5-Tetrachlorobenzene	25	26000	26000	120	U
58-90-2	2,3,4,6-Tetrachlorophenol	25	26000	26000	2500	U
88-06-2	2,4,6-Trichlorophenol	25	26000	26000	710	U
95-95-4	2,4,5-Trichlorophenol	25	26000	26000	930	U

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	316394	7.79	263301	7.79	
Naphthalene-d8	1001833	10.53	841238	10.54	
Acenaphthene-d10	539463	14.66	462970	14.67	
Phenanthrene-d10	757455	18.06	659422	18.07	
Chrysene-d12	632960	21.64	468710	21.64	
Perylene-d12	450912	23.38	430543	23.39	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-09 File ID: 71137709.D

Sampled: 11/14/07 11:15 Prepared: 11/28/07 07:07 Analyzed: 12/01/07 01:27

Solids: 82.15 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120444 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	1	21	21	0.49	U
208-96-8	Acenaphthylene	1	21	21	0.73	U
98-86-2	Acetophenone	1	210	210	8.2	U
120-12-7	Anthracene	1	0.81	21	0.52	J
1912-24-9	Atrazine	1	210	210	1.8	U
100-52-7	Benzaldehyde	1	74	210	32	J
56-55-3	Benzo(a)anthracene	1	2.4	21	0.65	J
50-32-8	Benzo(a)pyrene	1	1.6	21	1.3	J
205-99-2	Benzo(b)fluoranthene	1	4.1	21	1.0	J
207-08-9	Benzo(k)fluoranthene	1	2.0	21	0.87	J
191-24-2	Benzo(g,h,i)perylene	1	82	82	2.8	U
92-52-4	1,1'-Biphenyl	1	210	210	0.56	U
101-55-3	4-Bromophenyl Phenyl Ether	1	210	210	1.5	U
85-68-7	Butyl Benzyl Phthalate	1	210	210	2.6	U
105-60-2	Caprolactam	1	400	400	28	U
86-74-8	Carbazole	1	1.6	210	0.61	J
59-50-7	4-Chloro-3-methylphenol	1	210	210	2.2	U
106-47-8	4-Chloroaniline	1	210	210	24	U
111-91-1	Bis(2-chloroethoxy)methane	1	210	210	0.97	U
111-44-4	Bis(2-chloroethyl) Ether	1	210	210	1.1	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	210	210	0.38	U
91-58-7	2-Chloronaphthalene	1	210	210	0.53	U
95-57-8	2-Chlorophenol	1	210	210	0.47	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	210	210	0.55	U
218-01-9	Chrysene	1	2.8	21	0.58	J
53-70-3	Dibenz(a,h)anthracene	1	82	82	0.65	U
132-64-9	Dibenzofuran	1	210	210	0.32	U
84-74-2	Di-n-butyl Phthalate	1	80	210	1.5	J
91-94-1	3,3´-Dichlorobenzidine	1	400	400	95	U UJ, C
120-83-2	2,4-Dichlorophenol	1	210	210	8.0	U
84-66-2	Diethyl Phthalate	1	2.4	210	0.45	J
105-67-9	2,4-Dimethylphenol	1	210	210	6.9	U
131-11-3	Dimethyl Phthalate	1	0.81	210	0.41	J
534-52-1	4,6-Dinitro-2-methylphenol	1	210	210	44	U
51-28-5	2,4-Dinitrophenol	1	400	400	40	U
121-14-2	2,4-Dinitrotoluene	1	210	210	16	U
606-20-2	2,6-Dinitrotoluene	1	210	210	2.0	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-09 File ID: 71137709.D

Sampled: 11/14/07 11:15 Prepared: 11/28/07 07:07 Analyzed: 12/01/07 01:27

Solids: 82.15 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120444 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	210	210	12	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	26	210	1.6	J B7E
206-44-0	Fluoranthene	1	21	21	4.6	U
86-73-7	Fluorene	1	21	21	0.34	U
118-74-1	Hexachlorobenzene	1	210	210	0.97	U
87-68-3	Hexachlorobutadiene	1	210	210	0.84	U
77-47-4	Hexachlorocyclopentadiene	1	210	210	4.8	U
67-72-1	Hexachloroethane	1	210	210	0.97	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	82	82	0.85	U
78-59-1	Isophorone	1	210	210	0.49	U
91-57-6	2-Methylnaphthalene	1	210	210	0.58	U
95-48-7	2-Methylphenol	1	210	210	9.9	U
106-44-5	4-Methylphenol	1	210	210	11	U
91-20-3	Naphthalene	1	0.81	21	0.28	J
88-74-4	2-Nitroaniline	1	210	210	16	U
99-09-2	3-Nitroaniline	1	210	210	13	U
100-01-6	4-Nitroaniline	1	210	210	28	U
98-95-3	Nitrobenzene	1	210	210	1.8	U
100-02-7	4-Nitrophenol	1	400	400	14	U
88-75-5	2-Nitrophenol	1	210	210	15	U
86-30-6	N-Nitroso-diphenylamine	1	3.7	210	0.97	J
621-64-7	N-Nitroso-di-n-propylamine	1	210	210	0.87	U
87-86-5	Pentachlorophenol	1	400	400	4.5	U
85-01-8	Phenanthrene	1	21	21	4.4	U
108-95-2	Phenol	1	210	210	0.85	U
129-00-0	Pyrene	1	3.7	21	0.39	J
95-94-3	1,2,4,5-Tetrachlorobenzene	1	210	210	0.97	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	210	210	20	U
88-06-2	2,4,6-Trichlorophenol	1	210	210	5.6	U
95-95-4	2,4,5-Trichlorophenol	1	210	210	7.3	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	811	633	78	35 - 105	
Phenol-d6	811	649	80	40 - 100	
Nitrobenzene-d5	410	351	86	35 - 100	
2-Fluorobiphenyl	406	372	92	45 - 105	
2,4,6-Tribromophenol	816	615	75	35 - 125	
o-Terphenyl	410	388	95	30 - 125	

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-09 File ID: 71137709.D

Sampled: 11/14/07 11:15 Prepared: 11/28/07 07:07 Analyzed: 12/01/07 01:27

Solids: 82.20 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120444 Calibration: 7K30001 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	324157	7.88	377328	7.89	
Naphthalene-d8	1027304	10.63	1452644	10.64	
Acenaphthene-d10	557667	14.77	737768	14.77	
Phenanthrene-d10	746341	18.15	1027059	18.15	
Chrysene-d12	523413	21.71	720511	21.71	
Perylene-d12	323388	23.49	467875	23.49	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-10 File ID: 71137710.D

Sampled: 11/14/07 11:20 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 01:24

Solids: 81.09 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
83-32-9	Acenaphthene	5	100	100	2.5	U
208-96-8	Acenaphthylene	5	100	100	3.7	U
98-86-2	Acetophenone	5	1000	1000	41	U
120-12-7	Anthracene	5	100	100	2.6	U
1912-24-9	Atrazine	5	1000	1000	9.2	U
100-52-7	Benzaldehyde	5	1000	1000	160	U
56-55-3	Benzo(a)anthracene	5	4.1	100	3.3	J
50-32-8	Benzo(a)pyrene	5	100	100	6.4	U
205-99-2	Benzo(b)fluoranthene	5	100	100	5.2	U
207-08-9	Benzo(k)fluoranthene	5	100	100	4.4	U
191-24-2	Benzo(g,h,i)perylene	5	410	410	14	U
92-52-4	1,1'-Biphenyl	5	1000	1000	2.8	U
101-55-3	4-Bromophenyl Phenyl Ether	5	1000	1000	7.7	U
85-68-7	Butyl Benzyl Phthalate	5	1000	1000	13	U
105-60-2	Caprolactam	5	2000	2000	140	U
86-74-8	Carbazole	5	1000	1000	3.1	U
59-50-7	4-Chloro-3-methylphenol	5	1000	1000	11	U
106-47-8	4-Chloroaniline	5	1000	1000	120	U
111-91-1	Bis(2-chloroethoxy)methane	5	1000	1000	4.9	U
111-44-4	Bis(2-chloroethyl) Ether	5	1000	1000	5.5	U
108-60-1	Bis(2-chloroisopropyl) Ether	5	1000	1000	1.9	U
91-58-7	2-Chloronaphthalene	5	1000	1000	2.7	U
95-57-8	2-Chlorophenol	5	1000	1000	2.4	U
7005-72-3	4-Chlorophenyl Phenyl Ether	5	1000	1000	2.8	U
218-01-9	Chrysene	5	100	100	2.9	U
53-70-3	Dibenz(a,h)anthracene	5	410	410	3.3	U
132-64-9	Dibenzofuran	5	1000	1000	1.6	U
84-74-2	Di-n-butyl Phthalate	5	270	1000	7.4	J
91-94-1	3,3´-Dichlorobenzidine	5	2000	2000	480	U
120-83-2	2,4-Dichlorophenol	5	1000	1000	41	U
84-66-2	Diethyl Phthalate	5	6.2	1000	2.3	J
105-67-9	2,4-Dimethylphenol	5	1000	1000	35	U
131-11-3	Dimethyl Phthalate	5	1000	1000	2.1	U
534-52-1	4,6-Dinitro-2-methylphenol	5	1000	1000	220	U
51-28-5	2,4-Dinitrophenol	5	2000	2000	200	U
121-14-2	2,4-Dinitrotoluene	5	1000	1000	81	U
606-20-2	2,6-Dinitrotoluene	5	1000	1000	10	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-10 File ID: 71137710.D

Sampled: 11/14/07 11:20 Prepared: 11/28/07 07:07 Analyzed: 12/02/07 01:24

Solids: 81.09 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

QC Batch: 0714466 Sequence: 7120445 Calibration: 7K30001 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	5	1000	1000	61	U
117-81-7	Bis(2-ethylhexyl) Phthalate	5	31	1000	8.0	J B7E
206-44-0	Fluoranthene	5	100	100	23	U
86-73-7	Fluorene	5	100	100	1.7	U
118-74-1	Hexachlorobenzene	5	1000	1000	4.9	U
87-68-3	Hexachlorobutadiene	5	1000	1000	4.2	U
77-47-4	Hexachlorocyclopentadiene	5	1000	1000	24	U
67-72-1	Hexachloroethane	5	1000	1000	4.9	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	410	410	4.3	U
78-59-1	Isophorone	5	1000	1000	2.5	U
91-57-6	2-Methylnaphthalene	5	1000	1000	2.9	U
95-48-7	2-Methylphenol	5	1000	1000	50	U
106-44-5	4-Methylphenol	5	1000	1000	56	U
91-20-3	Naphthalene	5	100	100	1.4	U
88-74-4	2-Nitroaniline	5	1000	1000	81	U
99-09-2	3-Nitroaniline	5	1000	1000	68	U
100-01-6	4-Nitroaniline	5	1000	1000	140	U
98-95-3	Nitrobenzene	5	1000	1000	9.2	U
100-02-7	4-Nitrophenol	5	2000	2000	69	U
88-75-5	2-Nitrophenol	5	1000	1000	75	U
86-30-6	N-Nitroso-diphenylamine	5	6.2	1000	4.9	J
621-64-7	N-Nitroso-di-n-propylamine	5	1000	1000	4.4	U
87-86-5	Pentachlorophenol	5	2000	2000	23	U
85-01-8	Phenanthrene	5	100	100	22	U
108-95-2	Phenol	5	1000	1000	4.3	U
129-00-0	Pyrene	5	2.1	100	2.0	J
95-94-3	1,2,4,5-Tetrachlorobenzene	5	1000	1000	4.9	U
58-90-2	2,3,4,6-Tetrachlorophenol	5	1000	1000	100	U
88-06-2	2,4,6-Trichlorophenol	5	1000	1000	28	U
95-95-4	2,4,5-Trichlorophenol	5	1000	1000	37	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% REC.	QC Limits	Q
2-Fluorophenol	822	432	52	35 - 105	D
Phenol-d6	822	446	54	40 - 100	D
Nitrobenzene-d5	415	243	58	35 - 100	D
2-Fluorobiphenyl	411	267	65	45 - 105	D
2,4,6-Tribromophenol	826	413	50	35 - 125	D
o-Terphenyl	415	288	69	30 - 125	D

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35SB8C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42 4MD
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0711377-10
File ID: 71137710.D
Sampled: 11/14/07 11:20
Prepared: 11/28/07 07:07
Analyzed: 12/02/07 01:24
Solids: 81.09
Preparation: 3550B Sonication Extract
Initial/Final: 30 g / 1 mL
QC Batch: 0714466
Sequence: 7120445
Calibration: 7K30001
Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	285869	7.79	329482	7.8	
Naphthalene-d8	899289	10.53	1314112	10.53	
Acenaphthene-d10	487292	14.66	665678	14.67	
Phenanthrene-d10	699243	18.07	898814	18.07	
Chrysene-d12	552055	21.63	640414	21.64	
Perylene-d12	389748	23.38	570124	23.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711377-23 File ID: 71137723.D

Sampled: 11/14/07 16:00 Prepared: 11/19/07 07:02 Analyzed: 11/26/07 13:14

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0714041 Sequence: 7112784 Calibration: 7K27035 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	5.0	5.0	0.043	U
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	0.61	5.0	0.051	J
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	5.0	5.0	0.029	U
105-60-2	Caprolactam	1	5.0	5.0	0.14	UR,1
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	1.3	5.0	0.38	JB B7E
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	0.047	5.0	0.034	J
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711377-23 File ID: 71137723.D

Sampled: 11/14/07 16:00 Prepared: 11/19/07 07:02 Analyzed: 11/26/07 13:14

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0714041 Sequence: 7112784 Calibration: 7K27035 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	0.42	5.0	0.41	JB B7E
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	5.0	5.0	0.031	U
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.50	0.50	0.023	U
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	18.9	6.56	35	20 - 110	
Phenol-d6	18.9	4.24	22	10 - 115	
Nitrobenzene-d5	9.53	5.88	62	40 - 110	
2-Fluorobiphenyl	9.43	5.25	56	50 - 110	
2,4,6-Tribromophenol	19.0	11.4	60	40 - 125	
o-Terphenyl	9.53	6.50	68	50 - 135	

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711377-23 File ID: 71137723.D

Sampled: 11/14/07 16:00 Prepared: 11/19/07 07:02 Analyzed: 11/26/07 13:14

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0714041 Sequence: 7112784 Calibration: 7K27035 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	333913	7.7	238783	7.69	
Naphthalene-d8	1292427	10.43	925469	10.44	
Acenaphthene-d10	661401	14.56	498299	14.56	
Phenanthrene-d10	906677	17.98	688673	17.98	
Chrysene-d12	686611	21.58	512595	21.58	
Perylene-d12	479215	23.3	402396	23.3	

* Values outside of QC limits

01317

SAMPLE ID SUMMARY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35SB3A	0711293-01
EQBK-1	0711313-01
35SB4A	0711313-03
DUP-1	0711313-04
35SB1A	0711313-05
35SB2A	0711313-06
35SB6A	0711313-07
35SB6B	0711313-08
35SB6C	0711313-09
35SB9A	0711313-10
35SB9B	0711313-11
35SB9C	0711313-12
35SB10A	0711313-13
35SB10B	0711313-14
35SB10C	0711313-15
35SB7A	0711377-01
35SB7B	0711377-02
35SB7C	0711377-03
35SB5A	0711377-04
35SB5A	0711377-04RE1
35SB5B	0711377-05
35SB5C	0711377-06
DUP-2	0711377-07
35SB8A	0711377-08
35SB8B	0711377-09
35SB8C	0711377-10
37SB10A	0711377-13
37SB10B	0711377-14
37SB10C	0711377-15
37SB9A	0711377-16
37SB9B	0711377-17
37SB9C	0711377-18
DUP-3	0711377-19
37SB7A	0711377-20
37SB7B	0711377-21
37SB7C	0711377-22
EQBK-2	0711377-23

ANALYSIS DATA SHEET

35SB3A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711293-01 File ID: A61_075-0

Sampled: 11/12/07 16:06 Prepared: 11/26/07 06:56 Analyzed: 12/16/07 07:15

Solids: 90.68 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	1.9	1.9	0.39	U
319-85-7	beta-BHC	1	3.6	3.6	0.74	U
58-89-9	gamma-BHC (Lindane)	1	3.6	3.6	0.71	U
319-86-8	delta-BHC	1	3.6	3.6	1.0	U
5103-71-9	alpha-Chlordane	1	3.6	3.6	0.75	U
5103-74-2	gamma-Chlordane	1	3.6	3.6	0.52	U
72-54-8	4,4'-DDD	1	3.6	3.6	1.2	U
72-55-9	4,4'-DDE	1	3.6	3.6	0.99	U
50-29-3	4,4'-DDT	1	3.6	3.6	1.1	U
309-00-2	Aldrin	1	1.9	1.9	0.60	U
60-57-1	Dieldrin	1	3.6	3.6	0.51	U
959-98-8	Endosulfan I	1	3.6	3.6	0.99	U
33213-65-9	Endosulfan II	1	3.6	3.6	0.94	U
1031-07-8	Endosulfan Sulfate	1	3.6	3.6	1.1	U
72-20-8	Endrin	1	3.6	3.6	0.59	U
7421-93-4	Endrin Aldehyde	1	3.6	3.6	1.1	U
53494-70-5	Endrin Ketone	1	3.6	3.6	1.1	U
76-44-8	Heptachlor	1	7.4	7.4	1.3	U
1024-57-3	Heptachlor Epoxide	1	1.9	1.9	0.46	U
72-43-5	Methoxychlor	1	19	19	1.4	U
8001-35-2	Toxaphene	1	190	190	25	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	36.8	32.3	88	70 - 125	
Decachlorobiphenyl	36.8	33.7	92	55 - 130	

* Values outside of QC limits

05963

ANALYSIS DATA SHEET

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Water Laboratory ID: 0711313-01 File ID: A59_454-0

Sampled: 11/13/07 16:00 Prepared: 11/16/07 07:11 Analyzed: 11/29/07 07:10

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1050 mL / 2 mL

QC Batch: 0713952 Sequence: 7113009 Calibration: 7K30006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Tetrachloro-m-xylene		0.190	0.143	75	25 - 140	
Decachlorobiphenyl		0.190	0.169	89	30 - 135	

* Values outside of QC limits

0592

ANALYSIS DATA SHEET

35SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-03 File ID: A61_071-0

Sampled: 11/13/07 07:50 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 04:53

Solids: 83.32 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	4.0	4.0	0.81	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.77	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.81	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.56	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.3	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.65	U
60-57-1	Dieldrin	1	4.0	4.0	0.55	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.64	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.2	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.0	8.0	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.50	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.0	31.1	78	70 - 125	
Decachlorobiphenyl	40.0	30.8	77	55 - 130	

* Values outside of QC limits

: 05981

ANALYSIS DATA SHEET

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-04 File ID: A61_070-0

Sampled: 11/13/07 08:00 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 04:17

Solids: 83.87 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	3.9	3.9	0.80	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.77	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.81	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.56	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	3.9	3.9	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.65	U
60-57-1	Dieldrin	1	3.9	3.9	0.55	U
959-98-8	Endosulfan I	1	3.9	3.9	1.1	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.64	U
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	8.0	8.0	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.49	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.7	32.1	81	70 - 125	
Decachlorobiphenyl	39.7	32.5	82	55 - 130	

* Values outside of QC limits

05990

ANALYSIS DATA SHEET

35SB1A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-05 File ID: A61_069-0

Sampled: 11/13/07 08:25 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 03:42

Solids: 85.52 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.9	3.9	0.79	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.75	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.79	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.55	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	1.5	3.9	1.2	J
309-00-2	Aldrin	1	2.0	2.0	0.63	U
60-57-1	Dieldrin	1	3.9	3.9	0.54	U
959-98-8	Endosulfan I	1	3.9	3.9	1.0	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.63	U
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	7.8	7.8	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.48	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.0	40.6	104	70 - 125	
Decachlorobiphenyl	39.0	42.0	108	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

35SB2A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-06 File ID: A61_081-0

Sampled: 11/13/07 09:20 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 10:48

Solids: 83.07 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	4.0	4.0	0.81	U UJ, M
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.77	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.82	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.57	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.3	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.65	U
60-57-1	Dieldrin	1	4.0	4.0	0.55	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.65	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.3	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.1	8.1	1.5	U
1024-57-3	Heptachlor Epoxide	1	6.5	2.0	0.50	J, J
72-43-5	Methoxychlor	1	20	20	1.6	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.1	29.3	73	70 - 125	
Decachlorobiphenyl	40.1	29.9	75	55 - 130	

* Values outside of QC limits

06068

ANALYSIS DATA SHEET

35SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-07 File ID: A61_082-0

Sampled: 11/13/07 14:45 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 11:24

Solids: 58.85 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.9	2.9	0.60	U UL,S
319-85-7	beta-BHC	1	5.6	5.6	1.1	U
58-89-9	gamma-BHC (Lindane)	1	5.6	5.6	1.1	U
319-86-8	delta-BHC	1	5.6	5.6	1.6	U
5103-71-9	alpha-Chlordane	1	5.6	5.6	1.2	U
5103-74-2	gamma-Chlordane	1	5.6	5.6	0.80	U
72-54-8	4,4'-DDD	1	5.6	5.6	1.9	U
72-55-9	4,4'-DDE	1	5.6	5.6	1.5	U
50-29-3	4,4'-DDT	1	5.6	5.6	1.8	U
309-00-2	Aldrin	1	2.9	2.9	0.92	U
60-57-1	Dieldrin	1	5.6	5.6	0.78	U
959-98-8	Endosulfan I	1	5.6	5.6	1.5	U
33213-65-9	Endosulfan II	1	5.6	5.6	1.5	U
1031-07-8	Endosulfan Sulfate	1	5.6	5.6	1.7	U
72-20-8	Endrin	1	5.6	5.6	0.91	U
7421-93-4	Endrin Aldehyde	1	5.6	5.6	1.8	U
53494-70-5	Endrin Ketone	1	5.6	5.6	1.7	U
76-44-8	Heptachlor	1	11	11	2.1	U
1024-57-3	Heptachlor Epoxide	1	2.9	2.9	0.70	U
72-43-5	Methoxychlor	1	29	29	2.2	U
8001-35-2	Toxaphene	1	290	290	38	U UL,S

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	56.6	33.5	59	70 - 125	*
Decachlorobiphenyl	56.6	35.9	63	55 - 130	

* Values outside of QC limits

06017

ANALYSIS DATA SHEET

35SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-08 File ID: A61_083-0

Sampled: 11/13/07 14:55 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 11:59

Solids: 85.53 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.9	3.9	0.79	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.75	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.79	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.55	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	3.9	3.9	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.63	U
60-57-1	Dieldrin	1	3.9	3.9	0.54	U
959-98-8	Endosulfan I	1	3.9	3.9	1.0	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.63	U
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	7.8	7.8	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.48	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.0	39.1	100	70 - 125	
Decachlorobiphenyl	39.0	39.3	101	55 - 130	

* Values outside of QC limits

06034

ANALYSIS DATA SHEET

35SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-09 File ID: A61_084-0

Sampled: 11/13/07 15:05 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 12:35

Solids: 82.73 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.42	U
319-85-7	beta-BHC	1	4.0	4.0	0.81	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.78	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.82	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.57	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.4	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.2	U
309-00-2	Aldrin	1	2.1	2.1	0.66	U
60-57-1	Dieldrin	1	4.0	4.0	0.56	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.65	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.3	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.1	8.1	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.50	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.3	36.7	91	70 - 125	
Decachlorobiphenyl	40.3	41.0	102	55 - 130	

* Values outside of QC limits

06043

ANALYSIS DATA SHEET

35SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-10 File ID: A61_085-0

Sampled: 11/13/07 10:45 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 13:10

Solids: 73.11 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.3	2.3	0.48	U UL,S
319-85-7	beta-BHC	1	4.5	4.5	0.92	U
58-89-9	gamma-BHC (Lindane)	1	4.5	4.5	0.88	U
319-86-8	delta-BHC	1	4.5	4.5	1.3	U
5103-71-9	alpha-Chlordane	1	4.5	4.5	0.93	U
5103-74-2	gamma-Chlordane	1	4.5	4.5	0.64	U
72-54-8	4,4'-DDD	1	4.5	4.5	1.5	U
72-55-9	4,4'-DDE	1	4.5	4.5	1.2	U
50-29-3	4,4'-DDT	1	4.5	4.5	1.4	U
309-00-2	Aldrin	1	2.3	2.3	0.74	U
60-57-1	Dieldrin	1	4.5	4.5	0.63	U
959-98-8	Endosulfan I	1	4.5	4.5	1.2	U
33213-65-9	Endosulfan II	1	4.5	4.5	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.5	4.5	1.4	U
72-20-8	Endrin	1	4.5	4.5	0.73	U
7421-93-4	Endrin Aldehyde	1	4.5	4.5	1.4	U
53494-70-5	Endrin Ketone	1	4.5	4.5	1.4	U
76-44-8	Heptachlor	1	9.2	9.2	1.7	U
1024-57-3	Heptachlor Epoxide	1	2.3	2.3	0.57	U
72-43-5	Methoxychlor	1	23	23	1.8	U
8001-35-2	Toxaphene	1	230	230	31	U UL,S

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	45.6	27.9	61	70 - 125	*
Decachlorobiphenyl	45.6	26.5	58	55 - 130	

* Values outside of QC limits

06052

ANALYSIS DATA SHEET

35SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-11 File ID: A61_086-0

Sampled: 11/13/07 12:10 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 13:46

Solids: 66.46 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.6	2.6	0.53	U
319-85-7	beta-BHC	1	5.0	5.0	1.0	U
58-89-9	gamma-BHC (Lindane)	1	5.0	5.0	0.97	U
319-86-8	delta-BHC	1	5.0	5.0	1.4	U
5103-71-9	alpha-Chlordane	1	5.0	5.0	1.0	U
5103-74-2	gamma-Chlordane	1	5.0	5.0	0.71	U
72-54-8	4,4'-DDD	1	5.0	5.0	1.7	U
72-55-9	4,4'-DDE	1	5.0	5.0	1.4	U
50-29-3	4,4'-DDT	1	5.0	5.0	1.5	U
309-00-2	Aldrin	1	2.6	2.6	0.82	U
60-57-1	Dieldrin	1	5.0	5.0	0.69	U
959-98-8	Endosulfan I	1	5.0	5.0	1.3	U
33213-65-9	Endosulfan II	1	5.0	5.0	1.3	U
1031-07-8	Endosulfan Sulfate	1	5.0	5.0	1.5	U
72-20-8	Endrin	1	5.0	5.0	0.81	U
7421-93-4	Endrin Aldehyde	1	5.0	5.0	1.6	U
53494-70-5	Endrin Ketone	1	5.0	5.0	1.5	U
76-44-8	Heptachlor	1	10	10	1.8	U
1024-57-3	Heptachlor Epoxide	1	2.6	2.6	0.62	U
72-43-5	Methoxychlor	1	26	26	1.9	U
8001-35-2	Toxaphene	1	260	260	34	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	50.2	42.0	84	70 - 125	
Decachlorobiphenyl	50.2	42.2	84	55 - 130	

* Values outside of QC limits

06069

ANALYSIS DATA SHEET

35SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-12 File ID: A61_087-0

Sampled: 11/13/07 12:00 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 14:21

Solids: 80.32 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.44	U
319-85-7	beta-BHC	1	4.1	4.1	0.84	U
58-89-9	gamma-BHC (Lindane)	1	4.1	4.1	0.80	U
319-86-8	delta-BHC	1	4.1	4.1	1.2	U
5103-71-9	alpha-Chlordane	1	4.1	4.1	0.84	U
5103-74-2	gamma-Chlordane	1	4.1	4.1	0.59	U
72-54-8	4,4'-DDD	1	4.1	4.1	1.4	U
72-55-9	4,4'-DDE	1	4.1	4.1	1.1	U
50-29-3	4,4'-DDT	1	4.1	4.1	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.68	U
60-57-1	Dieldrin	1	4.1	4.1	0.57	U
959-98-8	Endosulfan I	1	4.1	4.1	1.1	U
33213-65-9	Endosulfan II	1	4.1	4.1	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.1	4.1	1.2	U
72-20-8	Endrin	1	4.1	4.1	0.67	U
7421-93-4	Endrin Aldehyde	1	4.1	4.1	1.3	U
53494-70-5	Endrin Ketone	1	4.1	4.1	1.3	U
76-44-8	Heptachlor	1	8.3	8.3	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.52	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	28	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	41.5	38.4	93	70 - 125	
Decachlorobiphenyl	41.5	39.9	96	55 - 130	

* Values outside of QC limits

: 06078

ANALYSIS DATA SHEET

35SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-13 File ID: A61_088-0

Sampled: 11/13/07 13:30 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 14:57

Solids: 50.60 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	3.4	3.4	0.69	U UL,S
319-85-7	beta-BHC	1	6.5	6.5	1.3	U
58-89-9	gamma-BHC (Lindane)	1	6.5	6.5	1.3	U
319-86-8	delta-BHC	1	6.5	6.5	1.8	U
5103-71-9	alpha-Chlordane	1	6.5	6.5	1.3	U
5103-74-2	gamma-Chlordane	1	6.5	6.5	0.93	U
72-54-8	4,4'-DDD	1	6.5	6.5	2.2	U
72-55-9	4,4'-DDE	1	6.5	6.5	1.8	U
50-29-3	4,4'-DDT	1	6.5	6.5	2.0	U
309-00-2	Aldrin	1	3.4	3.4	1.1	U
60-57-1	Dieldrin	1	6.5	6.5	0.91	U
959-98-8	Endosulfan I	1	6.5	6.5	1.8	U
33213-65-9	Endosulfan II	1	6.5	6.5	1.7	U
1031-07-8	Endosulfan Sulfate	1	6.5	6.5	2.0	U
72-20-8	Endrin	1	6.5	6.5	1.1	U
7421-93-4	Endrin Aldehyde	1	6.5	6.5	2.1	U
53494-70-5	Endrin Ketone	1	6.5	6.5	2.0	U
76-44-8	Heptachlor	1	13	13	2.4	U
1024-57-3	Heptachlor Epoxide	1	3.4	3.4	0.82	U
72-43-5	Methoxychlor	1	34	34	2.5	U
8001-35-2	Toxaphene	1	340	340	44	U UL,S

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	65.9	44.7	68	70 - 125	*
Decachlorobiphenyl	65.9	47.6	72	55 - 130	

* Values outside of QC limits

: 06087

ANALYSIS DATA SHEET

35SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-14 File ID: A61_089-0

Sampled: 11/13/07 13:38 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 15:33

Solids: 86.20 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.8	3.8	0.78	U
58-89-9	gamma-BHC (Lindane)	1	3.8	3.8	0.74	U
319-86-8	delta-BHC	1	3.8	3.8	1.1	U
5103-71-9	alpha-Chlordane	1	3.8	3.8	0.79	U
5103-74-2	gamma-Chlordane	1	3.8	3.8	0.55	U
72-54-8	4,4'-DDD	1	3.8	3.8	1.3	U
72-55-9	4,4'-DDE	1	3.8	3.8	1.0	U
50-29-3	4,4'-DDT	1	3.8	3.8	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.63	U
60-57-1	Dieldrin	1	3.8	3.8	0.53	U
959-98-8	Endosulfan I	1	3.8	3.8	1.0	U
33213-65-9	Endosulfan II	1	3.8	3.8	0.99	U
1031-07-8	Endosulfan Sulfate	1	3.8	3.8	1.2	U
72-20-8	Endrin	1	3.8	3.8	0.62	U
7421-93-4	Endrin Aldehyde	1	3.8	3.8	1.2	U
53494-70-5	Endrin Ketone	1	3.8	3.8	1.2	U
76-44-8	Heptachlor	1	7.8	7.8	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.48	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	38.7	36.8	95	70 - 125	
Decachlorobiphenyl	38.7	37.0	96	55 - 130	

* Values outside of QC limits

06104

ANALYSIS DATA SHEET

35SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-15 File ID: A61_090-0

Sampled: 11/13/07 13:45 Prepared: 11/27/07 06:56 Analyzed: 12/16/07 16:08

Solids: 82.38 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121726 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.43	U
319-85-7	beta-BHC	1	4.0	4.0	0.82	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.78	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.82	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.57	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.4	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.66	U
60-57-1	Dieldrin	1	4.0	4.0	0.56	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.65	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.3	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.1	8.1	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.50	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.5	34.4	85	70 - 125	
Decachlorobiphenyl	40.5	36.1	89	55 - 130	

* Values outside of QC limits

06113

ANALYSIS DATA SHEET

35SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-01 File ID: A61_108-0

Sampled: 11/14/07 08:00 Prepared: 11/27/07 06:56 Analyzed: 12/17/07 19:45

Solids: 53.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	3.2	3.2	0.66	U
319-85-7	beta-BHC	1	6.2	6.2	1.3	U
58-89-9	gamma-BHC (Lindane)	1	6.2	6.2	1.2	U
319-86-8	delta-BHC	1	6.2	6.2	1.8	U
5103-71-9	alpha-Chlordane	1	6.2	6.2	1.3	U
5103-74-2	gamma-Chlordane	1	6.2	6.2	0.89	U
72-54-8	4,4'-DDD	1	6.2	6.2	2.1	U
72-55-9	4,4'-DDE	1	6.2	6.2	1.7	U
50-29-3	4,4'-DDT	1	6.2	6.2	1.9	U
309-00-2	Aldrin	1	3.2	3.2	1.0	U
60-57-1	Dieldrin	1	6.2	6.2	0.87	U
959-98-8	Endosulfan I	1	6.2	6.2	1.7	U
33213-65-9	Endosulfan II	1	6.2	6.2	1.6	U
1031-07-8	Endosulfan Sulfate	1	6.2	6.2	1.9	U
72-20-8	Endrin	1	6.2	6.2	1.0	U
7421-93-4	Endrin Aldehyde	1	6.2	6.2	2.0	U
53494-70-5	Endrin Ketone	1	6.2	6.2	1.9	U
76-44-8	Heptachlor	1	13	13	2.3	U
1024-57-3	Heptachlor Epoxide	1	3.2	3.2	0.78	U
72-43-5	Methoxychlor	1	32	32	2.4	U
8001-35-2	Toxaphene	1	320	320	42	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	62.9	43.9	70	70 - 125	
Decachlorobiphenyl	62.9	45.2	72	55 - 130	

* Values outside of QC limits

06122

ANALYSIS DATA SHEET

35SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-02 File ID: A61_107-0

Sampled: 11/14/07 08:08 Prepared: 11/27/07 06:56 Analyzed: 12/17/07 19:10

Solids: 87.74 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	1.9	1.9	0.40	U
319-85-7	beta-BHC	1	3.8	3.8	0.77	U
58-89-9	gamma-BHC (Lindane)	1	3.8	3.8	0.73	U
319-86-8	delta-BHC	1	3.8	3.8	1.1	U
5103-71-9	alpha-Chlordane	1	3.8	3.8	0.77	U
5103-74-2	gamma-Chlordane	1	3.8	3.8	0.54	U
72-54-8	4,4'-DDD	1	3.8	3.8	1.3	U
72-55-9	4,4'-DDE	1	3.8	3.8	1.0	U
50-29-3	4,4'-DDT	1	3.8	3.8	1.2	U
309-00-2	Aldrin	1	1.9	1.9	0.62	U
60-57-1	Dieldrin	1	3.8	3.8	0.53	U
959-98-8	Endosulfan I	1	3.8	3.8	1.0	U
33213-65-9	Endosulfan II	1	3.8	3.8	0.97	U
1031-07-8	Endosulfan Sulfate	1	3.8	3.8	1.1	U
72-20-8	Endrin	1	3.8	3.8	0.61	U
7421-93-4	Endrin Aldehyde	1	3.8	3.8	1.2	U
53494-70-5	Endrin Ketone	1	3.8	3.8	1.2	U
76-44-8	Heptachlor	1	7.6	7.6	1.4	U
1024-57-3	Heptachlor Epoxide	1	1.9	1.9	0.47	U
72-43-5	Methoxychlor	1	19	19	1.5	U
8001-35-2	Toxaphene	1	190	190	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	38.0	36.4	96	70 - 125	
Decachlorobiphenyl	38.0	36.1	95	55 - 130	

* Values outside of QC limits

: 06139

ANALYSIS DATA SHEET

35SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-03 File ID: A61_106-0

Sampled: 11/14/07 08:25 Prepared: 11/27/07 06:56 Analyzed: 12/17/07 18:34

Solids: 86.53 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.8	3.8	0.78	U
58-89-9	gamma-BHC (Lindane)	1	3.8	3.8	0.74	U
319-86-8	delta-BHC	1	3.8	3.8	1.1	U
5103-71-9	alpha-Chlordane	1	3.8	3.8	0.78	U
5103-74-2	gamma-Chlordane	1	3.8	3.8	0.54	U
72-54-8	4,4'-DDD	1	3.8	3.8	1.3	U
72-55-9	4,4'-DDE	1	3.8	3.8	1.0	U
50-29-3	4,4'-DDT	1	3.8	3.8	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.63	U
60-57-1	Dieldrin	1	3.8	3.8	0.53	U
959-98-8	Endosulfan I	1	3.8	3.8	1.0	U
33213-65-9	Endosulfan II	1	3.8	3.8	0.99	U
1031-07-8	Endosulfan Sulfate	1	3.8	3.8	1.2	U
72-20-8	Endrin	1	3.8	3.8	0.62	U
7421-93-4	Endrin Aldehyde	1	3.8	3.8	1.2	U
53494-70-5	Endrin Ketone	1	3.8	3.8	1.2	U
76-44-8	Heptachlor	1	7.7	7.7	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.48	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	38.5	31.9	83	70 - 125	
Decachlorobiphenyl	38.5	32.0	83	55 - 130	

* Values outside of QC limits

06148

ANALYSIS DATA SHEET

35SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-04 File ID: A61_105-0

Sampled: 11/14/07 10:10 Prepared: 11/27/07 06:56 Analyzed: 12/17/07 17:59

Solids: 80.92 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.43	U UL,S
319-85-7	beta-BHC	1	4.1	4.1	0.83	U
58-89-9	gamma-BHC (Lindane)	1	4.1	4.1	0.79	U
319-86-8	delta-BHC	1	4.1	4.1	1.2	U
5103-71-9	alpha-Chlordane	1	4.1	4.1	0.84	U
5103-74-2	gamma-Chlordane	1	4.1	4.1	0.58	U
72-54-8	4,4'-DDD	1	4.1	4.1	1.4	U
72-55-9	4,4'-DDE	1	4.1	4.1	1.1	U
50-29-3	4,4'-DDT	1	4.1	4.1	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.67	U
60-57-1	Dieldrin	1	4.1	4.1	0.57	U
959-98-8	Endosulfan I	1	4.1	4.1	1.1	U
33213-65-9	Endosulfan II	1	4.1	4.1	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.1	4.1	1.2	U
72-20-8	Endrin	1	4.1	4.1	0.66	U
7421-93-4	Endrin Aldehyde	1	4.1	4.1	1.3	U
53494-70-5	Endrin Ketone	1	4.1	4.1	1.3	U
76-44-8	Heptachlor	1	8.3	8.3	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.51	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	28	U UL,S

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	41.2	24.4	59	70 - 125	*
Decachlorobiphenyl	41.2	25.2	61	55 - 130	

* Values outside of QC limits

06157

ANALYSIS DATA SHEET

35SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-04RE1 File ID: A63_275-0

Sampled: 11/14/07 10:10 Prepared: 12/11/07 07:04 Analyzed: 01/08/08 02:25

Solids: 80.92 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0715118 Sequence: 8011111 Calibration: 8A11004 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q	
319-84-6	alpha-BHC	1	2.1	2.1	0.43	U	UJ,h
319-85-7	beta-BHC	1	4.1	4.1	0.83	U	
58-89-9	gamma-BHC (Lindane)	1	4.1	4.1	0.79	U	
319-86-8	delta-BHC	1	4.1	4.1	1.2	U	UJ,h
5103-71-9	alpha-Chlordane	1	1.9	4.1	0.84	J	J,h
5103-74-2	gamma-Chlordane	1	4.1	4.1	0.58	U	UJ,h
72-54-8	4,4'-DDD	1	4.1	4.1	1.4	U	
72-55-9	4,4'-DDE	1	4.1	4.1	1.1	U	
50-29-3	4,4'-DDT	1	4.1	4.1	1.3	U	
309-00-2	Aldrin	1	2.1	2.1	0.67	U	
60-57-1	Dieldrin	1	4.1	4.1	0.57	U	
959-98-8	Endosulfan I	1	4.1	4.1	1.1	U	
33213-65-9	Endosulfan II	1	4.1	4.1	1.1	U	
1031-07-8	Endosulfan Sulfate	1	4.1	4.1	1.2	U	UJ,h
72-20-8	Endrin	1	1.1	4.1	0.66	J	J,h
7421-93-4	Endrin Aldehyde	1	4.1	4.1	1.3	U	UJ,h
53494-70-5	Endrin Ketone	1	4.1	4.1	1.3	U	
76-44-8	Heptachlor	1	8.3	8.3	1.5	U	
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.51	U	
72-43-5	Methoxychlor	1	21	21	1.6	U	
8001-35-2	Toxaphene	1	210	210	28	U	UJ,h

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	41.2	29.6	72	70 - 125	
Decachlorobiphenyl	41.2	28.6	69	55 - 130	

* Values outside of QC limits

Do Not Use RA 1/25/08

: 66166

ANALYSIS DATA SHEET

35SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-05 File ID: A61_104-0

Sampled: 11/14/07 10:23 Prepared: 11/27/07 06:56 Analyzed: 12/17/07 17:23

Solids: 83.40 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	4.0	4.0	0.81	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.77	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.81	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.56	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.3	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.65	U
60-57-1	Dieldrin	1	4.0	4.0	0.55	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.64	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.2	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.0	8.0	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.50	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.0	37.8	95	70 - 125	
Decachlorobiphenyl	40.0	37.3	93	55 - 130	

* Values outside of QC limits

06175

ANALYSIS DATA SHEET

35SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-06 File ID: A61_103-0

Sampled: 11/14/07 10:27 Prepared: 11/27/07 06:56 Analyzed: 12/17/07 16:48

Solids: 80.59 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714305 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.44	U
319-85-7	beta-BHC	1	4.1	4.1	0.84	U
58-89-9	gamma-BHC (Lindane)	1	4.1	4.1	0.80	U
319-86-8	delta-BHC	1	4.1	4.1	1.2	U
5103-71-9	alpha-Chlordane	1	4.1	4.1	0.84	U
5103-74-2	gamma-Chlordane	1	4.1	4.1	0.58	U
72-54-8	4,4'-DDD	1	4.1	4.1	1.4	U
72-55-9	4,4'-DDE	1	4.1	4.1	1.1	U
50-29-3	4,4'-DDT	1	4.1	4.1	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.67	U
60-57-1	Dieldrin	1	4.1	4.1	0.57	U
959-98-8	Endosulfan I	1	4.1	4.1	1.1	U
33213-65-9	Endosulfan II	1	4.1	4.1	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.1	4.1	1.2	U
72-20-8	Endrin	1	4.1	4.1	0.67	U
7421-93-4	Endrin Aldehyde	1	4.1	4.1	1.3	U
53494-70-5	Endrin Ketone	1	4.1	4.1	1.3	U
76-44-8	Heptachlor	1	8.3	8.3	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.51	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	28	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	41.4	39.7	96	70 - 125	
Decachlorobiphenyl	41.4	38.9	94	55 - 130	

* Values outside of QC limits

06184

ANALYSIS DATA SHEET

DUP-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-07 File ID: A61_117-0

Sampled: 11/14/07 10:00 Prepared: 11/28/07 06:59 Analyzed: 12/18/07 01:05

Solids: 79.15 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.44	U
319-85-7	beta-BHC	1	4.2	4.2	0.85	U
58-89-9	gamma-BHC (Lindane)	1	4.2	4.2	0.81	U
319-86-8	delta-BHC	1	4.2	4.2	1.2	U
5103-71-9	alpha-Chlordane	1	4.2	4.2	0.86	U
5103-74-2	gamma-Chlordane	1	4.2	4.2	0.59	U
72-54-8	4,4'-DDD	1	4.2	4.2	1.4	U
72-55-9	4,4'-DDE	1	4.2	4.2	1.1	U
50-29-3	4,4'-DDT	1	4.2	4.2	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.69	U
60-57-1	Dieldrin	1	4.2	4.2	0.58	U
959-98-8	Endosulfan I	1	4.2	4.2	1.1	U
33213-65-9	Endosulfan II	1	4.2	4.2	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.2	4.2	1.3	U
72-20-8	Endrin	1	4.2	4.2	0.68	U
7421-93-4	Endrin Aldehyde	1	4.2	4.2	1.3	U
53494-70-5	Endrin Ketone	1	4.2	4.2	1.3	U
76-44-8	Heptachlor	1	8.5	8.5	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.52	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	28	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	42.1	33.6	80	70 - 125	
Decachlorobiphenyl	42.1	32.5	77	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

35SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-08 File ID: A61_116-0

Sampled: 11/14/07 11:05 Prepared: 11/28/07 06:59 Analyzed: 12/18/07 00:30

Solids: 80.71 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.43	U
319-85-7	beta-BHC	1	4.1	4.1	0.83	U
58-89-9	gamma-BHC (Lindane)	1	4.1	4.1	0.80	U
319-86-8	delta-BHC	1	4.1	4.1	1.2	U
5103-71-9	alpha-Chlordane	1	4.1	4.1	0.84	U
5103-74-2	gamma-Chlordane	1	4.1	4.1	0.58	U
72-54-8	4,4'-DDD	1	4.1	4.1	1.4	U
72-55-9	4,4'-DDE	1	4.1	4.1	1.1	U
50-29-3	4,4'-DDT	1	4.1	4.1	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.67	U
60-57-1	Dieldrin	1	4.1	4.1	0.57	U
959-98-8	Endosulfan I	1	4.1	4.1	1.1	U
33213-65-9	Endosulfan II	1	4.1	4.1	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.1	4.1	1.2	U
72-20-8	Endrin	1	4.1	4.1	0.66	U
7421-93-4	Endrin Aldehyde	1	4.1	4.1	1.3	U
53494-70-5	Endrin Ketone	1	4.1	4.1	1.3	U
76-44-8	Heptachlor	1	8.3	8.3	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.51	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	28	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	41.3	29.4	71	70 - 125	
Decachlorobiphenyl	41.3	28.8	70	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

35SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-09 File ID: A61_115-0

Sampled: 11/14/07 11:15 Prepared: 11/28/07 06:59 Analyzed: 12/17/07 23:54

Solids: 82.15 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.43	U
319-85-7	beta-BHC	1	4.0	4.0	0.82	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.78	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.83	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.57	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.4	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.66	U
60-57-1	Dieldrin	1	4.0	4.0	0.56	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.65	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.3	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.2	8.2	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.50	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.6	39.6	98	70 - 125	
Decachlorobiphenyl	40.6	39.1	96	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

35SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-10 File ID: A61_114-0

Sampled: 11/14/07 11:20 Prepared: 11/28/07 06:59 Analyzed: 12/17/07 23:19

Solids: 81.09 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.43	U
319-85-7	beta-BHC	1	4.1	4.1	0.83	U
58-89-9	gamma-BHC (Lindane)	1	4.1	4.1	0.79	U
319-86-8	delta-BHC	1	4.1	4.1	1.2	U
5103-71-9	alpha-Chlordane	1	4.1	4.1	0.84	U
5103-74-2	gamma-Chlordane	1	4.1	4.1	0.58	U
72-54-8	4,4'-DDD	1	4.1	4.1	1.4	U
72-55-9	4,4'-DDE	1	4.1	4.1	1.1	U
50-29-3	4,4'-DDT	1	4.1	4.1	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.67	U
60-57-1	Dieldrin	1	4.1	4.1	0.57	U
959-98-8	Endosulfan I	1	4.1	4.1	1.1	U
33213-65-9	Endosulfan II	1	4.1	4.1	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.1	4.1	1.2	U
72-20-8	Endrin	1	4.1	4.1	0.66	U
7421-93-4	Endrin Aldehyde	1	4.1	4.1	1.3	U
53494-70-5	Endrin Ketone	1	4.1	4.1	1.3	U
76-44-8	Heptachlor	1	8.3	8.3	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.51	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	28	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	41.1	40.4	98	70 - 125	
Decachlorobiphenyl	41.1	39.5	96	55 - 130	

* Values outside of QC limits

: 06228

ANALYSIS DATA SHEET

37SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-13 File ID: A61_113-0

Sampled: 11/14/07 13:45 Prepared: 11/28/07 06:59 Analyzed: 12/17/07 22:43

Solids: 50.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	3.4	3.4	0.70	U UL,S
319-85-7	beta-BHC	1	6.6	6.6	1.3	U
58-89-9	gamma-BHC (Lindane)	1	6.6	6.6	1.3	U
319-86-8	delta-BHC	1	6.6	6.6	1.9	U
5103-71-9	alpha-Chlordane	1	6.6	6.6	1.4	U
5103-74-2	gamma-Chlordane	1	6.6	6.6	0.94	U
72-54-8	4,4'-DDD	1	6.6	6.6	2.2	U
72-55-9	4,4'-DDE	1	6.6	6.6	1.8	U
50-29-3	4,4'-DDT	1	6.6	6.6	2.1	U
309-00-2	Aldrin	1	3.4	3.4	1.1	U
60-57-1	Dieldrin	1	6.6	6.6	0.92	U
959-98-8	Endosulfan I	1	6.6	6.6	1.8	U
33213-65-9	Endosulfan II	1	6.6	6.6	1.7	U
1031-07-8	Endosulfan Sulfate	1	6.6	6.6	2.0	U UL,S
72-20-8	Endrin	1	8.3	6.6	1.1	L,S
7421-93-4	Endrin Aldehyde	1	6.6	6.6	2.1	U UL,S
53494-70-5	Endrin Ketone	1	6.6	6.6	2.0	U
76-44-8	Heptachlor	1	13	13	2.4	U
1024-57-3	Heptachlor Epoxide	1	3.4	3.4	0.83	U
72-43-5	Methoxychlor	1	34	34	2.6	U
8001-35-2	Toxaphene	1	340	340	45	U UL,S

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	66.7	39.1	59	70 - 125	*
Decachlorobiphenyl	66.7	39.3	59	55 - 130	

* Values outside of QC limits

06237

ANALYSIS DATA SHEET

37SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-14 File ID: A61_112-0

Sampled: 11/14/07 13:47 Prepared: 11/28/07 06:59 Analyzed: 12/17/07 22:08

Solids: 83.28 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	4.0	4.0	0.81	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.77	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.81	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.56	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.3	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.65	U
60-57-1	Dieldrin	1	4.0	4.0	0.55	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.64	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.2	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.0	8.0	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.50	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.0	39.2	98	70 - 125	
Decachlorobiphenyl	40.0	38.5	96	55 - 130	

* Values outside of QC limits

: 06254

ANALYSIS DATA SHEET

37SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-15 File ID: A61_111-0

Sampled: 11/14/07 13:47 Prepared: 11/28/07 06:59 Analyzed: 12/17/07 21:32

Solids: 85.90 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121830 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.8	3.8	0.78	U
58-89-9	gamma-BHC (Lindane)	1	3.8	3.8	0.75	U
319-86-8	delta-BHC	1	3.8	3.8	1.1	U
5103-71-9	alpha-Chlordane	1	3.8	3.8	0.79	U
5103-74-2	gamma-Chlordane	1	3.8	3.8	0.55	U
72-54-8	4,4'-DDD	1	3.8	3.8	1.3	U
72-55-9	4,4'-DDE	1	3.8	3.8	1.0	U
50-29-3	4,4'-DDT	1	3.8	3.8	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.63	U
60-57-1	Dieldrin	1	3.8	3.8	0.54	U
959-98-8	Endosulfan I	1	3.8	3.8	1.0	U
33213-65-9	Endosulfan II	1	3.8	3.8	0.99	U
1031-07-8	Endosulfan Sulfate	1	3.8	3.8	1.2	U
72-20-8	Endrin	1	3.8	3.8	0.62	U
7421-93-4	Endrin Aldehyde	1	3.8	3.8	1.2	U
53494-70-5	Endrin Ketone	1	3.8	3.8	1.2	U
76-44-8	Heptachlor	1	7.8	7.8	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.48	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	38.8	27.8	72	70 - 125	
Decachlorobiphenyl	38.8	27.2	70	55 - 130	

* Values outside of QC limits

: 06263

ANALYSIS DATA SHEET

37SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-16 File ID: A61_125-0

Sampled: 11/14/07 14:30 Prepared: 11/28/07 06:59 Analyzed: 12/18/07 05:50

Solids: 48.28 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121833 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	3.5	3.5	0.73	U
319-85-7	beta-BHC	1	6.8	6.8	1.4	U
58-89-9	gamma-BHC (Lindane)	1	6.8	6.8	1.3	U
319-86-8	delta-BHC	1	6.8	6.8	1.9	U
5103-71-9	alpha-Chlordane	1	6.8	6.8	1.4	U
5103-74-2	gamma-Chlordane	1	6.8	6.8	0.97	U
72-54-8	4,4'-DDD	1	6.8	6.8	2.3	U
72-55-9	4,4'-DDE	1	6.8	6.8	1.9	U
50-29-3	4,4'-DDT	1	6.8	6.8	2.1	U
309-00-2	Aldrin	1	3.5	3.5	1.1	U
60-57-1	Dieldrin	1	6.8	6.8	0.95	U
959-98-8	Endosulfan I	1	6.8	6.8	1.9	U
33213-65-9	Endosulfan II	1	6.8	6.8	1.8	U
1031-07-8	Endosulfan Sulfate	1	6.8	6.8	2.1	U
72-20-8	Endrin	1	4.8	6.8	1.1	J
7421-93-4	Endrin Aldehyde	1	6.8	6.8	2.2	U
53494-70-5	Endrin Ketone	1	6.8	6.8	2.1	U
76-44-8	Heptachlor	1	14	14	2.5	U
1024-57-3	Heptachlor Epoxide	1	3.5	3.5	0.86	U
72-43-5	Methoxychlor	1	35	35	2.7	U
8001-35-2	Toxaphene	1	350	350	46	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	69.0	48.9	71	70 - 125	
Decachlorobiphenyl	69.0	46.9	68	55 - 130	

* Values outside of QC limits

: 06272

ANALYSIS DATA SHEET

37SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-17 File ID: A61_126-0

Sampled: 11/14/07 14:30 Prepared: 11/28/07 06:59 Analyzed: 12/18/07 06:26

Solids: 85.35 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121833 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.9	3.9	0.79	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.75	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.79	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.55	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	3.9	3.9	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.64	U
60-57-1	Dieldrin	1	3.9	3.9	0.54	U
959-98-8	Endosulfan I	1	3.9	3.9	1.0	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.63	U
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	7.9	7.9	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.49	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.1	39.3	101	70 - 125	
Decachlorobiphenyl	39.1	37.6	96	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

37SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-18 File ID: A61_127-0

Sampled: 11/14/07 14:35 Prepared: 11/28/07 06:59 Analyzed: 12/18/07 07:01

Solids: 84.43 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121833 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	3.9	3.9	0.80	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.76	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.80	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.56	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	3.9	3.9	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.64	U
60-57-1	Dieldrin	1	3.9	3.9	0.55	U
959-98-8	Endosulfan I	1	3.9	3.9	1.1	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.63	U
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	7.9	7.9	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.49	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.5	38.5	98	70 - 125	
Decachlorobiphenyl	39.5	36.9	94	55 - 130	

* Values outside of QC limits

06290

ANALYSIS DATA SHEET

DUP-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-19 File ID: A61_128-0

Sampled: 11/14/07 14:00 Prepared: 11/28/07 06:59 Analyzed: 12/18/07 07:37

Solids: 60.13 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121833 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.8	2.8	0.58	U
319-85-7	beta-BHC	1	5.5	5.5	1.1	U
58-89-9	gamma-BHC (Lindane)	1	5.5	5.5	1.1	U
319-86-8	delta-BHC	1	5.5	5.5	1.6	U
5103-71-9	alpha-Chlordane	1	5.5	5.5	1.1	U
5103-74-2	gamma-Chlordane	1	5.5	5.5	0.78	U
72-54-8	4,4'-DDD	1	5.5	5.5	1.9	U
72-55-9	4,4'-DDE	1	5.5	5.5	1.5	U
50-29-3	4,4'-DDT	1	5.5	5.5	1.7	U
309-00-2	Aldrin	1	2.8	2.8	0.90	U
60-57-1	Dieldrin	1	5.5	5.5	0.77	U
959-98-8	Endosulfan I	1	5.5	5.5	1.5	U
33213-65-9	Endosulfan II	1	5.5	5.5	1.4	U
1031-07-8	Endosulfan Sulfate	1	5.5	5.5	1.7	U
72-20-8	Endrin	1	2.2	5.5	0.89	J JJ
7421-93-4	Endrin Aldehyde	1	5.5	5.5	1.7	U
53494-70-5	Endrin Ketone	1	5.5	5.5	1.7	U
76-44-8	Heptachlor	1	11	11	2.0	U
1024-57-3	Heptachlor Epoxide	1	2.8	2.8	0.69	U
72-43-5	Methoxychlor	1	28	28	2.1	U
8001-35-2	Toxaphene	1	280	280	37	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	55.4	43.0	78	70 - 125	
Decachlorobiphenyl	55.4	42.7	77	55 - 130	

* Values outside of QC limits

06299

ANALYSIS DATA SHEET

37SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-20 File ID: A61_129-0

Sampled: 11/14/07 15:10 Prepared: 11/28/07 06:59 Analyzed: 12/18/07 08:12

Solids: 49.06 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121833 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	3.5	3.5	0.72	U UL,S
319-85-7	beta-BHC	1	6.7	6.7	1.4	U
58-89-9	gamma-BHC (Lindane)	1	6.7	6.7	1.3	U
319-86-8	delta-BHC	1	6.7	6.7	1.9	U
5103-71-9	alpha-Chlordane	1	6.7	6.7	1.4	U
5103-74-2	gamma-Chlordane	1	6.7	6.7	0.96	U
72-54-8	4,4'-DDD	1	6.7	6.7	2.3	U
72-55-9	4,4'-DDE	1	6.7	6.7	1.8	U
50-29-3	4,4'-DDT	1	6.7	6.7	2.1	U
309-00-2	Aldrin	1	3.5	3.5	1.1	U
60-57-1	Dieldrin	1	6.7	6.7	0.94	U
959-98-8	Endosulfan I	1	6.7	6.7	1.8	U
33213-65-9	Endosulfan II	1	6.7	6.7	1.7	U
1031-07-8	Endosulfan Sulfate	1	6.7	6.7	2.0	U UL,S
72-20-8	Endrin	1	8.2	6.7	1.1	L,S
7421-93-4	Endrin Aldehyde	1	6.7	6.7	2.1	U UL,S
53494-70-5	Endrin Ketone	1	6.7	6.7	2.1	U
76-44-8	Heptachlor	1	14	14	2.5	U
1024-57-3	Heptachlor Epoxide	1	3.5	3.5	0.84	U
72-43-5	Methoxychlor	1	35	35	2.6	U
8001-35-2	Toxaphene	1	350	350	46	U UL,S

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	67.9	32.2	47	70 - 125	*
Decachlorobiphenyl	67.9	31.3	46	55 - 130	*

* Values outside of QC limits

ANALYSIS DATA SHEET

37SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-21 File ID: A61_130-0

Sampled: 11/14/07 15:15 Prepared: 11/28/07 06:59 Analyzed: 12/18/07 08:48

Solids: 84.67 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7121833 Calibration: 7L17005 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.9	3.9	0.79	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.76	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.80	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.56	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	3.9	3.9	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.64	U
60-57-1	Dieldrin	1	3.9	3.9	0.54	U
959-98-8	Endosulfan I	1	3.9	3.9	1.1	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.63	U
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	7.9	7.9	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.49	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.4	37.8	96	70 - 125	
Decachlorobiphenyl	39.4	36.3	92	55 - 130	

* Values outside of QC limits

: 06325

ANALYSIS DATA SHEET

37SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-22 File ID: A61_344-0

Sampled: 11/14/07 15:15 Prepared: 11/28/07 06:59 Analyzed: 12/24/07 22:48

Solids: 83.78 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	3.9	3.9	0.80	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.77	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.81	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.56	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	3.9	3.9	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.65	U
60-57-1	Dieldrin	1	3.9	3.9	0.55	U
959-98-8	Endosulfan I	1	3.9	3.9	1.1	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.64	U
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	8.0	8.0	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.49	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.8	38.6	97	70 - 125	
Decachlorobiphenyl	39.8	35.3	89	55 - 130	

* Values outside of QC limits

: 06334

ANALYSIS DATA SHEET

EQBK-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Water Laboratory ID: 0711377-23 File ID: A59_453-0

Sampled: 11/14/07 16:00 Prepared: 11/16/07 07:11 Analyzed: 11/29/07 06:35

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0713952 Sequence: 7113009 Calibration: 7K30006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.0062	0.10	0.0023	J J, P
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.137	73	25 - 140	
Decachlorobiphenyl	0.189	0.166	88	30 - 135	

* Values outside of QC limits

: 06343

SAMPLE ID SUMMARY

USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42

Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35SB3A	0711293-01
EQBK-1	0711313-01
35SB4A	0711313-03
DUP-1	0711313-04
35SB1A	0711313-05
35SB2A	0711313-06
35SB6A	0711313-07
35SB6B	0711313-08
35SB6C	0711313-09
35SB9A	0711313-10
35SB9B	0711313-11
35SB9C	0711313-12
35SB10A	0711313-13
35SB10B	0711313-14
35SB10C	0711313-15
35SB7A	0711377-01
35SB7B	0711377-02
35SB7C	0711377-03
35SB5A	0711377-04
~~35SB5A~~	~~0711377-04RE1~~ wm 1/14/08
35SB5B	0711377-05
35SB5C	0711377-06
DUP-2	0711377-07
35SB8A	0711377-08
35SB8B	0711377-09
35SB8C	0711377-10
37SB10A	0711377-13
37SB10B	0711377-14
37SB10C	0711377-15
37SB9A	0711377-16
37SB9B	0711377-17
37SB9C	0711377-18
DUP-3	0711377-19
37SB7A	0711377-20
37SB7B	0711377-21
37SB7C	0711377-22
EQBK-2	0711377-23

ANALYSIS DATA SHEET

35SB3A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711293-01 File ID: A189124-0

Sampled: 11/12/07 16:06 Prepared: 11/26/07 06:56 Analyzed: 12/03/07 08:38

Solids: 90.68 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	36	36	4.6	U
11104-28-2	PCB-1221	1	36	36	8.2	U
11141-16-5	PCB-1232	1	36	36	9.3	U
53469-21-9	PCB-1242	1	74	74	18	U
12672-29-6	PCB-1248	1	36	36	5.8	U
11097-69-1	PCB-1254	1	320	36	4.9	
11096-82-5	PCB-1260	1	74	74	18	U
37324-23-5	PCB-1262	1	36	36	5.7	U
11100-14-4	PCB-1268	1	36	36	4.9	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		36.8	31.9	87	60 - 125	
Tetrachloro-m-xylene		36.8	31.6	86	32 - 129	

* Values outside of QC limits

04717

ANALYSIS DATA SHEET

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Water Laboratory ID: 0711313-01 File ID: A189127-0

Sampled: 11/13/07 16:00 Prepared: 11/16/07 07:12 Analyzed: 12/03/07 09:29

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1050 mL / 2 mL

QC Batch: 0713953 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.190	0.195	103	40 - 135	
Tetrachloro-m-xylene		0.190	0.162	85	36 - 114	

* Values outside of QC limits

04726

ANALYSIS DATA SHEET

35SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-03 File ID: A190042-0

Sampled: 11/13/07 07:50 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 19:07

Solids: 83.30 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.0	U
11104-28-2	PCB-1221	1	40	40	8.9	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	80	80	20	U
12672-29-6	PCB-1248	1	40	40	6.4	U
11097-69-1	PCB-1254	1	69	40	5.3	
11096-82-5	PCB-1260	1	80	80	19	U
37324-23-5	PCB-1262	1	40	40	6.2	U
11100-14-4	PCB-1268	1	40	40	5.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.0	28.6	72	60 - 125	
Tetrachloro-m-xylene		40.0	27.0	68	32 - 129	

* Values outside of QC limits

04735

ANALYSIS DATA SHEET

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-04 File ID: A190043-0

Sampled: 11/13/07 08:00 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 19:24

Solids: 83.87 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	5.0	U
11104-28-2	PCB-1221	1	39	39	8.8	U
11141-16-5	PCB-1232	1	39	39	10	U
53469-21-9	PCB-1242	1	80	80	19	U
12672-29-6	PCB-1248	1	39	39	6.3	U
11097-69-1	PCB-1254	1	170	39	5.2	
11096-82-5	PCB-1260	1	80	80	19	U
37324-23-5	PCB-1262	1	39	39	6.2	U
11100-14-4	PCB-1268	1	39	39	5.2	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.7	29.0	73	60 - 125	
Tetrachloro-m-xylene		39.7	29.2	74	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

35SB1A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-05 File ID: A190044-0

Sampled: 11/13/07 08:25 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 19:42

Solids: 85.50 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	4.9	U
11104-28-2	PCB-1221	1	39	39	8.7	U
11141-16-5	PCB-1232	1	39	39	9.8	U
53469-21-9	PCB-1242	1	78	78	19	U
12672-29-6	PCB-1248	1	39	39	6.2	U
11097-69-1	PCB-1254	1	32	39	5.1	J J,5
11096-82-5	PCB-1260	1	78	78	19	U
37324-23-5	PCB-1262	1	39	39	6.1	U
11100-14-4	PCB-1268	1	39	39	5.1	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.0	33.9	87	60 - 125	
Tetrachloro-m-xylene		39.0	33.1	85	32 - 129	

* Values outside of QC limits

04753

ANALYSIS DATA SHEET

35SB2A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-06 File ID: A190045-0

Sampled: 11/13/07 09:20 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 19:59

Solids: 83.07 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.1	U
11104-28-2	PCB-1221	1	40	40	8.9	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	81	81	20	U
12672-29-6	PCB-1248	1	40	40	6.4	U
11097-69-1	PCB-1254	1	350	40	5.3	
11096-82-5	PCB-1260	1	81	81	19	U
37324-23-5	PCB-1262	1	40	40	6.3	U
11100-14-4	PCB-1268	1	40	40	5.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.1	27.0	67	60 - 125	
Tetrachloro-m-xylene		40.1	27.6	69	32 - 129	

* Values outside of QC limits

04762

ANALYSIS DATA SHEET

35SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-07 File ID: A190099-0

Sampled: 11/13/07 14:45 Prepared: 11/27/07 06:56 Analyzed: 12/07/07 13:43

Solids: 58.85 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 8010337 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	2	110	110	14	U UL,S
11104-28-2	PCB-1221	2	110	110	25	U
11141-16-5	PCB-1232	2	110	110	29	U
53469-21-9	PCB-1242	2	230	230	55	U
12672-29-6	PCB-1248	2	110	110	18	U UL,S
11097-69-1	PCB-1254	2	1700	110	15	L,S
11096-82-5	PCB-1260	2	800	230	54	L,S
37324-23-5	PCB-1262	2	110	110	18	U UL,S
11100-14-4	PCB-1268	2	110	110	15	U UL,S
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		56.6	25.7	45	60 - 125	*
Tetrachloro-m-xylene		56.6	29.0	51	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

35SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-08 File ID: A190047-0

Sampled: 11/13/07 14:55 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 20:33

Solids: 85.50 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	4.9	U
11104-28-2	PCB-1221	1	39	39	8.7	U
11141-16-5	PCB-1232	1	39	39	9.8	U
53469-21-9	PCB-1242	1	78	78	19	U
12672-29-6	PCB-1248	1	39	39	6.2	U
11097-69-1	PCB-1254	1	39	39	5.1	U
11096-82-5	PCB-1260	1	78	78	19	U
37324-23-5	PCB-1262	1	39	39	6.1	U
11100-14-4	PCB-1268	1	39	39	5.1	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.0	34.9	89	60 - 125	
Tetrachloro-m-xylene		39.0	35.4	91	32 - 129	

* Values outside of QC limits

04788

ANALYSIS DATA SHEET

35SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-09 File ID: A190048-0

Sampled: 11/13/07 15:05 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 20:50

Solids: 82.70 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.1	U
11104-28-2	PCB-1221	1	40	40	8.9	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	81	81	20	U
12672-29-6	PCB-1248	1	40	40	6.4	U
11097-69-1	PCB-1254	1	40	40	5.3	U
11096-82-5	PCB-1260	1	81	81	19	U
37324-23-5	PCB-1262	1	40	40	6.3	U
11100-14-4	PCB-1268	1	40	40	5.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.3	37.3	93	60 - 125	
Tetrachloro-m-xylene		40.3	32.0	79	32 - 129	

* Values outside of QC limits

: 04797

ANALYSIS DATA SHEET

35SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-10 File ID: A190049-0

Sampled: 11/13/07 10:45 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 21:08

Solids: 73.11 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	45	45	5.7	U UL,S
11104-28-2	PCB-1221	1	45	45	10	U
11141-16-5	PCB-1232	1	45	45	11	U
53469-21-9	PCB-1242	1	92	92	22	U
12672-29-6	PCB-1248	1	45	45	7.2	U UL,S
11097-69-1	PCB-1254	1	330	45	6.0	J,g
11096-82-5	PCB-1260	1	92	92	22	U UL,S
37324-23-5	PCB-1262	1	45	45	7.1	U
11100-14-4	PCB-1268	1	45	45	6.0	U UL,S
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		45.6	21.5	47	60 - 125	*
Tetrachloro-m-xylene		45.6	25.5	56	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

35SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-11 File ID: A190051-0

Sampled: 11/13/07 12:10 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 21:42

Solids: 66.50 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	50	50	6.3	U
11104-28-2	PCB-1221	1	50	50	11	U
11141-16-5	PCB-1232	1	50	50	13	U
53469-21-9	PCB-1242	1	100	100	25	U
12672-29-6	PCB-1248	1	50	50	8.0	U
11097-69-1	PCB-1254	1	150	50	6.6	
11096-82-5	PCB-1260	1	100	100	24	U
37324-23-5	PCB-1262	1	50	50	7.8	U
11100-14-4	PCB-1268	1	50	50	6.6	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		50.1	39.0	78	60 - 125	
Tetrachloro-m-xylene		50.1	38.2	76	32 - 129	

* Values outside of QC limits

: 04823

ANALYSIS DATA SHEET

35SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-12 File ID: A190052-0

Sampled: 11/13/07 12:00 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 21:59

Solids: 80.30 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	41	41	5.2	U
11104-28-2	PCB-1221	1	41	41	9.2	U
11141-16-5	PCB-1232	1	41	41	10	U
53469-21-9	PCB-1242	1	83	83	20	U
12672-29-6	PCB-1248	1	41	41	6.6	U
11097-69-1	PCB-1254	1	20	41	5.5	J J19
11096-82-5	PCB-1260	1	83	83	20	U
37324-23-5	PCB-1262	1	41	41	6.5	U
11100-14-4	PCB-1268	1	41	41	5.5	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	41.5	36.5	88	60 - 125	
Tetrachloro-m-xylene	41.5	36.8	89	32 - 129	

* Values outside of QC limits

046832

ANALYSIS DATA SHEET

35SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-13 File ID: A190053-0

Sampled: 11/13/07 13:30 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 22:17

Solids: 50.60 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	65	65	8.3	U
11104-28-2	PCB-1221	1	65	65	15	U
11141-16-5	PCB-1232	1	65	65	17	U
53469-21-9	PCB-1242	1	130	130	32	U
12672-29-6	PCB-1248	1	65	65	10	U
11097-69-1	PCB-1254	1	590	65	8.7	
11096-82-5	PCB-1260	1	130	130	31	U
37324-23-5	PCB-1262	1	65	65	10	U
11100-14-4	PCB-1268	1	65	65	8.7	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		65.9	42.4	64	60 - 125	
Tetrachloro-m-xylene		65.9	40.6	62	32 - 129	

* Values outside of QC limits

: 04841

ANALYSIS DATA SHEET

35SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-14 File ID: A190054-0

Sampled: 11/13/07 13:38 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 22:34

Solids: 86.20 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	38	38	4.9	U
11104-28-2	PCB-1221	1	38	38	8.6	U
11141-16-5	PCB-1232	1	38	38	9.7	U
53469-21-9	PCB-1242	1	78	78	19	U
12672-29-6	PCB-1248	1	38	38	6.1	U
11097-69-1	PCB-1254	1	21	38	5.1	J
11096-82-5	PCB-1260	1	78	78	18	U
37324-23-5	PCB-1262	1	38	38	6.0	U
11100-14-4	PCB-1268	1	38	38	5.1	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		38.7	35.4	91	60 - 125	
Tetrachloro-m-xylene		38.7	35.2	91	32 - 129	

* Values outside of QC limits

: 04858

ANALYSIS DATA SHEET

35SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711313-15 File ID: A190055-0

Sampled: 11/13/07 13:45 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 22:51

Solids: 82.40 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.1	U
11104-28-2	PCB-1221	1	40	40	9.0	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	81	81	20	U
12672-29-6	PCB-1248	1	40	40	6.4	U
11097-69-1	PCB-1254	1	120	40	5.3	
11096-82-5	PCB-1260	1	81	81	19	U
37324-23-5	PCB-1262	1	40	40	6.3	U
11100-14-4	PCB-1268	1	40	40	5.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.5	30.7	76	60 - 125	
Tetrachloro-m-xylene		40.5	32.7	81	32 - 129	

* Values outside of QC limits

04867

ANALYSIS DATA SHEET

35SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-01 File ID: A190056-0

Sampled: 11/14/07 08:00 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 23:08

Solids: 53.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	62	62	7.9	U
11104-28-2	PCB-1221	1	62	62	14	U
11141-16-5	PCB-1232	1	62	62	16	U
53469-21-9	PCB-1242	1	130	130	31	U
12672-29-6	PCB-1248	1	62	62	10	U
11097-69-1	PCB-1254	1	580	62	8.3	J,g
11096-82-5	PCB-1260	1	130	130	30	U
37324-23-5	PCB-1262	1	62	62	9.8	U
11100-14-4	PCB-1268	1	62	62	8.3	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	62.9	37.4	60	60 - 125	
Tetrachloro-m-xylene	62.9	44.5	71	32 - 129	

* Values outside of QC limits

04876

ANALYSIS DATA SHEET

35SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-02 File ID: A190057-0

Sampled: 11/14/07 08:08 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 23:26

Solids: 87.70 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	38	38	4.8	U
11104-28-2	PCB-1221	1	38	38	8.4	U
11141-16-5	PCB-1232	1	38	38	9.6	U
53469-21-9	PCB-1242	1	76	76	19	U
12672-29-6	PCB-1248	1	38	38	6.0	U
11097-69-1	PCB-1254	1	38	38	5.0	U
11096-82-5	PCB-1260	1	76	76	18	U
37324-23-5	PCB-1262	1	38	38	5.9	U
11100-14-4	PCB-1268	1	38	38	5.0	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		38.0	34.5	91	60 - 125	
Tetrachloro-m-xylene		38.0	34.3	90	32 - 129	

* Values outside of QC limits

04893

ANALYSIS DATA SHEET

35SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-03 File ID: A190058-0

Sampled: 11/14/07 08:25 Prepared: 11/27/07 06:56 Analyzed: 12/06/07 23:43

Solids: 86.50 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	38	38	4.9	U
11104-28-2	PCB-1221	1	38	38	8.6	U
11141-16-5	PCB-1232	1	38	38	9.7	U
53469-21-9	PCB-1242	1	77	77	19	U
12672-29-6	PCB-1248	1	38	38	6.1	U
11097-69-1	PCB-1254	1	56	38	5.1	
11096-82-5	PCB-1260	1	77	77	18	U
37324-23-5	PCB-1262	1	38	38	6.0	U
11100-14-4	PCB-1268	1	38	38	5.1	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		38.5	28.7	75	60 - 125	
Tetrachloro-m-xylene		38.5	29.8	77	32 - 129	

* Values outside of QC limits

: 04982

ANALYSIS DATA SHEET

35SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-04 File ID: A190059-0

Sampled: 11/14/07 10:10 Prepared: 11/27/07 06:56 Analyzed: 12/07/07 00:00

Solids: 80.90 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	41	41	5.2	U UL,S
11104-28-2	PCB-1221	1	41	41	9.1	U
11141-16-5	PCB-1232	1	41	41	10	U
53469-21-9	PCB-1242	1	83	83	20	U
12672-29-6	PCB-1248	1	41	41	6.6	U UL,S
11097-69-1	PCB-1254	1	88	41	5.4	J,P
11096-82-5	PCB-1260	1	83	83	20	U UL,S
37324-23-5	PCB-1262	1	41	41	6.4	U
11100-14-4	PCB-1268	1	41	41	5.4	U UL,S
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		41.2	22.4	54	60 - 125	*
Tetrachloro-m-xylene		41.2	22.0	53	32 - 129	

* Values outside of QC limits

04911

ANALYSIS DATA SHEET

35SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-05 File ID: A190060-0

Sampled: 11/14/07 10:23 Prepared: 11/27/07 06:56 Analyzed: 12/07/07 00:17

Solids: 83.40 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.0	U
11104-28-2	PCB-1221	1	40	40	8.9	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	80	80	20	U
12672-29-6	PCB-1248	1	40	40	6.4	U
11097-69-1	PCB-1254	1	40	40	5.3	U
11096-82-5	PCB-1260	1	80	80	19	U
37324-23-5	PCB-1262	1	40	40	6.2	U
11100-14-4	PCB-1268	1	40	40	5.3	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	40.0	34.4	86	60 - 125	
Tetrachloro-m-xylene	40.0	36.3	91	32 - 129	

* Values outside of QC limits

: 04528

ANALYSIS DATA SHEET

35SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-06 File ID: A190062-0

Sampled: 11/14/07 10:27 Prepared: 11/27/07 06:56 Analyzed: 12/07/07 00:52

Solids: 80.60 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714306 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	41	41	5.2	U
11104-28-2	PCB-1221	1	41	41	9.2	U
11141-16-5	PCB-1232	1	41	41	10	U
53469-21-9	PCB-1242	1	83	83	20	U
12672-29-6	PCB-1248	1	41	41	6.6	U
11097-69-1	PCB-1254	1	41	41	5.5	U
11096-82-5	PCB-1260	1	83	83	20	U
37324-23-5	PCB-1262	1	41	41	6.5	U
11100-14-4	PCB-1268	1	41	41	5.5	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		41.4	36.7	89	60 - 125	
Tetrachloro-m-xylene		41.4	39.0	94	32 - 129	

* Values outside of QC limits

04937

ANALYSIS DATA SHEET

DUP-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-07 File ID: A189139-0

Sampled: 11/14/07 10:00 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 12:56

Solids: 79.15 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	42	42	5.3	U
11104-28-2	PCB-1221	1	42	42	9.3	U
11141-16-5	PCB-1232	1	42	42	11	U
53469-21-9	PCB-1242	1	85	85	21	U
12672-29-6	PCB-1248	1	42	42	6.7	U
11097-69-1	PCB-1254	1	260	42	5.6	J,f
11096-82-5	PCB-1260	1	85	85	20	U
37324-23-5	PCB-1262	1	42	42	6.6	U
11100-14-4	PCB-1268	1	42	42	5.6	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	42.1	32.5	77	60 - 125	
Tetrachloro-m-xylene	42.1	33.2	79	32 - 129	

* Values outside of QC limits

64946

ANALYSIS DATA SHEET

35SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-08 File ID: A189140-0

Sampled: 11/14/07 11:05 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 13:13

Solids: 80.71 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	41	41	5.2	U
11104-28-2	PCB-1221	1	41	41	9.2	U
11141-16-5	PCB-1232	1	41	41	10	U
53469-21-9	PCB-1242	1	83	83	20	U
12672-29-6	PCB-1248	1	41	41	6.6	U
11097-69-1	PCB-1254	1	300	41	5.5	
11096-82-5	PCB-1260	1	83	83	20	U
37324-23-5	PCB-1262	1	41	41	6.4	U
11100-14-4	PCB-1268	1	41	41	5.5	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	41.3	28.7	69	60 - 125	
Tetrachloro-m-xylene	41.3	29.0	70	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

35SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-09 File ID: A189141-0

Sampled: 11/14/07 11:15 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 13:31

Solids: 82.20 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.1	U
11104-28-2	PCB-1221	1	40	40	9.0	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	82	82	20	U
12672-29-6	PCB-1248	1	40	40	6.4	U
11097-69-1	PCB-1254	1	16	40	5.4	J
11096-82-5	PCB-1260	1	82	82	19	U
37324-23-5	PCB-1262	1	40	40	6.3	U
11100-14-4	PCB-1268	1	40	40	5.4	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.6	38.9	96	60 - 125	
Tetrachloro-m-xylene		40.6	38.0	94	32 - 129	

* Values outside of QC limits

04972

ANALYSIS DATA SHEET

35SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-10 File ID: A189142-0

Sampled: 11/14/07 11:20 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 13:48

Solids: 81.10 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	41	41	5.2	U
11104-28-2	PCB-1221	1	41	41	9.1	U
11141-16-5	PCB-1232	1	41	41	10	U
53469-21-9	PCB-1242	1	83	83	20	U
12672-29-6	PCB-1248	1	41	41	6.5	U
11097-69-1	PCB-1254	1	26	41	5.4	J
11096-82-5	PCB-1260	1	83	83	20	U
37324-23-5	PCB-1262	1	41	41	6.4	U
11100-14-4	PCB-1268	1	41	41	5.4	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		41.1	41.4	101	60 - 125	
Tetrachloro-m-xylene		41.1	39.6	96	32 - 129	

* Values outside of QC limits

04981

ANALYSIS DATA SHEET

37SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-13 File ID: A189144-0

Sampled: 11/14/07 13:45 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 14:22

Solids: 50.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	66	66	8.4	U UL,S
11104-28-2	PCB-1221	1	66	66	15	U
11141-16-5	PCB-1232	1	66	66	17	U
53469-21-9	PCB-1242	1	130	130	33	U
12672-29-6	PCB-1248	1	66	66	11	U UL,S
11097-69-1	PCB-1254	1	1000	66	8.8	L,S
11096-82-5	PCB-1260	1	130	130	32	U UL,S
37324-23-5	PCB-1262	1	66	66	10	U
11100-14-4	PCB-1268	1	66	66	8.8	U UL,S
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		66.7	39.1	59	60 - 125	*
Tetrachloro-m-xylene		66.7	39.5	59	32 - 129	

* Values outside of QC limits

04996

ANALYSIS DATA SHEET

37SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-14 File ID: A189145-0

Sampled: 11/14/07 13:47 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 14:39

Solids: 83.30 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.0	U
11104-28-2	PCB-1221	1	40	40	8.9	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	80	80	20	U
12672-29-6	PCB-1248	1	40	40	6.4	U
11097-69-1	PCB-1254	1	40	40	5.3	U
11096-82-5	PCB-1260	1	80	80	19	U
37324-23-5	PCB-1262	1	40	40	6.2	U
11100-14-4	PCB-1268	1	40	40	5.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.0	39.5	99	60 - 125	
Tetrachloro-m-xylene		40.0	37.8	94	32 - 129	

* Values outside of QC limits

05007

ANALYSIS DATA SHEET

37SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-15 File ID: A189146-0

Sampled: 11/14/07 13:47 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 14:57

Solids: 85.90 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	38	38	4.9	U
11104-28-2	PCB-1221	1	38	38	8.6	U
11141-16-5	PCB-1232	1	38	38	9.8	U
53469-21-9	PCB-1242	1	78	78	19	U
12672-29-6	PCB-1248	1	38	38	6.2	U
11097-69-1	PCB-1254	1	73	38	5.1	
11096-82-5	PCB-1260	1	78	78	19	U
37324-23-5	PCB-1262	1	38	38	6.1	U
11100-14-4	PCB-1268	1	38	38	5.1	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		38.8	28.6	74	60 - 125	
Tetrachloro-m-xylene		38.8	27.5	71	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

37SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-16 File ID: A189147-0

Sampled: 11/14/07 14:30 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 15:14

Solids: 48.28 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	68	68	8.7	U
11104-28-2	PCB-1221	1	68	68	15	U
11141-16-5	PCB-1232	1	68	68	17	U
53469-21-9	PCB-1242	1	140	140	34	U
12672-29-6	PCB-1248	1	68	68	11	U
11097-69-1	PCB-1254	1	560	68	9.1	
11096-82-5	PCB-1260	1	140	140	33	U
37324-23-5	PCB-1262	1	68	68	11	U
11100-14-4	PCB-1268	1	68	68	9.1	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		69.0	43.6	63	60 - 125	
Tetrachloro-m-xylene		69.0	46.9	68	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

37SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-17 File ID: A189148-0

Sampled: 11/14/07 14:30 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 15:31

Solids: 85.30 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	4.9	U
11104-28-2	PCB-1221	1	39	39	8.7	U
11141-16-5	PCB-1232	1	39	39	9.8	U
53469-21-9	PCB-1242	1	79	79	19	U
12672-29-6	PCB-1248	1	39	39	6.2	U
11097-69-1	PCB-1254	1	39	39	5.2	U
11096-82-5	PCB-1260	1	79	79	19	U
37324-23-5	PCB-1262	1	39	39	6.1	U
11100-14-4	PCB-1268	1	39	39	5.2	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	39.1	38.4	98	60 - 125	
Tetrachloro-m-xylene	39.1	37.4	96	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

37SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-18 File ID: A189149-0

Sampled: 11/14/07 14:35 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 15:48

Solids: 84.40 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	5.0	U
11104-28-2	PCB-1221	1	39	39	8.8	U
11141-16-5	PCB-1232	1	39	39	10	U
53469-21-9	PCB-1242	1	79	79	19	U
12672-29-6	PCB-1248	1	39	39	6.3	U
11097-69-1	PCB-1254	1	39	39	5.2	U
11096-82-5	PCB-1260	1	79	79	19	U
37324-23-5	PCB-1262	1	39	39	6.2	U
11100-14-4	PCB-1268	1	39	39	5.2	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.5	38.8	98	60 - 125	
Tetrachloro-m-xylene		39.5	36.4	92	32 - 129	

* Values outside of QC limits

05051

ANALYSIS DATA SHEET

DUP-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-19 File ID: A189150-0

Sampled: 11/14/07 14:00 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 16:06

Solids: 60.13 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	55	55	7.0	U
11104-28-2	PCB-1221	1	55	55	12	U
11141-16-5	PCB-1232	1	55	55	14	U
53469-21-9	PCB-1242	1	110	110	27	U
12672-29-6	PCB-1248	1	55	55	8.8	U
11097-69-1	PCB-1254	1	290	55	7.3	
11096-82-5	PCB-1260	1	110	110	26	U
37324-23-5	PCB-1262	1	55	55	8.6	U
11100-14-4	PCB-1268	1	55	55	7.3	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	55.4	43.8	79	60 - 125	
Tetrachloro-m-xylene	55.4	43.8	79	32 - 129	

* Values outside of QC limits

05060

ANALYSIS DATA SHEET

37SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-20 File ID: A189151-0

Sampled: 11/14/07 15:10 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 16:23

Solids: 49.06 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	67	67	8.6	U UL,S
11104-28-2	PCB-1221	1	67	67	15	U
11141-16-5	PCB-1232	1	67	67	17	U
53469-21-9	PCB-1242	1	140	140	33	U
12672-29-6	PCB-1248	1	67	67	11	U UL,S
11097-69-1	PCB-1254	1	1000	67	9.0	L,S
11096-82-5	PCB-1260	1	140	140	32	U UL,S
37324-23-5	PCB-1262	1	67	67	11	U
11100-14-4	PCB-1268	1	67	67	9.0	U UL,S
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		67.9	32.0	47	60 - 125	*
Tetrachloro-m-xylene		67.9	33.2	49	32 - 129	

* Values outside of QC limits

05869

ANALYSIS DATA SHEET

37SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-21 File ID: A189152-0

Sampled: 11/14/07 15:15 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 16:40

Solids: 84.70 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	5.0	U
11104-28-2	PCB-1221	1	39	39	8.7	U
11141-16-5	PCB-1232	1	39	39	9.9	U
53469-21-9	PCB-1242	1	79	79	19	U
12672-29-6	PCB-1248	1	39	39	6.3	U
11097-69-1	PCB-1254	1	39	39	5.2	U
11096-82-5	PCB-1260	1	79	79	19	U
37324-23-5	PCB-1262	1	39	39	6.1	U
11100-14-4	PCB-1268	1	39	39	5.2	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.4	37.5	95	60 - 125	
Tetrachloro-m-xylene		39.4	36.8	93	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

37SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711377-22 File ID: A189153-0

Sampled: 11/14/07 15:15 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 16:57

Solids: 83.80 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	5.0	U
11104-28-2	PCB-1221	1	39	39	8.8	U
11141-16-5	PCB-1232	1	39	39	10	U
53469-21-9	PCB-1242	1	80	80	19	U
12672-29-6	PCB-1248	1	39	39	6.3	U
11097-69-1	PCB-1254	1	39	39	5.3	U
11096-82-5	PCB-1260	1	80	80	19	U
37324-23-5	PCB-1262	1	39	39	6.2	U
11100-14-4	PCB-1268	1	39	39	5.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.8	37.6	94	60 - 125	
Tetrachloro-m-xylene		39.8	37.9	95	32 - 129	

* Values outside of QC limits

05095

ANALYSIS DATA SHEET

EQBK-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Water Laboratory ID: 0711377-23 File ID: A189128-0

Sampled: 11/14/07 16:00 Prepared: 11/16/07 07:12 Analyzed: 12/03/07 09:47

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0713953 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.189	0.192	102	40 - 135	
Tetrachloro-m-xylene		0.189	0.163	86	36 - 114	

* Values outside of QC limits

05104

SAMPLE ID SUMMARY

USEPA-8330

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-42

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35SB3A	0711293-01
EQBK-1	0711313-01
35SB4A	0711313-03
DUP-1	0711313-04
35SB1A	0711313-05
35SB2A	0711313-06
35SB6A	0711313-07
35SB6A	0711313-07RE1
35SB6B	0711313-08
35SB6C	0711313-09
35SB9A	0711313-10
35SB9A	0711313-10RE1
35SB9B	0711313-11
35SB9C	0711313-12
35SB10A	0711313-13
35SB10A	0711313-13RE1
35SB10B	0711313-14
35SB10C	0711313-15
35SB7A	0711377-01
35SB7A	0711377-01RE1
35SB7B	0711377-02
35SB7C	0711377-03
35SB7C	0711377-03RE1
35SB5A	0711377-04
35SB5A	0711377-04RE1
35SB5B	0711377-05
35SB5C	0711377-06
DUP-2	0711377-07
DUP-2	0711377-07RE1
35SB8A	0711377-08
35SB8A	0711377-08RE1
35SB8B	0711377-09
35SB8C	0711377-10
37SB10A	0711377-13
37SB10B	0711377-14
37SB10C	0711377-15
37SB9A	0711377-16
37SB9B	0711377-17
37SB9C	0711377-18
DUP-3	0711377-19
37SB7A	0711377-20

37SB7B	0711377-21
~~37SB7C~~	0711377-22
37SB7C	0711377-22RE1
~~EQBK-2~~	0711377-23

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB3A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711293-01 File ID: E1a012-0

Sampled: 11/12/07 16:06 Prepared: 11/26/07 09:02 Analyzed: 12/08/07 20:26

Solids: 90.68 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.32	93	57 - 139	

* Values outside of QC limits

02172

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711313-01 File ID: data030-0

Sampled: 11/13/07 16:00 Prepared: 11/20/07 18:37 Analyzed: 12/13/07 06:18

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0714136 Sequence: 7121403 Calibration: 7L14001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.28	70	29 - 138	

* Values outside of QC limits

02175

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-03 File ID: E1a013-0

Sampled: 11/13/07 07:50 Prepared: 11/26/07 09:02 Analyzed: 12/08/07 21:13

Solids: 83.32 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.19	88	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-04 File ID: E1a014-0

Sampled: 11/13/07 08:00 Prepared: 11/26/07 09:02 Analyzed: 12/08/07 22:00

Solids: 83.87 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.30	92	57 - 139	

* Values outside of QC limits

02181

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB1A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-05 File ID: E1a015-0

Sampled: 11/13/07 08:25 Prepared: 11/26/07 09:02 Analyzed: 12/08/07 22:48

Solids: 85.52 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.16	86	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB2A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-06 File ID: E1a016-0

Sampled: 11/13/07 09:20 Prepared: 11/26/07 09:02 Analyzed: 12/08/07 23:35

Solids: 83.07 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U UJ,m
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ,m
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U UJ,m
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.17	87	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-07 File ID: E1a017-0

Sampled: 11/13/07 14:45 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 00:22

Solids: 58.85 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	0.31	2.5	0.15	J
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	3.3	2.5	0.066	

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.06	82	57 - 139	

* Values outside of QC limits

02196

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-07RE1 File ID: data011-0

Sampled: 11/13/07 14:45 Prepared: 11/26/07 09:02 Analyzed: 12/31/07 23:42

Solids: 58.85 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 8010222 Calibration: 8A02004 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	0.27	2.5	0.15	J
121-14-2	2,4-Dinitrotoluene	1	0.21	2.5	0.10	J
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.51	2.5	0.30	J
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	0.061	2.5	0.030	J
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.8	2.5	0.066	

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.26	90	57 - 139	

* Values outside of QC limits

conf. do not use RR 1/17/08

: 02498

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-08 File ID: E1a018-0

Sampled: 11/13/07 14:55 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 01:09

Solids: 85.53 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.07	83	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-09 File ID: E1a019-0

Sampled: 11/13/07 15:05 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 01:56

Solids: 82.73 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.31	92	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-10 File ID: E1a021-0

Sampled: 11/13/07 10:45 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 03:31

Solids: 73.11 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	4.0	2.5	0.066	

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.76	110	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-10RE1 File ID: E2a007-0

Sampled: 11/13/07 10:45 Prepared: 11/26/07 09:02 Analyzed: 12/17/07 20:34

Solids: 73.11 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7121838 Calibration: 7H30002 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	3.6	2.5	0.066	

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.50	100	57 - 139	

* Values outside of QC limits

conf. Do Not use RA 1/17/08

: 02561

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-11 File ID: E1a022-0

Sampled: 11/13/07 12:10 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 04:18

Solids: 66.46 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.06	83	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-12 File ID: E1a023-0

Sampled: 11/13/07 12:00 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 05:05

Solids: 80.32 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.15	86	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-13 File ID: E1a024-0

Sampled: 11/13/07 13:30 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 05:52

Solids: 50.60 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	4.0	2.5	0.066	

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	1.84	74	57 - 139	

* Values outside of QC limits

02212

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-13RE1 File ID: E2a010-0

Sampled: 11/13/07 13:30 Prepared: 11/26/07 09:02 Analyzed: 12/17/07 22:40

Solids: 50.60 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7121838 Calibration: 7H30002 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	4.6	2.5	0.066	

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.13	125	57 - 139	

* Values outside of QC limits

Do Not Use RA 1/17/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-14 File ID: E1a025-0

Sampled: 11/13/07 13:38 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 06:39

Solids: 86.20 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.14	86	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-15 File ID: E1a026-0

Sampled: 11/13/07 13:45 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 07:26

Solids: 82.38 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.18	87	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-01 File ID: E1a027-0

Sampled: 11/14/07 08:00 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 08:13

Solids: 53.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	0.10	2.5	0.10	J
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	4.4	2.5	0.066	

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	1.65	66	57 - 139	

* Values outside of QC limits

use conf. result RA 1/17/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-01RE1 File ID: E2a012-0

Sampled: 11/14/07 08:00 Prepared: 11/26/07 09:02 Analyzed: 12/18/07 00:04

Solids: 53.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7121838 Calibration: 7H30002 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	7.0	2.5	0.066	J,g

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.73	109	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-02 File ID: E1a028-0

Sampled: 11/14/07 08:08 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 09:02

Solids: 87.74 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	1.98	79	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-03 File ID: E1a029-0

Sampled: 11/14/07 08:25 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 09:49

Solids: 86.53 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	0.27	2.5	0.066	J

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.78	111	57 - 139	

* Values outside of QC limits

use conf. results
RA
1/17/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-03RE1 File ID: E2a003-0

Sampled: 11/14/07 08:25 Prepared: 11/26/07 09:02 Analyzed: 12/28/07 15:15

Solids: 86.53 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7123001 Calibration: 7H28022 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	0.51	2.5	0.066	J J,g

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.25	90	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-04 File ID: E1a030-0

Sampled: 11/14/07 10:10 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 10:37

Solids: 80.92 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7120901 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	0.24	2.5	0.10	J
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	0.33	2.5	0.066	J

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.20	88	57 - 139	

* Values outside of QC limits

Use Conf. results RA 1/11/10

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-04RE1 File ID: E2a015-0

Sampled: 11/14/07 10:10 Prepared: 11/26/07 09:02 Analyzed: 12/18/07 02:11

Solids: 80.92 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7121838 Calibration: 7H30002 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	0.46	2.5	0.10	J
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	0.64	2.5	0.066	J JJ9

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.53	101	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-05 File ID: E1a003-0

Sampled: 11/14/07 10:23 Prepared: 11/26/07 09:02 Analyzed: 12/09/07 16:03

Solids: 83.40 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.11	84	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-06 File ID: data026-0

Sampled: 11/14/07 10:27 Prepared: 11/28/07 09:02 Analyzed: 12/13/07 03:02

Solids: 80.59 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714010 Sequence: 7121403 Calibration: 7L14001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.53	101	57 - 139	

* Values outside of QC limits

02237

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-07 File ID: E1a011-0

Sampled: 11/14/07 10:00 Prepared: 11/28/07 07:41 Analyzed: 12/09/07 22:38

Solids: 79.15 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	0.46	2.5	0.10	J
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	0.29	2.5	0.066	J

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.03	81	57 - 139	

* Values outside of QC limits

use conf. results RA 1/7/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-07RE1 File ID: E2a016-0

Sampled: 11/14/07 10:00 Prepared: 11/28/07 07:41 Analyzed: 12/18/07 02:53

Solids: 79.15 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121838 Calibration: 7H30002 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	0.58	2.5	0.10	J
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	0.53	2.5	0.066	J J, g

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.16	87	57 - 139	

* Values outside of QC limits

02521

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-08 File ID: E1a012-0

Sampled: 11/14/07 11:05 Prepared: 11/28/07 07:41 Analyzed: 12/09/07 23:27

Solids: 80.71 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	0.39	2.5	0.066	J

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.09	84	57 - 139	

* Values outside of QC limits

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ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-08RE1 File ID: E2a017-0

Sampled: 11/14/07 11:05 Prepared: 11/28/07 07:41 Analyzed: 12/18/07 03:35

Solids: 80.71 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121838 Calibration: 7H30002 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5		U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	0.66	2.5	0.066	J J,g

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.43	97	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-09 File ID: E1a014-0

Sampled: 11/14/07 11:15 Prepared: 11/28/07 07:41 Analyzed: 12/10/07 01:05

Solids: 82.15 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.17	87	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-10 File ID: E1a015-0

Sampled: 11/14/07 11:20 Prepared: 11/28/07 07:41 Analyzed: 12/10/07 01:54

Solids: 81.09 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.15	86	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-13 File ID: E1a016-0

Sampled: 11/14/07 13:45 Prepared: 11/28/07 07:41 Analyzed: 12/10/07 02:43

Solids: 50.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.00	80	57 - 139	

* Values outside of QC limits

02252

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-14 File ID: E1a017-0

Sampled: 11/14/07 13:47 Prepared: 11/28/07 07:41 Analyzed: 12/10/07 03:32

Solids: 83.28 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.05	82	57 - 139	

* Values outside of QC limits

02255

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-15 File ID: E1a018-0

Sampled: 11/14/07 13:47 Prepared: 11/28/07 07:41 Analyzed: 12/10/07 04:22

Solids: 85.90 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.22	89	57 - 139	

* Values outside of QC limits

02258

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-16 File ID: data044-0

Sampled: 11/14/07 14:30 Prepared: 11/28/07 07:41 Analyzed: 12/16/07 22:27

Solids: 48.28 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.43	97	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-17 File ID: E1a020-0

Sampled: 11/14/07 14:30 Prepared: 11/28/07 07:41 Analyzed: 12/10/07 06:00

Solids: 85.35 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.13	85	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-18 File ID: E1a021-0

Sampled: 11/14/07 14:35 Prepared: 11/28/07 07:41 Analyzed: 12/10/07 06:49

Solids: 84.43 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.13	85	57 - 139	

* Values outside of QC limits

02267

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-19 File ID: E1a022-0

Sampled: 11/14/07 14:00 Prepared: 11/28/07 07:41 Analyzed: 12/10/07 07:38

Solids: 60.13 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.17	87	57 - 139	

* Values outside of QC limits

02270

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-20 File ID: E1a023-0

Sampled: 11/14/07 15:10 Prepared: 11/28/07 07:41 Analyzed: 12/10/07 08:27

Solids: 49.06 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121401 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.03	81	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-21 File ID: data045-0

Sampled: 11/14/07 15:15 Prepared: 11/28/07 07:41 Analyzed: 12/16/07 23:16

Solids: 84.67 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.68	107	57 - 139	

* Values outside of QC limits

02276

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-22 File ID: data043-0

Sampled: 11/14/07 15:15 Prepared: 11/28/07 07:41 Analyzed: 12/16/07 21:38

Solids: 83.78 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	0.32	2.5	0.066	J

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.56	102	57 - 139	

* Values outside of QC limits

02279

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-22RE1 File ID: E2a019-0

Sampled: 11/14/07 15:15 Prepared: 11/28/07 07:41 Analyzed: 12/18/07 04:59

Solids: 83.78 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121838 Calibration: 7H30002 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	0.25	2.5	0.066	J

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.44	97	57 - 139	

* Values outside of QC limits

DO NOT USE RA 1/17/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

EQBK-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711377-23 File ID: data031-0

Sampled: 11/14/07 16:00 Prepared: 11/20/07 18:37 Analyzed: 12/13/07 07:07

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0714136 Sequence: 7121403 Calibration: 7L14001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.04	63	29 - 138	

* Values outside of QC limits

02282

SAMPLE ID SUMMARY

USEPA-8332

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35SB3A	0711293-01
EQBK-1	0711313-01
35SB4A	0711313-03
DUP-1	0711313-04
35SB1A	0711313-05
35SB2A	0711313-06
35SB6A	0711313-07
35SB6A	0711313-07RE1
35SB6B	0711313-08
35SB6C	0711313-09
35SB9A	0711313-10
35SB9B	0711313-11
35SB9C	0711313-12
35SB10A	0711313-13
35SB10B	0711313-14
35SB10C	0711313-15
35SB7A	0711377-01
35SB7B	0711377-02
35SB7C	0711377-03
35SB5A	0711377-04
35SB5B	0711377-05
35SB5C	0711377-06
DUP-2	0711377-07
35SB8A	0711377-08
35SB8B	0711377-09
35SB8C	0711377-10
37SB10A	0711377-13
37SB10B	0711377-14
37SB10C	0711377-15
37SB9A	0711377-16
37SB9B	0711377-17
37SB9C	0711377-18
DUP-3	0711377-19
37SB7A	0711377-20
37SB7B	0711377-21
37SB7C	0711377-22
EQBK-2	0711377-23

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB3A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711293-01 File ID: data005-0

Sampled: 11/12/07 16:06 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 18:49

Solids: 90.68 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.80	113	50 - 150	

* Values outside of QC limits

: 02654

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

EQBK-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711313-01 File ID: data013-0

Sampled: 11/13/07 16:00 Prepared: 11/20/07 18:38 Analyzed: 11/26/07 14:49

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0714137 Sequence: 7120530 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.53	110	50 - 150	

* Values outside of QC limits

02666

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-03 File ID: data006-0

Sampled: 11/13/07 07:50 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 19:07

Solids: 83.32 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.83	114	50 - 150	

* Values outside of QC limits

02571

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-04 File ID: data007-0

Sampled: 11/13/07 08:00 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 19:24

Solids: 83.87 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.82	114	50 - 150	

* Values outside of QC limits

02673

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB1A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-05 File ID: data008-0

Sampled: 11/13/07 08:25 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 19:41

Solids: 85.52 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.84	115	50 - 150	

* Values outside of QC limits

02675

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB2A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-06 File ID: data009-0

Sampled: 11/13/07 09:20 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 19:59

Solids: 83.07 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.87	116	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-07 File ID: data010-0

Sampled: 11/13/07 14:45 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 20:16

Solids: 58.85 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	11	5.0	0.39	
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.47	100	50 - 150	

* Values outside of QC limits

02679

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-07RE1 File ID: data012-0

Sampled: 11/13/07 14:45 Prepared: 11/26/07 09:04 Analyzed: 12/28/07 12:00

Solids: 58.85 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 8010275 Calibration: 8A03006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	10	5.0	0.89	
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.00	81	50 - 150	

* Values outside of QC limits

DO NOT USE RA 1/17/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB6B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-08 File ID: data011-0

Sampled: 11/13/07 14:55 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 20:33

Solids: 85.53 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.92	118	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB6C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-09 File ID: data012-0

Sampled: 11/13/07 15:05 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 20:50

Solids: 82.73 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.86	115	50 - 150	

* Values outside of QC limits

02684

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-10 File ID: data014-0

Sampled: 11/13/07 10:45 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 21:25

Solids: 73.11 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.34	94	50 - 150	

* Values outside of QC limits

02586

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-11 File ID: data015-0

Sampled: 11/13/07 12:10 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 21:42

Solids: 66.46 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.86	116	50 - 150	

* Values outside of QC limits

02593

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-12 File ID: data016-0

Sampled: 11/13/07 12:00 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 21:59

Solids: 80.32 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.88	116	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-13 File ID: data017-0

Sampled: 11/13/07 13:30 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 22:17

Solids: 50.60 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.16	87	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-14 File ID: data018-0

Sampled: 11/13/07 13:38 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 22:34

Solids: 86.20 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.89	117	50 - 150	

* Values outside of QC limits

: 02701

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711313-15 File ID: data019-0

Sampled: 11/13/07 13:45 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 22:51

Solids: 82.38 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.81	114	50 - 150	

* Values outside of QC limits

02703

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-01 File ID: data020-0

Sampled: 11/14/07 08:00 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 23:09

Solids: 53.00 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.27	92	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-02 File ID: data021-0

Sampled: 11/14/07 08:08 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 23:26

Solids: 87.74 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.89	117	50 - 150	

* Values outside of QC limits

02710

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-03 File ID: data022-0

Sampled: 11/14/07 08:25 Prepared: 11/26/07 09:04 Analyzed: 11/27/07 23:43

Solids: 86.53 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.82	114	50 - 150	

* Values outside of QC limits

02713

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-04 File ID: data023-0

Sampled: 11/14/07 10:10 Prepared: 11/26/07 09:04 Analyzed: 11/28/07 00:00

Solids: 80.92 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.63	106	50 - 150	

* Values outside of QC limits

02716

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB5B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-05 File ID: data025-0

Sampled: 11/14/07 10:23 Prepared: 11/26/07 09:04 Analyzed: 11/28/07 00:35

Solids: 83.40 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.90	117	50 - 150	

* Values outside of QC limits

02719

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB5C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-06 File ID: data026-0

Sampled: 11/14/07 10:27 Prepared: 11/26/07 09:04 Analyzed: 11/28/07 00:52

Solids: 80.59 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714011 Sequence: 7120539 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.92	118	50 - 150	

* Values outside of QC limits

02722

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

DUP-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-07 File ID: data005-20071203-140001-0

Sampled: 11/14/07 10:00 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 13:59

Solids: 79.15 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.74	111	50 - 150	

* Values outside of QC limits

02725

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-08 File ID: data006-0

Sampled: 11/14/07 11:05 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 14:17

Solids: 80.71 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.71	110	50 - 150	

* Values outside of QC limits

: 02727

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-09 File ID: data007-0

Sampled: 11/14/07 11:15 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 14:34

Solids: 82.15 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.87	116	50 - 150	

* Values outside of QC limits

02729

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-10 File ID: data008-0

Sampled: 11/14/07 11:20 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 14:51

Solids: 81.09 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.84	115	50 - 150	

* Values outside of QC limits

: 02731

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-13 File ID: data009-0

Sampled: 11/14/07 13:45 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 15:08

Solids: 50.00 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.06	83	50 - 150	

* Values outside of QC limits

02733

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-14 File ID: data010-0

Sampled: 11/14/07 13:47 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 15:26

Solids: 83.28 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.84	115	50 - 150	

* Values outside of QC limits

02735

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-15 File ID: data011-0

Sampled: 11/14/07 13:47 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 15:43

Solids: 85.90 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.86	116	50 - 150	

* Values outside of QC limits

02737

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-16 File ID: data012-0

Sampled: 11/14/07 14:30 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 16:00

Solids: 48.28 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.03	82	50 - 150	

* Values outside of QC limits

02739

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-17 File ID: data014-0

Sampled: 11/14/07 14:30 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 16:35

Solids: 85.35 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.84	115	50 - 150	

* Values outside of QC limits

027741

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-18 File ID: data015-0

Sampled: 11/14/07 14:35 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 16:52

Solids: 84.43 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.84	115	50 - 150	

* Values outside of QC limits

: 02743

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

DUP-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-19 File ID: data016-0

Sampled: 11/14/07 14:00 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 17:09

Solids: 60.13 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.49	101	50 - 150	

* Values outside of QC limits

02745

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-20 File ID: data017-0

Sampled: 11/14/07 15:10 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 17:27

Solids: 49.06 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	1.84	75	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711377-21 File ID: data018-0

Sampled: 11/14/07 15:15 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 17:44

Solids: 84.67 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.85	115	50 - 150	

* Values outside of QC limits

02745

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB7C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42 4MD
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0711377-22
File ID: data019-0
Sampled: 11/14/07 15:15
Prepared: 11/28/07 07:12
Analyzed: 12/03/07 18:01
Solids: 83.78
Preparation: 8332 Extraction
Initial/Final: 2 g / 20 mL
QC Batch: 0714468
Sequence: 7120808
Calibration: 7L05006
Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.83	114	50 - 150	

* Values outside of QC limits

027751

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

EQBK-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711377-23 File ID: data014-0

Sampled: 11/14/07 16:00 Prepared: 11/20/07 18:38 Analyzed: 11/26/07 15:06

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0714137 Sequence: 7120530 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.49	108	50 - 150	

* Values outside of QC limits

02753

SAMPLE ID SUMMARY

USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-42

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35SB3A	0711293-01
EQBK-1	0711313-01
35SB4A	0711313-03
DUP-1	0711313-04
35SB1A	0711313-05
35SB2A	0711313-06
35SB6A	0711313-07
35SB6B	0711313-08
35SB6C	0711313-09
35SB9A	0711313-10
35SB9B	0711313-11
35SB9C	0711313-12
35SB10A	0711313-13
35SB10B	0711313-14
35SB10C	0711313-15
35SB7A	0711377-01
35SB7B	0711377-02
35SB7C	0711377-03
35SB5A	0711377-04
35SB5B	0711377-05
35SB5C	0711377-06
DUP-2	0711377-07
35SB8A	0711377-08
35SB8B	0711377-09
35SB8C	0711377-10
37SB10A	0711377-13
37SB10B	0711377-14
37SB10C	0711377-15
37SB9A	0711377-16
37SB9B	0711377-17
37SB9C	0711377-18
DUP-3	0711377-19
37SB7A	0711377-20
37SB7B	0711377-21
37SB7C	0711377-22
EQBK-2	0711377-23

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB3A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/12/07 16:06
Solids: 90.68
Laboratory ID: 0711293-01

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	19000	mg/kg dry wt.	1	10	2.1		11/27/07 09:14
7440-39-3	Barium, Total	120	mg/kg dry wt.	1	1.0	0.17	Km	11/27/07 09:14
7440-41-7	Beryllium, Total	0.78	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 09:16
7440-43-9	Cadmium, Total	1.3	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 09:16
7440-70-2	Calcium, Total	12000	mg/kg dry wt.	1	50	4.2		11/27/07 09:14
7440-47-3	Chromium, Total	29	mg/kg dry wt.	1	5.0	0.72		11/27/07 09:16
7440-48-4	Cobalt, Total	9.7	mg/kg dry wt.	1	2.0	0.37		11/27/07 09:16
7439-89-6	Iron, Total	27000	mg/kg dry wt.	1	10	0.48		11/28/07 10:29
7439-95-4	Magnesium, Total	6900	mg/kg dry wt.	1	50	5.0		11/27/07 09:14
7439-96-5	Manganese, Total	490	mg/kg dry wt.	1	1.0	0.16		11/27/07 09:14
7440-09-7	Potassium, Total	1700	mg/kg dry wt.	1	50	5.3		11/28/07 10:29
7440-23-5	Sodium, Total	54	mg/kg dry wt.	1	100	13	J	11/27/07 09:14
7440-66-6	Zinc, Total	78	mg/kg dry wt.	1	5.0	1.0	J, S	11/27/07 09:16

02952

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

EQBK-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/13/07 16:00
Solids: 0.00
Laboratory ID: 0711313-01

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3010A Digestion
Prepared: 11/29/07 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0714542

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	11/30/07 08:32
7440-70-2	Calcium, Total	130	ug/L	1	500	40	J	11/30/07 08:32
7439-89-6	Iron, Total	9.8	ug/L	1	20	5.7	J	11/30/07 08:32
7439-95-4	Magnesium, Total	500	ug/L	1	500	38	U	11/30/07 08:32
7440-09-7	Potassium, Total	200	ug/L	1	200	54	U	11/30/07 08:32
7440-23-5	Sodium, Total	500	ug/L	1	500	84	U	11/30/07 08:32

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 07:50
Solids: 83.32
Laboratory ID: 0711313-03

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	22000	mg/kg dry wt.	1	10	2.1		11/27/07 09:20
7440-39-3	Barium, Total	150	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 09:20
7440-41-7	Beryllium, Total	0.82	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 09:21
7440-43-9	Cadmium, Total	1.5	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 09:22
7440-70-2	Calcium, Total	9200	mg/kg dry wt.	1	50	4.2	J,f	11/27/07 09:20
7440-47-3	Chromium, Total	31	mg/kg dry wt.	1	5.0	0.72		11/27/07 09:22
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		11/27/07 09:22
7439-89-6	Iron, Total	29000	mg/kg dry wt.	1	10	0.48		11/28/07 10:39
7439-95-4	Magnesium, Total	5900	mg/kg dry wt.	1	50	5.0		11/27/07 09:20
7439-96-5	Manganese, Total	750	mg/kg dry wt.	1	1.0	0.16		11/27/07 09:20
7440-09-7	Potassium, Total	1700	mg/kg dry wt.	1	50	5.3		11/28/07 10:39
7440-23-5	Sodium, Total	43	mg/kg dry wt.	1	100	13	J	11/27/07 09:20
7440-66-6	Zinc, Total	110	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 09:22

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 08:00
Solids: 83.87
Laboratory ID: 0711313-04

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.4999 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	24000	mg/kg dry wt.	1	10	2.1		11/27/07 09:25
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 09:25
7440-41-7	Beryllium, Total	0.70	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 09:27
7440-43-9	Cadmium, Total	1.9	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 09:27
7440-70-2	Calcium, Total	4600	mg/kg dry wt.	1	50	4.2	J,f	11/27/07 09:25
7440-47-3	Chromium, Total	40	mg/kg dry wt.	1	5.0	0.72		11/27/07 09:27
7440-48-4	Cobalt, Total	9.8	mg/kg dry wt.	1	2.0	0.37		11/27/07 09:27
7439-89-6	Iron, Total	29000	mg/kg dry wt.	1	10	0.48		11/28/07 10:45
7439-95-4	Magnesium, Total	3600	mg/kg dry wt.	1	50	5.0		11/27/07 09:25
7439-96-5	Manganese, Total	600	mg/kg dry wt.	1	1.0	0.16		11/27/07 09:25
7440-09-7	Potassium, Total	1400	mg/kg dry wt.	1	50	5.3		11/28/07 10:45
7440-23-5	Sodium, Total	34	mg/kg dry wt.	1	100	13	J	11/27/07 09:25
7440-66-6	Zinc, Total	83	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 09:27

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB1A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 08:25
Solids: 85.52
Laboratory ID: 0711313-05

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	19000	mg/kg dry wt.	1	10	2.1		11/27/07 09:31
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 09:31
7440-41-7	Beryllium, Total	0.68	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 09:32
7440-43-9	Cadmium, Total	1.2	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 09:33
7440-70-2	Calcium, Total	5300	mg/kg dry wt.	1	50	4.2		11/27/07 09:31
7440-47-3	Chromium, Total	23	mg/kg dry wt.	1	5.0	0.72		11/27/07 09:33
7440-48-4	Cobalt, Total	9.9	mg/kg dry wt.	1	2.0	0.37		11/27/07 09:33
7439-89-6	Iron, Total	24000	mg/kg dry wt.	1	10	0.48		11/28/07 10:50
7439-95-4	Magnesium, Total	3300	mg/kg dry wt.	1	50	5.0		11/27/07 09:31
7439-96-5	Manganese, Total	590	mg/kg dry wt.	1	1.0	0.16		11/27/07 09:31
7440-09-7	Potassium, Total	1600	mg/kg dry wt.	1	50	5.3		11/28/07 10:50
7440-23-5	Sodium, Total	31	mg/kg dry wt.	1	100	13	J	11/27/07 09:31
7440-66-6	Zinc, Total	60	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 09:33

02956

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB2A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 09:20
Solids: 83.07
Laboratory ID: 0711313-06

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.4995 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	22000	mg/kg dry wt.	100	1000	210		11/28/07 15:33
7440-39-3	Barium, Total	98	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 09:38
7440-41-7	Beryllium, Total	0.59	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 09:39
7440-43-9	Cadmium, Total	1.4	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 09:40
7440-70-2	Calcium, Total	11000	mg/kg dry wt.	1	50	4.2		11/27/07 09:38
7440-47-3	Chromium, Total	35	mg/kg dry wt.	1	5.0	0.72		11/27/07 09:40
7440-48-4	Cobalt, Total	7.9	mg/kg dry wt.	1	2.0	0.37		11/27/07 09:40
7439-89-6	Iron, Total	31000	mg/kg dry wt.	500	5000	240		11/27/07 14:50
7439-95-4	Magnesium, Total	6000	mg/kg dry wt.	1	50	5.0		11/27/07 09:38
7439-96-5	Manganese, Total	510	mg/kg dry wt.	10	10	1.6		11/27/07 15:10
7440-09-7	Potassium, Total	1600	mg/kg dry wt.	1	50	5.3		11/28/07 10:56
7440-23-5	Sodium, Total	59	mg/kg dry wt.	1	100	13	J	11/27/07 09:38
7440-66-6	Zinc, Total	150	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 09:40

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 14:45
Solids: 58.85
Laboratory ID: 0711313-07

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	22000	mg/kg dry wt.	1	10	2.1		11/27/07 10:25
7440-39-3	Barium, Total	100	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 10:25
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		11/27/07 10:26
7440-43-9	Cadmium, Total	1.5	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 10:26
7440-70-2	Calcium, Total	33000	mg/kg dry wt.	1	50	4.2		11/27/07 10:25
7440-47-3	Chromium, Total	140	mg/kg dry wt.	1	5.0	0.72		11/28/07 11:38
7440-48-4	Cobalt, Total	8.9	mg/kg dry wt.	1	2.0	0.37		11/27/07 10:26
7439-89-6	Iron, Total	26000	mg/kg dry wt.	1	10	0.48		11/28/07 11:36
7439-95-4	Magnesium, Total	11000	mg/kg dry wt.	1	50	5.0		11/27/07 10:25
7439-96-5	Manganese, Total	420	mg/kg dry wt.	1	1.0	0.16		11/27/07 10:25
7440-09-7	Potassium, Total	1500	mg/kg dry wt.	1	50	5.3		11/28/07 11:36
7440-23-5	Sodium, Total	79	mg/kg dry wt.	1	100	13	J	11/27/07 10:25
7440-66-6	Zinc, Total	140	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 10:26

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB6B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 14:55
Solids: 85.53
Laboratory ID: 0711313-08

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	18000	mg/kg dry wt.	1	10	2.1		11/27/07 10:31
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17	Kjm	11/27/07 10:31
7440-41-7	Beryllium, Total	0.76	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 10:33
7440-43-9	Cadmium, Total	1.7	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 10:33
7440-70-2	Calcium, Total	2800	mg/kg dry wt.	1	50	4.2		11/27/07 10:31
7440-47-3	Chromium, Total	33	mg/kg dry wt.	1	5.0	0.72		11/27/07 10:33
7440-48-4	Cobalt, Total	9.8	mg/kg dry wt.	1	2.0	0.37		11/27/07 10:33
7439-89-6	Iron, Total	25000	mg/kg dry wt.	1	10	0.48		11/28/07 11:41
7439-95-4	Magnesium, Total	4300	mg/kg dry wt.	1	50	5.0		11/27/07 10:31
7439-96-5	Manganese, Total	410	mg/kg dry wt.	1	1.0	0.16		11/27/07 10:31
7440-09-7	Potassium, Total	1700	mg/kg dry wt.	1	50	5.3		11/28/07 11:41
7440-23-5	Sodium, Total	47	mg/kg dry wt.	1	100	13	J	11/27/07 10:31
7440-66-6	Zinc, Total	63	mg/kg dry wt.	1	5.0	1.0	JLS	11/27/07 10:33

02959

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB6C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 15:05
Solids: 82.73
Laboratory ID: 0711313-09

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	13000	mg/kg dry wt.	1	10	2.1		11/27/07 10:38
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17	Kjm	11/27/07 10:38
7440-41-7	Beryllium, Total	0.57	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 10:39
7440-43-9	Cadmium, Total	1.2	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 10:40
7440-70-2	Calcium, Total	2000	mg/kg dry wt.	1	50	4.2		11/27/07 10:38
7440-47-3	Chromium, Total	21	mg/kg dry wt.	1	5.0	0.72		11/27/07 10:40
7440-48-4	Cobalt, Total	8.7	mg/kg dry wt.	1	2.0	0.37		11/27/07 10:40
7439-89-6	Iron, Total	20000	mg/kg dry wt.	1	10	0.48		11/28/07 11:47
7439-95-4	Magnesium, Total	3600	mg/kg dry wt.	1	50	5.0		11/27/07 10:38
7439-96-5	Manganese, Total	310	mg/kg dry wt.	1	1.0	0.16		11/27/07 10:38
7440-09-7	Potassium, Total	1500	mg/kg dry wt.	1	50	5.3		11/28/07 11:47
7440-23-5	Sodium, Total	47	mg/kg dry wt.	1	100	13	J	11/27/07 10:38
7440-66-6	Zinc, Total	54	mg/kg dry wt.	1	5.0	1.0	J,S	11/27/07 10:40

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 10:45
Solids: 73.11
Laboratory ID: 0711313-10

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	24000	mg/kg dry wt.	1	10	2.1		11/27/07 10:44
7440-39-3	Barium, Total	180	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 10:44
7440-41-7	Beryllium, Total	0.97	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 10:46
7440-43-9	Cadmium, Total	1.8	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 10:46
7440-70-2	Calcium, Total	38000	mg/kg dry wt.	1	50	4.2		11/27/07 10:44
7440-47-3	Chromium, Total	120	mg/kg dry wt.	1	5.0	0.72		11/28/07 11:54
7440-48-4	Cobalt, Total	9.3	mg/kg dry wt.	1	2.0	0.37		11/27/07 10:46
7439-89-6	Iron, Total	26000	mg/kg dry wt.	1	10	0.48		11/28/07 11:52
7439-95-4	Magnesium, Total	4700	mg/kg dry wt.	1	50	5.0		11/27/07 10:44
7439-96-5	Manganese, Total	590	mg/kg dry wt.	1	1.0	0.16		11/27/07 10:44
7440-09-7	Potassium, Total	1600	mg/kg dry wt.	1	50	5.3		11/28/07 11:52
7440-23-5	Sodium, Total	83	mg/kg dry wt.	1	100	13	J	11/27/07 10:44
7440-66-6	Zinc, Total	280	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 10:46

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 12:10
Solids: 66.46
Laboratory ID: 0711313-11

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.4999 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	20000	mg/kg dry wt.	1	10	2.1		11/27/07 10:51
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 10:51
7440-41-7	Beryllium, Total	1.0	mg/kg dry wt.	1	1.0	0.021		11/27/07 10:52
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 10:53
7440-70-2	Calcium, Total	3000	mg/kg dry wt.	1	50	4.2		11/27/07 10:51
7440-47-3	Chromium, Total	40	mg/kg dry wt.	1	5.0	0.72		11/27/07 10:53
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		11/27/07 10:53
7439-89-6	Iron, Total	29000	mg/kg dry wt.	1	10	0.48		11/28/07 11:58
7439-95-4	Magnesium, Total	5000	mg/kg dry wt.	1	50	5.0		11/27/07 10:51
7439-96-5	Manganese, Total	470	mg/kg dry wt.	1	1.0	0.16		11/27/07 10:51
7440-09-7	Potassium, Total	2100	mg/kg dry wt.	1	50	5.3		11/28/07 11:58
7440-23-5	Sodium, Total	51	mg/kg dry wt.	1	100	13	J	11/27/07 10:51
7440-66-6	Zinc, Total	81	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 10:53

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 12:00
Solids: 80.32
Laboratory ID: 0711313-12

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.4998 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	14000	mg/kg dry wt.	1	10	2.1		11/27/07 10:57
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 10:57
7440-41-7	Beryllium, Total	0.64	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 10:59
7440-43-9	Cadmium, Total	1.2	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 10:59
7440-70-2	Calcium, Total	4600	mg/kg dry wt.	1	50	4.2		11/27/07 10:57
7440-47-3	Chromium, Total	24	mg/kg dry wt.	1	5.0	0.72		11/27/07 10:59
7440-48-4	Cobalt, Total	9.3	mg/kg dry wt.	1	2.0	0.37		11/27/07 10:59
7439-89-6	Iron, Total	22000	mg/kg dry wt.	1	10	0.48		11/28/07 12:03
7439-95-4	Magnesium, Total	4000	mg/kg dry wt.	1	50	5.0		11/27/07 10:57
7439-96-5	Manganese, Total	550	mg/kg dry wt.	1	1.0	0.16		11/27/07 10:57
7440-09-7	Potassium, Total	1400	mg/kg dry wt.	1	50	5.3		11/28/07 12:03
7440-23-5	Sodium, Total	49	mg/kg dry wt.	1	100	13	J	11/27/07 10:57
7440-66-6	Zinc, Total	64	mg/kg dry wt.	1	5.0	1.0	J,S	11/27/07 10:59

INORGANIC ANALYSIS DATA SHEET

USEPA-6010B

35SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:30
Solids: 50.60
Laboratory ID: 0711313-13

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	24000	mg/kg dry wt.	1	10	2.1		11/27/07 11:04
7440-39-3	Barium, Total	82	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 11:04
7440-41-7	Beryllium, Total	1.1	mg/kg dry wt.	1	1.0	0.021		11/27/07 11:05
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 11:06
7440-70-2	Calcium, Total	87000	mg/kg dry wt.	1	50	4.2		11/27/07 11:04
7440-47-3	Chromium, Total	160	mg/kg dry wt.	1	5.0	0.72		11/28/07 12:22
7440-48-4	Cobalt, Total	5.1	mg/kg dry wt.	1	2.0	0.37		11/27/07 11:06
7439-89-6	Iron, Total	19000	mg/kg dry wt.	1	10	0.48		11/28/07 12:21
7439-95-4	Magnesium, Total	14000	mg/kg dry wt.	1	50	5.0		11/27/07 11:04
7439-96-5	Manganese, Total	260	mg/kg dry wt.	1	1.0	0.16		11/27/07 11:04
7440-09-7	Potassium, Total	1400	mg/kg dry wt.	1	50	5.3		11/28/07 12:21
7440-23-5	Sodium, Total	85	mg/kg dry wt.	1	100	13	J	11/27/07 11:04
7440-66-6	Zinc, Total	110	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 11:06

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:38
Solids: 86.20
Laboratory ID: 0711313-14

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	16000	mg/kg dry wt.	1	10	2.1		11/27/07 11:10
7440-39-3	Barium, Total	89	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 11:10
7440-41-7	Beryllium, Total	0.62	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 11:12
7440-43-9	Cadmium, Total	1.2	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 11:12
7440-70-2	Calcium, Total	3700	mg/kg dry wt.	1	50	4.2		11/27/07 11:10
7440-47-3	Chromium, Total	25	mg/kg dry wt.	1	5.0	0.72		11/27/07 11:12
7440-48-4	Cobalt, Total	9.2	mg/kg dry wt.	1	2.0	0.37		11/27/07 11:12
7439-89-6	Iron, Total	23000	mg/kg dry wt.	1	10	0.48		11/28/07 12:26
7439-95-4	Magnesium, Total	4200	mg/kg dry wt.	1	50	5.0		11/27/07 11:10
7439-96-5	Manganese, Total	350	mg/kg dry wt.	1	1.0	0.16		11/27/07 11:10
7440-09-7	Potassium, Total	1800	mg/kg dry wt.	1	50	5.3		11/28/07 12:26
7440-23-5	Sodium, Total	50	mg/kg dry wt.	1	100	13	J	11/27/07 11:10
7440-66-6	Zinc, Total	56	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 11:12

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:45
Solids: 82.38
Laboratory ID: 0711313-15

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.4997 g / 50 mL
QC Batch: 0714219

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	18000	mg/kg dry wt.	1	10	2.1		11/27/07 11:17
7440-39-3	Barium, Total	91	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 11:17
7440-41-7	Beryllium, Total	0.60	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 11:18
7440-43-9	Cadmium, Total	0.97	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 11:19
7440-70-2	Calcium, Total	17000	mg/kg dry wt.	1	50	4.2		11/27/07 11:17
7440-47-3	Chromium, Total	38	mg/kg dry wt.	1	5.0	0.72		11/27/07 11:19
7440-48-4	Cobalt, Total	8.7	mg/kg dry wt.	1	2.0	0.37		11/27/07 11:19
7439-89-6	Iron, Total	23000	mg/kg dry wt.	1	10	0.48		11/28/07 12:32
7439-95-4	Magnesium, Total	10000	mg/kg dry wt.	1	50	5.0		11/27/07 11:17
7439-96-5	Manganese, Total	300	mg/kg dry wt.	1	1.0	0.16		11/27/07 11:17
7440-09-7	Potassium, Total	1800	mg/kg dry wt.	1	50	5.3		11/28/07 12:32
7440-23-5	Sodium, Total	74	mg/kg dry wt.	1	100	13	J	11/27/07 11:17
7440-66-6	Zinc, Total	70	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 11:19

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:00
Solids: 53.00
Laboratory ID: 0711377-01

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	25000	mg/kg dry wt.	1	10	2.1		11/27/07 11:58
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 11:58
7440-41-7	Beryllium, Total	0.80	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 12:00
7440-43-9	Cadmium, Total	2.2	mg/kg dry wt.	1	2.0	0.11		11/27/07 12:00
7440-70-2	Calcium, Total	53000	mg/kg dry wt.	1	50	4.2		11/27/07 11:58
7440-47-3	Chromium, Total	150	mg/kg dry wt.	1	5.0	0.72		11/28/07 12:57
7440-48-4	Cobalt, Total	6.4	mg/kg dry wt.	1	2.0	0.37		11/27/07 12:00
7439-89-6	Iron, Total	24000	mg/kg dry wt.	1	10	0.48		11/28/07 12:55
7439-95-4	Magnesium, Total	5000	mg/kg dry wt.	1	50	5.0		11/27/07 11:59
7439-96-5	Manganese, Total	330	mg/kg dry wt.	1	1.0	0.16		11/27/07 11:59
7440-09-7	Potassium, Total	1300	mg/kg dry wt.	1	50	5.3		11/28/07 12:55
7440-23-5	Sodium, Total	82	mg/kg dry wt.	1	100	13	J	11/27/07 11:58
7440-66-6	Zinc, Total	210	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 12:00

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:08
Solids: 87.74
Laboratory ID: 0711377-02

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5003 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	18000	mg/kg dry wt.	1	10	2.1		11/27/07 12:05
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 12:05
7440-41-7	Beryllium, Total	0.67	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 12:07
7440-43-9	Cadmium, Total	1.8	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 12:07
7440-70-2	Calcium, Total	1700	mg/kg dry wt.	1	50	4.2		11/27/07 12:05
7440-47-3	Chromium, Total	26	mg/kg dry wt.	1	5.0	0.72		11/27/07 12:07
7440-48-4	Cobalt, Total	9.9	mg/kg dry wt.	1	2.0	0.37		11/27/07 12:07
7439-89-6	Iron, Total	26000	mg/kg dry wt.	1	10	0.48		11/28/07 13:01
7439-95-4	Magnesium, Total	4200	mg/kg dry wt.	1	50	5.0		11/27/07 12:05
7439-96-5	Manganese, Total	380	mg/kg dry wt.	1	1.0	0.16		11/27/07 12:05
7440-09-7	Potassium, Total	1900	mg/kg dry wt.	1	50	5.3		11/28/07 13:01
7440-23-5	Sodium, Total	52	mg/kg dry wt.	1	100	13	J	11/27/07 12:05
7440-66-6	Zinc, Total	61	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 12:07

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:25
Solids: 86.53
Laboratory ID: 0711377-03

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	14000	mg/kg dry wt.	1	10	2.1		11/27/07 12:12
7440-39-3	Barium, Total	95	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 12:12
7440-41-7	Beryllium, Total	0.57	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 12:13
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11		11/27/07 12:13
7440-70-2	Calcium, Total	61000	mg/kg dry wt.	1	50	4.2		11/27/07 12:12
7440-47-3	Chromium, Total	51	mg/kg dry wt.	1	5.0	0.72		11/27/07 12:13
7440-48-4	Cobalt, Total	9.7	mg/kg dry wt.	1	2.0	0.37		11/27/07 12:13
7439-89-6	Iron, Total	27000	mg/kg dry wt.	1	10	0.48		11/28/07 13:06
7439-95-4	Magnesium, Total	39000	mg/kg dry wt.	1	50	5.0		11/27/07 12:12
7439-96-5	Manganese, Total	490	mg/kg dry wt.	1	1.0	0.16		11/27/07 12:12
7440-09-7	Potassium, Total	1800	mg/kg dry wt.	1	50	5.3		11/28/07 13:06
7440-23-5	Sodium, Total	110	mg/kg dry wt.	1	100	13		11/27/07 12:12
7440-66-6	Zinc, Total	79	mg/kg dry wt.	1	5.0	1.0	J,S	11/27/07 12:13

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:10
Solids: 80.92
Laboratory ID: 0711377-04

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	20000	mg/kg dry wt.	1	10	2.1		11/27/07 12:18
7440-39-3	Barium, Total	170	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 12:18
7440-41-7	Beryllium, Total	0.77	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 12:20
7440-43-9	Cadmium, Total	1.7	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 12:20
7440-70-2	Calcium, Total	8700	mg/kg dry wt.	1	50	4.2		11/27/07 12:18
7440-47-3	Chromium, Total	93	mg/kg dry wt.	1	5.0	0.72		11/27/07 12:20
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		11/27/07 12:20
7439-89-6	Iron, Total	27000	mg/kg dry wt.	1	10	0.48		11/28/07 13:12
7439-95-4	Magnesium, Total	5500	mg/kg dry wt.	1	50	5.0		11/27/07 12:18
7439-96-5	Manganese, Total	640	mg/kg dry wt.	1	1.0	0.16		11/27/07 12:18
7440-09-7	Potassium, Total	1600	mg/kg dry wt.	1	50	5.3		11/28/07 13:12
7440-23-5	Sodium, Total	51	mg/kg dry wt.	1	100	13	J	11/27/07 12:18
7440-66-6	Zinc, Total	160	mg/kg dry wt.	1	5.0	1.0	J,S	11/27/07 12:20

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB5B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:23
Solids: 83.40
Laboratory ID: 0711377-05

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	17000	mg/kg dry wt.	1	10	2.1		11/27/07 12:25
7440-39-3	Barium, Total	120	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 12:25
7440-41-7	Beryllium, Total	0.79	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 12:26
7440-43-9	Cadmium, Total	1.6	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 12:27
7440-70-2	Calcium, Total	1800	mg/kg dry wt.	1	50	4.2		11/27/07 12:25
7440-47-3	Chromium, Total	27	mg/kg dry wt.	1	5.0	0.72		11/27/07 12:27
7440-48-4	Cobalt, Total	10	mg/kg dry wt.	1	2.0	0.37		11/27/07 12:27
7439-89-6	Iron, Total	23000	mg/kg dry wt.	1	10	0.48		11/28/07 13:29
7439-95-4	Magnesium, Total	4400	mg/kg dry wt.	1	50	5.0		11/27/07 12:25
7439-96-5	Manganese, Total	280	mg/kg dry wt.	1	1.0	0.16		11/27/07 12:25
7440-09-7	Potassium, Total	1800	mg/kg dry wt.	1	50	5.3		11/28/07 13:29
7440-23-5	Sodium, Total	60	mg/kg dry wt.	1	100	13	J	11/27/07 12:25
7440-66-6	Zinc, Total	69	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 12:27

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB5C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:27
Solids: 80.59
Laboratory ID: 0711377-06

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	17000	mg/kg dry wt.	1	10	2.1		11/27/07 12:31
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 12:31
7440-41-7	Beryllium, Total	0.76	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 12:33
7440-43-9	Cadmium, Total	1.6	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 12:33
7440-70-2	Calcium, Total	1500	mg/kg dry wt.	1	50	4.2		11/27/07 12:31
7440-47-3	Chromium, Total	28	mg/kg dry wt.	1	5.0	0.72		11/27/07 12:33
7440-48-4	Cobalt, Total	7.8	mg/kg dry wt.	1	2.0	0.37		11/27/07 12:33
7439-89-6	Iron, Total	20000	mg/kg dry wt.	1	10	0.48		11/28/07 13:35
7439-95-4	Magnesium, Total	4300	mg/kg dry wt.	1	50	5.0		11/27/07 12:31
7439-96-5	Manganese, Total	230	mg/kg dry wt.	1	1.0	0.16		11/27/07 12:31
7440-09-7	Potassium, Total	1600	mg/kg dry wt.	1	50	5.3		11/28/07 13:35
7440-23-5	Sodium, Total	56	mg/kg dry wt.	1	100	13	J	11/27/07 12:31
7440-66-6	Zinc, Total	75	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 12:33

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:00
Solids: 79.15
Laboratory ID: 0711377-07

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.4999 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	20000	mg/kg dry wt.	1	10	2.1		11/27/07 12:38
7440-39-3	Barium, Total	170	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 12:38
7440-41-7	Beryllium, Total	0.85	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 12:39
7440-43-9	Cadmium, Total	1.8	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 12:40
7440-70-2	Calcium, Total	5300	mg/kg dry wt.	1	50	4.2		11/27/07 12:38
7440-47-3	Chromium, Total	72	mg/kg dry wt.	1	5.0	0.72		11/27/07 12:40
7440-48-4	Cobalt, Total	11	mg/kg dry wt.	1	2.0	0.37		11/27/07 12:40
7439-89-6	Iron, Total	27000	mg/kg dry wt.	1	10	0.48		11/28/07 13:40
7439-95-4	Magnesium, Total	3800	mg/kg dry wt.	1	50	5.0		11/27/07 12:38
7439-96-5	Manganese, Total	620	mg/kg dry wt.	1	1.0	0.16		11/27/07 12:38
7440-09-7	Potassium, Total	1600	mg/kg dry wt.	1	50	5.3		11/28/07 13:40
7440-23-5	Sodium, Total	46	mg/kg dry wt.	1	100	13	J	11/27/07 12:38
7440-66-6	Zinc, Total	160	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 12:40

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:05
Solids: 80.71
Laboratory ID: 0711377-08

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	17000	mg/kg dry wt.	1	10	2.1		11/27/07 12:59
7440-39-3	Barium, Total	140	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 12:59
7440-41-7	Beryllium, Total	0.92	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 13:00
7440-43-9	Cadmium, Total	1.4	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 13:00
7440-70-2	Calcium, Total	8400	mg/kg dry wt.	1	50	4.2		11/27/07 12:59
7440-47-3	Chromium, Total	39	mg/kg dry wt.	1	5.0	0.72		11/27/07 13:00
7440-48-4	Cobalt, Total	10	mg/kg dry wt.	1	2.0	0.37		11/27/07 13:00
7439-89-6	Iron, Total	24000	mg/kg dry wt.	1	10	0.48		11/28/07 13:46
7439-95-4	Magnesium, Total	5200	mg/kg dry wt.	1	50	5.0		11/27/07 12:59
7439-96-5	Manganese, Total	640	mg/kg dry wt.	1	1.0	0.16		11/27/07 12:59
7440-09-7	Potassium, Total	1600	mg/kg dry wt.	1	50	5.3		11/28/07 13:46
7440-23-5	Sodium, Total	54	mg/kg dry wt.	1	100	13	J	11/27/07 12:59
7440-66-6	Zinc, Total	110	mg/kg dry wt.	1	5.0	1.0	J,S	11/27/07 13:00

02974

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:15
Solids: 82.15
Laboratory ID: 0711377-09

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	14000	mg/kg dry wt.	1	10	2.1		11/27/07 13:05
7440-39-3	Barium, Total	77	mg/kg dry wt.	1	1.0	0.17	Kjm	11/27/07 13:05
7440-41-7	Beryllium, Total	0.66	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 13:07
7440-43-9	Cadmium, Total	1.4	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 13:07
7440-70-2	Calcium, Total	2300	mg/kg dry wt.	1	50	4.2		11/27/07 13:05
7440-47-3	Chromium, Total	24	mg/kg dry wt.	1	5.0	0.72		11/27/07 13:07
7440-48-4	Cobalt, Total	9.0	mg/kg dry wt.	1	2.0	0.37		11/27/07 13:07
7439-89-6	Iron, Total	21000	mg/kg dry wt.	1	10	0.48		11/28/07 13:51
7439-95-4	Magnesium, Total	3800	mg/kg dry wt.	1	50	5.0		11/27/07 13:05
7439-96-5	Manganese, Total	280	mg/kg dry wt.	1	1.0	0.16		11/27/07 13:05
7440-09-7	Potassium, Total	1500	mg/kg dry wt.	1	50	5.3		11/28/07 13:51
7440-23-5	Sodium, Total	43	mg/kg dry wt.	1	100	13	J	11/27/07 13:05
7440-66-6	Zinc, Total	54	mg/kg dry wt.	1	5.0	1.0	J,S	11/27/07 13:07

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:20
Solids: 81.09
Laboratory ID: 0711377-10

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	12000	mg/kg dry wt.	1	10	2.1		11/27/07 13:11
7440-39-3	Barium, Total	60	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 13:12
7440-41-7	Beryllium, Total	0.54	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 13:13
7440-43-9	Cadmium, Total	1.5	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 13:13
7440-70-2	Calcium, Total	89000	mg/kg dry wt.	1	50	4.2		11/27/07 13:11
7440-47-3	Chromium, Total	23	mg/kg dry wt.	1	5.0	0.72		11/27/07 13:13
7440-48-4	Cobalt, Total	6.3	mg/kg dry wt.	1	2.0	0.37		11/27/07 13:13
7439-89-6	Iron, Total	17000	mg/kg dry wt.	1	10	0.48		11/28/07 13:57
7439-95-4	Magnesium, Total	44000	mg/kg dry wt.	10	500	50		11/27/07 16:10
7439-96-5	Manganese, Total	330	mg/kg dry wt.	1	1.0	0.16		11/27/07 13:12
7440-09-7	Potassium, Total	3100	mg/kg dry wt.	1	50	5.3		11/28/07 13:57
7440-23-5	Sodium, Total	110	mg/kg dry wt.	1	100	13		11/27/07 13:11
7440-66-6	Zinc, Total	41	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 13:13

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:45
Solids: 50.00
Laboratory ID: 0711377-13

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.4999 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	28000	mg/kg dry wt.	1	10	2.1		11/27/07 13:18
7440-39-3	Barium, Total	55	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 13:18
7440-41-7	Beryllium, Total	1.3	mg/kg dry wt.	1	1.0	0.021		11/27/07 13:19
7440-43-9	Cadmium, Total	2.6	mg/kg dry wt.	1	2.0	0.11		11/27/07 13:20
7440-70-2	Calcium, Total	87000	mg/kg dry wt.	1	50	4.2		11/27/07 13:18
7440-47-3	Chromium, Total	200	mg/kg dry wt.	1	5.0	0.72		11/28/07 14:05
7440-48-4	Cobalt, Total	4.7	mg/kg dry wt.	1	2.0	0.37		11/27/07 13:20
7439-89-6	Iron, Total	27000	mg/kg dry wt.	1	10	0.48		11/28/07 14:03
7439-95-4	Magnesium, Total	6900	mg/kg dry wt.	1	50	5.0		11/27/07 13:18
7439-96-5	Manganese, Total	240	mg/kg dry wt.	1	1.0	0.16		11/27/07 13:18
7440-09-7	Potassium, Total	810	mg/kg dry wt.	1	50	5.3		11/28/07 14:03
7440-23-5	Sodium, Total	110	mg/kg dry wt.	1	100	13		11/27/07 13:18
7440-66-6	Zinc, Total	150	mg/kg dry wt.	1	5.0	1.0	J,S	11/27/07 13:20

02977

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:47
Solids: 83.28
Laboratory ID: 0711377-14

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	20000	mg/kg dry wt.	1	10	2.1		11/27/07 13:24
7440-39-3	Barium, Total	120	mg/kg dry wt.	1	1.0	0.17	Km	11/27/07 13:24
7440-41-7	Beryllium, Total	0.88	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 13:26
7440-43-9	Cadmium, Total	2.1	mg/kg dry wt.	1	2.0	0.11		11/27/07 13:26
7440-70-2	Calcium, Total	2400	mg/kg dry wt.	1	50	4.2		11/27/07 13:24
7440-47-3	Chromium, Total	30	mg/kg dry wt.	1	5.0	0.72		11/27/07 13:26
7440-48-4	Cobalt, Total	13	mg/kg dry wt.	1	2.0	0.37		11/27/07 13:26
7439-89-6	Iron, Total	29000	mg/kg dry wt.	1	10	0.48		11/28/07 14:09
7439-95-4	Magnesium, Total	5000	mg/kg dry wt.	1	50	5.0		11/27/07 13:24
7439-96-5	Manganese, Total	470	mg/kg dry wt.	1	1.0	0.16		11/27/07 13:24
7440-09-7	Potassium, Total	2100	mg/kg dry wt.	1	50	5.3		11/28/07 14:09
7440-23-5	Sodium, Total	62	mg/kg dry wt.	1	100	13	J	11/27/07 13:24
7440-66-6	Zinc, Total	79	mg/kg dry wt.	1	5.0	1.0	JS	11/27/07 13:26

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:47
Solids: 85.90
Laboratory ID: 0711377-15

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	16000	mg/kg dry wt.	1	10	2.1		11/27/07 13:31
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17	Km	11/27/07 13:31
7440-41-7	Beryllium, Total	0.84	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 13:32
7440-43-9	Cadmium, Total	1.3	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 13:33
7440-70-2	Calcium, Total	3800	mg/kg dry wt.	1	50	4.2		11/27/07 13:31
7440-47-3	Chromium, Total	30	mg/kg dry wt.	1	5.0	0.72		11/27/07 13:33
7440-48-4	Cobalt, Total	9.3	mg/kg dry wt.	1	2.0	0.37		11/27/07 13:33
7439-89-6	Iron, Total	22000	mg/kg dry wt.	1	10	0.48		11/28/07 14:14
7439-95-4	Magnesium, Total	3800	mg/kg dry wt.	1	50	5.0		11/27/07 13:31
7439-96-5	Manganese, Total	290	mg/kg dry wt.	1	1.0	0.16		11/27/07 13:31
7440-09-7	Potassium, Total	2000	mg/kg dry wt.	1	50	5.3		11/28/07 14:14
7440-23-5	Sodium, Total	69	mg/kg dry wt.	1	100	13	J	11/27/07 13:31
7440-66-6	Zinc, Total	62	mg/kg dry wt.	1	5.0	1.0	JS	11/27/07 13:33

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:30
Solids: 48.28
Laboratory ID: 0711377-16

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	18000	mg/kg dry wt.	1	10	2.1		11/27/07 13:37
7440-39-3	Barium, Total	88	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 13:37
7440-41-7	Beryllium, Total	0.94	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 13:39
7440-43-9	Cadmium, Total	1.0	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 13:39
7440-70-2	Calcium, Total	12000	mg/kg dry wt.	1	50	4.2		11/27/07 13:37
7440-47-3	Chromium, Total	110	mg/kg dry wt.	1	5.0	0.72		11/28/07 14:22
7440-48-4	Cobalt, Total	4.0	mg/kg dry wt.	1	2.0	0.37		11/27/07 13:39
7439-89-6	Iron, Total	18000	mg/kg dry wt.	1	10	0.48		11/28/07 14:20
7439-95-4	Magnesium, Total	4100	mg/kg dry wt.	1	50	5.0		11/27/07 13:37
7439-96-5	Manganese, Total	140	mg/kg dry wt.	1	1.0	0.16		11/27/07 13:37
7440-09-7	Potassium, Total	1400	mg/kg dry wt.	1	50	5.3		11/28/07 14:20
7440-23-5	Sodium, Total	57	mg/kg dry wt.	1	100	13	J	11/27/07 13:37
7440-66-6	Zinc, Total	90	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 13:39

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:30
Solids: 85.35
Laboratory ID: 0711377-17

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	13000	mg/kg dry wt.	1	10	2.1		11/27/07 13:44
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 13:44
7440-41-7	Beryllium, Total	0.91	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 13:45
7440-43-9	Cadmium, Total	1.4	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 13:46
7440-70-2	Calcium, Total	2000	mg/kg dry wt.	1	50	4.2		11/27/07 13:44
7440-47-3	Chromium, Total	31	mg/kg dry wt.	1	5.0	0.72		11/27/07 13:46
7440-48-4	Cobalt, Total	6.0	mg/kg dry wt.	1	2.0	0.37		11/27/07 13:46
7439-89-6	Iron, Total	19000	mg/kg dry wt.	1	10	0.48		11/28/07 14:48
7439-95-4	Magnesium, Total	3100	mg/kg dry wt.	1	50	5.0		11/27/07 13:44
7439-96-5	Manganese, Total	150	mg/kg dry wt.	1	1.0	0.16		11/27/07 13:44
7440-09-7	Potassium, Total	1400	mg/kg dry wt.	1	50	5.3		11/28/07 14:48
7440-23-5	Sodium, Total	53	mg/kg dry wt.	1	100	13	J	11/27/07 13:44
7440-66-6	Zinc, Total	68	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 13:46

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:35
Solids: 84.43
Laboratory ID: 0711377-18

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	18000	mg/kg dry wt.	1	10	2.1		11/27/07 13:50
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 13:50
7440-41-7	Beryllium, Total	0.80	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 13:52
7440-43-9	Cadmium, Total	1.2	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 13:52
7440-70-2	Calcium, Total	10000	mg/kg dry wt.	1	50	4.2		11/27/07 13:50
7440-47-3	Chromium, Total	27	mg/kg dry wt.	1	5.0	0.72		11/27/07 13:52
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		11/27/07 13:52
7439-89-6	Iron, Total	24000	mg/kg dry wt.	1	10	0.48		11/28/07 14:54
7439-95-4	Magnesium, Total	3900	mg/kg dry wt.	1	50	5.0		11/27/07 13:50
7439-96-5	Manganese, Total	640	mg/kg dry wt.	1	1.0	0.16		11/27/07 13:50
7440-09-7	Potassium, Total	2300	mg/kg dry wt.	1	50	5.3		11/28/07 14:54
7440-23-5	Sodium, Total	51	mg/kg dry wt.	1	100	13	J	11/27/07 13:50
7440-66-6	Zinc, Total	66	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 13:52

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:00
Solids: 60.13
Laboratory ID: 0711377-19

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.4999 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	19000	mg/kg dry wt.	1	10	2.1		11/27/07 13:57
7440-39-3	Barium, Total	90	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 13:57
7440-41-7	Beryllium, Total	0.91	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 13:58
7440-43-9	Cadmium, Total	0.86	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 13:59
7440-70-2	Calcium, Total	18000	mg/kg dry wt.	1	50	4.2		11/27/07 13:57
7440-47-3	Chromium, Total	120	mg/kg dry wt.	1	5.0	0.72		11/28/07 15:01
7440-48-4	Cobalt, Total	4.3	mg/kg dry wt.	1	2.0	0.37		11/27/07 13:59
7439-89-6	Iron, Total	20000	mg/kg dry wt.	1	10	0.48		11/28/07 15:00
7439-95-4	Magnesium, Total	4500	mg/kg dry wt.	1	50	5.0		11/27/07 13:57
7439-96-5	Manganese, Total	150	mg/kg dry wt.	1	1.0	0.16		11/27/07 13:57
7440-09-7	Potassium, Total	1500	mg/kg dry wt.	1	50	5.3		11/28/07 15:00
7440-23-5	Sodium, Total	64	mg/kg dry wt.	1	100	13	J	11/27/07 13:57
7440-66-6	Zinc, Total	84	mg/kg dry wt.	1	5.0	1.0	J,S	11/27/07 13:59

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:10
Solids: 49.06
Laboratory ID: 0711377-20

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	29000	mg/kg dry wt.	1	10	2.1		11/27/07 14:18
7440-39-3	Barium, Total	63	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 14:18
7440-41-7	Beryllium, Total	1.4	mg/kg dry wt.	1	1.0	0.021		11/27/07 14:19
7440-43-9	Cadmium, Total	1.7	mg/kg dry wt.	1	2.0	0.11	J	11/27/07 14:19
7440-70-2	Calcium, Total	49000	mg/kg dry wt.	1	50	4.2		11/27/07 14:18
7440-47-3	Chromium, Total	170	mg/kg dry wt.	1	5.0	0.72		11/28/07 15:07
7440-48-4	Cobalt, Total	5.0	mg/kg dry wt.	1	2.0	0.37		11/27/07 14:19
7439-89-6	Iron, Total	21000	mg/kg dry wt.	1	10	0.48		11/28/07 15:05
7439-95-4	Magnesium, Total	6600	mg/kg dry wt.	1	50	5.0		11/27/07 14:18
7439-96-5	Manganese, Total	250	mg/kg dry wt.	1	1.0	0.16		11/27/07 14:18
7440-09-7	Potassium, Total	1000	mg/kg dry wt.	1	50	5.3		11/28/07 15:05
7440-23-5	Sodium, Total	93	mg/kg dry wt.	1	100	13	J	11/27/07 14:18
7440-66-6	Zinc, Total	150	mg/kg dry wt.	1	5.0	1.0	J,S	11/27/07 14:19

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:15
Solids: 84.67
Laboratory ID: 0711377-21

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	20000	mg/kg dry wt.	1	10	2.1		11/27/07 14:24
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 14:24
7440-41-7	Beryllium, Total	0.93	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 14:26
7440-43-9	Cadmium, Total	2.1	mg/kg dry wt.	1	2.0	0.11		11/27/07 14:26
7440-70-2	Calcium, Total	1900	mg/kg dry wt.	1	50	4.2		11/27/07 14:24
7440-47-3	Chromium, Total	30	mg/kg dry wt.	1	5.0	0.72		11/27/07 14:26
7440-48-4	Cobalt, Total	11	mg/kg dry wt.	1	2.0	0.37		11/27/07 14:26
7439-89-6	Iron, Total	27000	mg/kg dry wt.	1	10	0.48		11/28/07 15:11
7439-95-4	Magnesium, Total	4700	mg/kg dry wt.	1	50	5.0		11/27/07 14:24
7439-96-5	Manganese, Total	430	mg/kg dry wt.	1	1.0	0.16		11/27/07 14:24
7440-09-7	Potassium, Total	2600	mg/kg dry wt.	1	50	5.3		11/28/07 15:11
7440-23-5	Sodium, Total	77	mg/kg dry wt.	1	100	13	J	11/27/07 14:24
7440-66-6	Zinc, Total	77	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 14:26

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:15
Solids: 83.78
Laboratory ID: 0711377-22

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/20/07 07:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714264

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	20000	mg/kg dry wt.	100	1000	210		11/27/07 15:48
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17	K,m	11/27/07 14:31
7440-41-7	Beryllium, Total	0.93	mg/kg dry wt.	1	1.0	0.021	J	11/27/07 14:32
7440-43-9	Cadmium, Total	2.4	mg/kg dry wt.	1	2.0	0.11		11/27/07 14:33
7440-70-2	Calcium, Total	1900	mg/kg dry wt.	1	50	4.2		11/27/07 14:31
7440-47-3	Chromium, Total	31	mg/kg dry wt.	1	5.0	0.72		11/27/07 14:33
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		11/27/07 14:33
7439-89-6	Iron, Total	32000	mg/kg dry wt.	500	5000	240		11/28/07 16:02
7439-95-4	Magnesium, Total	5000	mg/kg dry wt.	1	50	5.0		11/27/07 14:31
7439-96-5	Manganese, Total	330	mg/kg dry wt.	1	1.0	0.16		11/27/07 14:31
7440-09-7	Potassium, Total	2700	mg/kg dry wt.	1	50	5.3		11/28/07 15:16
7440-23-5	Sodium, Total	110	mg/kg dry wt.	1	100	13		11/27/07 14:31
7440-66-6	Zinc, Total	80	mg/kg dry wt.	1	5.0	1.0	J,s	11/27/07 14:33

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

EQBK-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/14/07 16:00
Solids: 0.00
Laboratory ID: 0711377-23

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3010A Digestion
Prepared: 11/27/07 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0714425

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	11/30/07 08:53
7440-70-2	Calcium, Total	270	ug/L	1	500	40	J	11/30/07 08:53
7439-89-6	Iron, Total	9.0	ug/L	1	20	5.7	J	11/30/07 08:53
7439-95-4	Magnesium, Total	500	ug/L	1	500	38	U	11/30/07 08:53
7440-09-7	Potassium, Total	200	ug/L	1	200	54	U	11/30/07 08:53
7440-23-5	Sodium, Total	500	ug/L	1	500	84	U	11/30/07 08:53

SAMPLE ID SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42

Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35SB3A	0711293-01
EQBK-1	0711313-01
35SB4A	0711313-03
DUP-1	0711313-04
35SB1A	0711313-05
35SB2A	0711313-06
35SB6A	0711313-07
35SB6B	0711313-08
35SB6C	0711313-09
35SB9A	0711313-10
35SB9B	0711313-11
35SB9C	0711313-12
35SB10A	0711313-13
35SB10B	0711313-14
35SB10C	0711313-15
35SB7A	0711377-01
35SB7B	0711377-02
35SB7C	0711377-03
35SB5A	0711377-04
35SB5B	0711377-05
35SB5C	0711377-06
DUP-2	0711377-07
35SB8A	0711377-08
35SB8B	0711377-09
35SB8C	0711377-10
37SB10A	0711377-13
37SB10B	0711377-14
37SB10C	0711377-15
37SB9A	0711377-16
37SB9B	0711377-17
37SB9C	0711377-18
DUP-3	0711377-19
37SB7A	0711377-20
37SB7B	0711377-21
37SB7C	0711377-22
EQBK-2	0711377-23

: 03459

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB3A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/12/07 16:06
Solids: 90.68
Laboratory ID: 0711293-01

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	2.1	mg/kg dry wt.	1	0.20	0.071		11/27/07 21:12
7440-50-8	Copper, Total	18	mg/kg dry wt.	1	0.20	0.044	J,S	11/27/07 21:12
7439-92-1	Lead, Total	63	mg/kg dry wt.	2	0.40	0.045		11/27/07 22:24
7440-02-0	Nickel, Total	17	mg/kg dry wt.	1	0.10	0.036	J,S	11/27/07 21:12
7782-49-2	Selenium, Total	0.37	mg/kg dry wt.	1	0.30	0.089	L,m	11/27/07 21:12
7440-22-4	Silver, Total	0.12	mg/kg dry wt.	1	0.10	0.013		11/27/07 21:12
7440-28-0	Thallium, Total	0.19	mg/kg dry wt.	1	0.10	0.0049		11/27/07 21:12
7440-62-2	Vanadium, Total	41	mg/kg dry wt.	1	0.10	0.034	J,S	11/27/07 21:12

: 03491

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB3A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/12/07 16:06
Solids: 90.68
Laboratory ID: 0711293-01

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.086	mg/kg dry wt.	1	0.20	0.042	J	11/21/07 14:52

: 03495

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/13/07 16:00
Solids: 0.00
Laboratory ID: 0711313-01

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3020A Digestion
Prepared: 11/29/07 07:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0714543

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	12/01/07 00:59
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	11/30/07 13:56
7440-39-3	Barium, Total	2.0	ug/L	1	2.0	0.52	U	11/30/07 13:56
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	11/30/07 13:56
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	11/30/07 13:56
7440-47-3	Chromium, Total	2.0	ug/L	1	2.0	0.31	U	12/01/07 00:59
7440-48-4	Cobalt, Total	1.0	ug/L	1	1.0	0.096	U	11/30/07 13:56
7440-50-8	Copper, Total	1.0	ug/L	1	1.0	0.33	U	11/30/07 13:56
7439-92-1	Lead, Total	0.98	ug/L	1	1.0	0.33	J	12/01/07 00:59
7439-96-5	Manganese, Total	0.66	ug/L	1	3.0	0.43	J	11/30/07 13:56
7440-02-0	Nickel, Total	0.32	ug/L	1	2.0	0.28	J	11/30/07 13:56
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	11/30/07 13:56
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	11/30/07 13:56
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	12/03/07 13:39
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	11/30/07 13:56
7440-66-6	Zinc, Total	5.3	ug/L	1	10	0.84	J B,P	11/30/07 13:56

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 07:50
Solids: 83.32
Laboratory ID: 0711313-03

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.4997 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	2.4	mg/kg dry wt.	1	0.20	0.071		11/27/07 21:15
7440-50-8	Copper, Total	18	mg/kg dry wt.	1	0.20	0.044	J,S	11/27/07 21:15
7439-92-1	Lead, Total	97	mg/kg dry wt.	4	0.80	0.090		11/27/07 22:27
7440-02-0	Nickel, Total	16	mg/kg dry wt.	1	0.10	0.036	J,S	11/27/07 21:15
7782-49-2	Selenium, Total	0.31	mg/kg dry wt.	1	0.30	0.089	L,M	11/27/07 21:15
7440-22-4	Silver, Total	0.092	mg/kg dry wt.	1	0.10	0.013	J	11/27/07 21:15
7440-28-0	Thallium, Total	0.20	mg/kg dry wt.	1	0.10	0.0049		11/27/07 21:15
7440-62-2	Vanadium, Total	40	mg/kg dry wt.	1	0.10	0.034	J,S	11/27/07 21:15

: 03497

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 07:50
Solids: 83.32
Laboratory ID: 0711313-03

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.052	mg/kg dry wt.	1	0.20	0.042	J	11/21/07 14:54

03498

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 08:00
Solids: 83.87
Laboratory ID: 0711313-04

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	3.0	mg/kg dry wt.	1	0.20	0.071		11/27/07 21:18
7440-50-8	Copper, Total	17	mg/kg dry wt.	1	0.20	0.044	J,s	11/27/07 21:18
7439-92-1	Lead, Total	70	mg/kg dry wt.	2	0.40	0.045		11/27/07 22:30
7440-02-0	Nickel, Total	15	mg/kg dry wt.	1	0.10	0.036	J,s	11/27/07 21:18
7782-49-2	Selenium, Total	0.29	mg/kg dry wt.	1	0.30	0.089	J L,m	11/27/07 21:18
7440-22-4	Silver, Total	0.085	mg/kg dry wt.	1	0.10	0.013	J	11/27/07 21:18
7440-28-0	Thallium, Total	0.22	mg/kg dry wt.	1	0.10	0.0049		11/27/07 21:18
7440-62-2	Vanadium, Total	47	mg/kg dry wt.	1	0.10	0.034	J,s	11/27/07 21:18

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 08:00
Solids: 83.87
Laboratory ID: 0711313-04

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.20	mg/kg dry wt.	1	0.20	0.042	U	11/21/07 14:56

03508

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB1A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 08:25
Solids: 85.52
Laboratory ID: 0711313-05

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.4996 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.5	mg/kg dry wt.	1	0.20	0.071		11/27/07 21:21
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044	J,s	11/27/07 21:21
7439-92-1	Lead, Total	25	mg/kg dry wt.	1	0.20	0.022		11/27/07 21:21
7440-02-0	Nickel, Total	12	mg/kg dry wt.	1	0.10	0.036	J,s	11/27/07 21:21
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	J,L,m	11/27/07 21:21
7440-22-4	Silver, Total	0.067	mg/kg dry wt.	1	0.10	0.013	J	11/27/07 21:21
7440-28-0	Thallium, Total	0.19	mg/kg dry wt.	1	0.10	0.0049		11/27/07 21:21
7440-62-2	Vanadium, Total	39	mg/kg dry wt.	1	0.10	0.034	J,s	11/27/07 21:21

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB1A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 08:25
Solids: 85.52
Laboratory ID: 0711313-05

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.20	mg/kg dry wt.	1	0.20	0.042	U	11/21/07 14:58

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB2A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 09:20
Solids: 83.07
Laboratory ID: 0711313-06

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	3.6	mg/kg dry wt.	1	0.20	0.071		11/27/07 21:24
7440-50-8	Copper, Total	21	mg/kg dry wt.	1	0.20	0.044	J,s	11/27/07 21:24
7439-92-1	Lead, Total	54	mg/kg dry wt.	2	0.40	0.045		11/27/07 22:33
7440-02-0	Nickel, Total	16	mg/kg dry wt.	1	0.10	0.036	J,s	11/27/07 21:24
7782-49-2	Selenium, Total	0.37	mg/kg dry wt.	1	0.30	0.089	L,m	11/27/07 21:24
7440-22-4	Silver, Total	0.27	mg/kg dry wt.	1	0.10	0.013		11/27/07 21:24
7440-28-0	Thallium, Total	0.22	mg/kg dry wt.	1	0.10	0.0049		11/27/07 21:24
7440-62-2	Vanadium, Total	40	mg/kg dry wt.	1	0.10	0.034	J,s	11/27/07 21:24

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB2A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 09:20
Solids: 83.07
Laboratory ID: 0711313-06

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.079	mg/kg dry wt.	1	0.20	0.042	J	11/21/07 15:01

035611

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 14:45
Solids: 58.85
Laboratory ID: 0711313-07

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	7.9	mg/kg dry wt.	1	0.20	0.071		11/27/07 21:48
7440-50-8	Copper, Total	79	mg/kg dry wt.	2	0.40	0.088	J,S	11/27/07 22:47
7439-92-1	Lead, Total	250	mg/kg dry wt.	10	2.0	0.22		11/27/07 22:50
7440-02-0	Nickel, Total	45	mg/kg dry wt.	1	0.10	0.036	J,S	11/27/07 21:48
7782-49-2	Selenium, Total	0.16	mg/kg dry wt.	1	0.30	0.089	J L,M	11/27/07 21:48
7440-22-4	Silver, Total	2.2	mg/kg dry wt.	1	0.10	0.013		11/27/07 21:48
7440-28-0	Thallium, Total	0.11	mg/kg dry wt.	1	0.10	0.0049		11/27/07 21:48
7440-62-2	Vanadium, Total	28	mg/kg dry wt.	1	0.10	0.034	J,S	11/27/07 21:48

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 14:45
Solids: 58.85
Laboratory ID: 0711313-07

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.21	mg/kg dry wt.	1	0.20	0.042		11/21/07 15:25

: 03506

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB6B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 14:55
Solids: 85.53
Laboratory ID: 0711313-08

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.2	mg/kg dry wt.	1	0.20	0.071		11/27/07 21:51
7440-50-8	Copper, Total	11	mg/kg dry wt.	1	0.20	0.044	J,s	11/27/07 21:51
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022		11/27/07 21:51
7440-02-0	Nickel, Total	15	mg/kg dry wt.	1	0.10	0.036	J,s	11/27/07 21:51
7782-49-2	Selenium, Total	0.29	mg/kg dry wt.	1	0.30	0.089	J L,m	11/27/07 21:51
7440-22-4	Silver, Total	0.052	mg/kg dry wt.	1	0.10	0.013	J	11/27/07 21:51
7440-28-0	Thallium, Total	0.18	mg/kg dry wt.	1	0.10	0.0049		11/27/07 21:51
7440-62-2	Vanadium, Total	41	mg/kg dry wt.	1	0.10	0.034	J,s	11/27/07 21:51

03587

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB6B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 14:55
Solids: 85.53
Laboratory ID: 0711313-08

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.20	mg/kg dry wt.	1	0.20	0.042	U	11/21/07 15:28

03508

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB6C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 15:05
Solids: 82.73
Laboratory ID: 0711313-09

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.0	mg/kg dry wt.	1	0.20	0.071		11/27/07 21:54
7440-50-8	Copper, Total	10	mg/kg dry wt.	1	0.20	0.044	J, s	11/27/07 21:54
7439-92-1	Lead, Total	10	mg/kg dry wt.	1	0.20	0.022		11/27/07 21:54
7440-02-0	Nickel, Total	12	mg/kg dry wt.	1	0.10	0.036	J, s	11/27/07 21:54
7782-49-2	Selenium, Total	0.14	mg/kg dry wt.	1	0.30	0.089	J L, m	11/27/07 21:54
7440-22-4	Silver, Total	0.070	mg/kg dry wt.	1	0.10	0.013	J	11/27/07 21:54
7440-28-0	Thallium, Total	0.15	mg/kg dry wt.	1	0.10	0.0049		11/27/07 21:54
7440-62-2	Vanadium, Total	30	mg/kg dry wt.	1	0.10	0.034	J, s	11/27/07 21:54

: 03509

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB6C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 15:05
Solids: 82.73
Laboratory ID: 0711313-09

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.20	mg/kg dry wt.	1	0.20	0.042	U	11/21/07 15:30

03510

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 10:45
Solids: 73.11
Laboratory ID: 0711313-10

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	6.7	mg/kg dry wt.	1	0.20	0.071		11/27/07 21:57
7440-50-8	Copper, Total	130	mg/kg dry wt.	5	1.0	0.22	J,S	11/27/07 22:59
7439-92-1	Lead, Total	530	mg/kg dry wt.	20	4.0	0.45		11/27/07 23:02
7440-02-0	Nickel, Total	37	mg/kg dry wt.	1	0.10	0.036	J,S	11/27/07 21:57
7782-49-2	Selenium, Total	0.33	mg/kg dry wt.	1	0.30	0.089	L,m	11/27/07 21:57
7440-22-4	Silver, Total	17	mg/kg dry wt.	1	0.10	0.013		11/27/07 21:57
7440-28-0	Thallium, Total	0.19	mg/kg dry wt.	1	0.10	0.0049		11/27/07 21:57
7440-62-2	Vanadium, Total	35	mg/kg dry wt.	1	0.10	0.034	J,S	11/27/07 21:57

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 10:45
Solids: 73.11
Laboratory ID: 0711313-10

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.16	mg/kg dry wt.	1	0.20	0.042	J	11/21/07 15:32

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 12:10
Solids: 66.46
Laboratory ID: 0711313-11

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.5	mg/kg dry wt.	1	0.20	0.071		11/27/07 22:00
7440-50-8	Copper, Total	24	mg/kg dry wt.	1	0.20	0.044	J,S	11/27/07 22:00
7439-92-1	Lead, Total	120	mg/kg dry wt.	5	1.0	0.11		11/27/07 23:05
7440-02-0	Nickel, Total	21	mg/kg dry wt.	1	0.10	0.036	J,S	11/27/07 22:00
7782-49-2	Selenium, Total	0.21	mg/kg dry wt.	1	0.30	0.089	J L,M	11/27/07 22:00
7440-22-4	Silver, Total	0.11	mg/kg dry wt.	1	0.10	0.013		11/27/07 22:00
7440-28-0	Thallium, Total	0.20	mg/kg dry wt.	1	0.10	0.0049		11/27/07 22:00
7440-62-2	Vanadium, Total	41	mg/kg dry wt.	1	0.10	0.034	J,S	11/27/07 22:00

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 12:10
Solids: 66.46
Laboratory ID: 0711313-11

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.20	mg/kg dry wt.	1	0.20	0.042	U	11/21/07 15:34

03514

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 12:00
Solids: 80.32
Laboratory ID: 0711313-12

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.9	mg/kg dry wt.	1	0.20	0.071		11/27/07 22:03
7440-50-8	Copper, Total	16	mg/kg dry wt.	1	0.20	0.044	J,S	11/27/07 22:03
7439-92-1	Lead, Total	37	mg/kg dry wt.	1	0.20	0.022		11/27/07 22:03
7440-02-0	Nickel, Total	13	mg/kg dry wt.	1	0.10	0.036	J,S	11/27/07 22:03
7782-49-2	Selenium, Total	0.22	mg/kg dry wt.	1	0.30	0.089	J L,M	11/27/07 22:03
7440-22-4	Silver, Total	1.0	mg/kg dry wt.	1	0.10	0.013		11/27/07 22:03
7440-28-0	Thallium, Total	0.15	mg/kg dry wt.	1	0.10	0.0049		11/27/07 22:03
7440-62-2	Vanadium, Total	31	mg/kg dry wt.	1	0.10	0.034	J,S	11/27/07 22:03

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 12:00
Solids: 80.32
Laboratory ID: 0711313-12

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.20	mg/kg dry wt.	1	0.20	0.042	U	11/21/07 15:36

: 03516

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:30
Solids: 50.60
Laboratory ID: 0711313-13

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	10	mg/kg dry wt.	1	0.20	0.071		11/27/07 22:06
7440-50-8	Copper, Total	83	mg/kg dry wt.	5	1.0	0.22	J,S	11/27/07 23:08
7439-92-1	Lead, Total	130	mg/kg dry wt.	5	1.0	0.11		11/27/07 23:08
7440-02-0	Nickel, Total	36	mg/kg dry wt.	1	0.10	0.036	J,S	11/27/07 22:06
7782-49-2	Selenium, Total	0.18	mg/kg dry wt.	1	0.30	0.089	J L,M	11/27/07 22:06
7440-22-4	Silver, Total	2.2	mg/kg dry wt.	1	0.10	0.013		11/27/07 22:06
7440-28-0	Thallium, Total	0.059	mg/kg dry wt.	1	0.10	0.0049	J	11/27/07 22:06
7440-62-2	Vanadium, Total	21	mg/kg dry wt.	1	0.10	0.034	J,S	11/27/07 22:06

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:30
Solids: 50.60
Laboratory ID: 0711313-13

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.20	mg/kg dry wt.	1	0.20	0.042		11/21/07 15:38

03518

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:38
Solids: 86.20
Laboratory ID: 0711313-14

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	0.95	mg/kg dry wt.	1	0.20	0.071		11/27/07 22:09
7440-50-8	Copper, Total	11	mg/kg dry wt.	1	0.20	0.044	J,s	11/27/07 22:09
7439-92-1	Lead, Total	22	mg/kg dry wt.	1	0.20	0.022		11/27/07 22:09
7440-02-0	Nickel, Total	13	mg/kg dry wt.	1	0.10	0.036	J,s	11/27/07 22:09
7782-49-2	Selenium, Total	0.22	mg/kg dry wt.	1	0.30	0.089	J L,m	11/27/07 22:09
7440-22-4	Silver, Total	0.048	mg/kg dry wt.	1	0.10	0.013	J	11/27/07 22:09
7440-28-0	Thallium, Total	0.17	mg/kg dry wt.	1	0.10	0.0049		11/27/07 22:09
7440-62-2	Vanadium, Total	36	mg/kg dry wt.	1	0.10	0.034	J,s	11/27/07 22:09

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:38
Solids: 86.20
Laboratory ID: 0711313-14

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.20	mg/kg dry wt.	1	0.20	0.042	U	11/21/07 15:40

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:45
Solids: 82.38
Laboratory ID: 0711313-15

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 07:35
Initial/Final: 0.4996 g / 250 mL
QC Batch: 0714077

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.5	mg/kg dry wt.	1	0.20	0.071		11/27/07 22:11
7440-50-8	Copper, Total	28	mg/kg dry wt.	1	0.20	0.044	J,S	11/27/07 22:11
7439-92-1	Lead, Total	180	mg/kg dry wt.	5	1.0	0.11		11/27/07 23:11
7440-02-0	Nickel, Total	17	mg/kg dry wt.	1	0.10	0.036	J,S	11/27/07 22:11
7782-49-2	Selenium, Total	0.29	mg/kg dry wt.	1	0.30	0.089	J L,m	11/27/07 22:11
7440-22-4	Silver, Total	1.1	mg/kg dry wt.	1	0.10	0.013		11/27/07 22:11
7440-28-0	Thallium, Total	0.15	mg/kg dry wt.	1	0.10	0.0049		11/27/07 22:11
7440-62-2	Vanadium, Total	32	mg/kg dry wt.	1	0.10	0.034	J,S	11/27/07 22:11

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:45
Solids: 82.38
Laboratory ID: 0711313-15

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/19/07 14:30
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0714088

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.045	mg/kg dry wt.	1	0.20	0.042	J	11/21/07 15:42

03522

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:00
Solids: 53.00
Laboratory ID: 0711377-01

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	9.7	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:20
7440-50-8	Copper, Total	200	mg/kg dry wt.	5	1.0	0.22	J,S	12/01/07 14:38
7439-92-1	Lead, Total	750	mg/kg dry wt.	20	4.0	0.45		12/01/07 14:35
7440-02-0	Nickel, Total	34	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 11:20
7782-49-2	Selenium, Total	0.20	mg/kg dry wt.	1	0.30	0.089	J L,M	12/01/07 11:20
7440-22-4	Silver, Total	25	mg/kg dry wt.	1	0.10	0.013		12/01/07 11:20
7440-28-0	Thallium, Total	0.12	mg/kg dry wt.	1	0.10	0.0049		12/01/07 11:20
7440-62-2	Vanadium, Total	28	mg/kg dry wt.	1	0.10	0.034	J,S	12/01/07 11:20

03524

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:00
Solids: 53.00
Laboratory ID: 0711377-01

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	1.1	mg/kg dry wt.	1	0.20	0.042		11/28/07 22:10

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:08
Solids: 87.74
Laboratory ID: 0711377-02

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.5	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:23
7440-50-8	Copper, Total	11	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 11:23
7439-92-1	Lead, Total	13	mg/kg dry wt.	1	0.20	0.022		12/01/07 11:23
7440-02-0	Nickel, Total	14	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 11:23
7782-49-2	Selenium, Total	0.12	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 11:23
7440-22-4	Silver, Total	0.065	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 11:23
7440-28-0	Thallium, Total	0.18	mg/kg dry wt.	1	0.10	0.0049		12/01/07 11:23
7440-62-2	Vanadium, Total	37	mg/kg dry wt.	1	0.10	0.034	J,s	12/01/07 11:23

03526

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:08
Solids: 87.74
Laboratory ID: 0711377-02

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.12	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:12

: 03525

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:25
Solids: 86.53
Laboratory ID: 0711377-03

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	4.7	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:26
7440-50-8	Copper, Total	65	mg/kg dry wt.	5	1.0	0.22	J,s	12/01/07 14:41
7439-92-1	Lead, Total	220	mg/kg dry wt.	5	1.0	0.11		12/01/07 14:41
7440-02-0	Nickel, Total	33	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 11:26
7782-49-2	Selenium, Total	0.14	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 11:26
7440-22-4	Silver, Total	5.0	mg/kg dry wt.	1	0.10	0.013		12/01/07 11:26
7440-28-0	Thallium, Total	0.19	mg/kg dry wt.	1	0.10	0.0049		12/01/07 11:26
7440-62-2	Vanadium, Total	40	mg/kg dry wt.	1	0.10	0.034	J,s	12/01/07 11:26

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:25
Solids: 86.53
Laboratory ID: 0711377-03

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.35	mg/kg dry wt.	1	0.20	0.042		11/28/07 22:13

03527

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:10
Solids: 80.92
Laboratory ID: 0711377-04

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	3.8	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:29
7440-50-8	Copper, Total	73	mg/kg dry wt.	5	1.0	0.22	J,s	12/01/07 14:44
7439-92-1	Lead, Total	240	mg/kg dry wt.	5	1.0	0.11		12/01/07 14:44
7440-02-0	Nickel, Total	27	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 11:29
7782-49-2	Selenium, Total	0.31	mg/kg dry wt.	1	0.30	0.089	L,m	12/01/07 11:29
7440-22-4	Silver, Total	7.4	mg/kg dry wt.	1	0.10	0.013		12/01/07 11:29
7440-28-0	Thallium, Total	0.23	mg/kg dry wt.	1	0.10	0.0049		12/01/07 11:29
7440-62-2	Vanadium, Total	38	mg/kg dry wt.	1	0.10	0.034	J,s	12/01/07 11:29

03538

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:10
Solids: 80.92
Laboratory ID: 0711377-04

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.50	mg/kg dry wt.	1	0.20	0.042		11/28/07 22:20

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB5B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:23
Solids: 83.40
Laboratory ID: 0711377-05

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.1	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:32
7440-50-8	Copper, Total	11	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 11:32
7439-92-1	Lead, Total	9.6	mg/kg dry wt.	1	0.20	0.022		12/01/07 11:32
7440-02-0	Nickel, Total	14	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 11:32
7782-49-2	Selenium, Total	0.13	mg/kg dry wt.	1	0.30	0.089	J L,M	12/01/07 11:32
7440-22-4	Silver, Total	0.073	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 11:32
7440-28-0	Thallium, Total	0.18	mg/kg dry wt.	1	0.10	0.0049		12/01/07 11:32
7440-62-2	Vanadium, Total	35	mg/kg dry wt.	1	0.10	0.034	J,S	12/01/07 11:32

03532

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB5B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:23
Solids: 83.40
Laboratory ID: 0711377-05

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.082	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:22

03531

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB5C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:27
Solids: 80.59
Laboratory ID: 0711377-06

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	0.82	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:35
7440-50-8	Copper, Total	11	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 11:35
7439-92-1	Lead, Total	10	mg/kg dry wt.	1	0.20	0.022		12/01/07 11:35
7440-02-0	Nickel, Total	13	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 11:35
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U UL,m	12/01/07 11:35
7440-22-4	Silver, Total	0.080	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 11:35
7440-28-0	Thallium, Total	0.19	mg/kg dry wt.	1	0.10	0.0049		12/01/07 11:35
7440-62-2	Vanadium, Total	35	mg/kg dry wt.	1	0.10	0.034	J,s	12/01/07 11:35

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB5C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:27
Solids: 80.59
Laboratory ID: 0711377-06

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.065	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:23

035533

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:00
Solids: 79.15
Laboratory ID: 0711377-07

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	3.4	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:38
7440-50-8	Copper, Total	68	mg/kg dry wt.	2	0.40	0.088	J,S	12/01/07 14:50
7439-92-1	Lead, Total	300	mg/kg dry wt.	10	2.0	0.22		12/01/07 14:47
7440-02-0	Nickel, Total	23	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 11:38
7782-49-2	Selenium, Total	0.26	mg/kg dry wt.	1	0.30	0.089	J Lm	12/01/07 11:38
7440-22-4	Silver, Total	8.7	mg/kg dry wt.	1	0.10	0.013		12/01/07 11:38
7440-28-0	Thallium, Total	0.24	mg/kg dry wt.	1	0.10	0.0049		12/01/07 11:38
7440-62-2	Vanadium, Total	38	mg/kg dry wt.	1	0.10	0.034	J,S	12/01/07 11:38

: 03536

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:00
Solids: 79.15
Laboratory ID: 0711377-07

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.42	mg/kg dry wt.	1	0.20	0.042		11/28/07 22:25

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:05
Solids: 80.71
Laboratory ID: 0711377-08

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	2.5	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:48
7440-50-8	Copper, Total	38	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 11:48
7439-92-1	Lead, Total	180	mg/kg dry wt.	5	1.0	0.11		12/01/07 14:53
7440-02-0	Nickel, Total	23	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 11:48
7782-49-2	Selenium, Total	0.16	mg/kg dry wt.	1	0.30	0.089	J L,M	12/01/07 11:48
7440-22-4	Silver, Total	0.71	mg/kg dry wt.	1	0.10	0.013		12/01/07 11:48
7440-28-0	Thallium, Total	0.17	mg/kg dry wt.	1	0.10	0.0049		12/01/07 11:48
7440-62-2	Vanadium, Total	32	mg/kg dry wt.	1	0.10	0.034	J,S	12/01/07 11:48

03538

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:05
Solids: 80.71
Laboratory ID: 0711377-08

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.31	mg/kg dry wt.	1	0.20	0.042		11/28/07 22:27

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:15
Solids: 82.15
Laboratory ID: 0711377-09

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	2.2	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:50
7440-50-8	Copper, Total	16	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 11:50
7439-92-1	Lead, Total	26	mg/kg dry wt.	1	0.20	0.022		12/01/07 11:50
7440-02-0	Nickel, Total	15	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 11:50
7782-49-2	Selenium, Total	0.15	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 11:50
7440-22-4	Silver, Total	0.62	mg/kg dry wt.	1	0.10	0.013		12/01/07 11:50
7440-28-0	Thallium, Total	0.14	mg/kg dry wt.	1	0.10	0.0049		12/01/07 11:50
7440-62-2	Vanadium, Total	28	mg/kg dry wt.	1	0.10	0.034	J,s	12/01/07 11:50

: 03548

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:15
Solids: 82.15
Laboratory ID: 0711377-09

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.12	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:28

03539

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:20
Solids: 81.09
Laboratory ID: 0711377-10

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.2	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:53
7440-50-8	Copper, Total	13	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 11:53
7439-92-1	Lead, Total	22	mg/kg dry wt.	1	0.20	0.022		12/01/07 11:53
7440-02-0	Nickel, Total	11	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 11:53
7782-49-2	Selenium, Total	0.13	mg/kg dry wt.	1	0.30	0.089	J L,M	12/01/07 11:53
7440-22-4	Silver, Total	0.68	mg/kg dry wt.	1	0.10	0.013		12/01/07 11:53
7440-28-0	Thallium, Total	0.16	mg/kg dry wt.	1	0.10	0.0049		12/01/07 11:53
7440-62-2	Vanadium, Total	32	mg/kg dry wt.	1	0.10	0.034	J,S	12/01/07 11:53

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:20
Solids: 81.09
Laboratory ID: 0711377-10

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.13	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:30

: 035141

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:45
Solids: 50.00
Laboratory ID: 0711377-13

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	10	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:56
7440-50-8	Copper, Total	200	mg/kg dry wt.	5	1.0	0.22	J,s	12/01/07 14:55
7439-92-1	Lead, Total	170	mg/kg dry wt.	5	1.0	0.11		12/01/07 14:55
7440-02-0	Nickel, Total	48	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 11:56
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U UL,m	12/01/07 11:56
7440-22-4	Silver, Total	0.25	mg/kg dry wt.	1	0.10	0.013		12/01/07 11:56
7440-28-0	Thallium, Total	0.048	mg/kg dry wt.	1	0.10	0.0049	J	12/01/07 11:56
7440-62-2	Vanadium, Total	19	mg/kg dry wt.	1	0.10	0.034	J,s	12/01/07 11:56

035114

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:45
Solids: 50.00
Laboratory ID: 0711377-13

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.076	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:32

03543

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:47
Solids: 83.28
Laboratory ID: 0711377-14

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.5	mg/kg dry wt.	1	0.20	0.071		12/01/07 11:59
7440-50-8	Copper, Total	13	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 11:59
7439-92-1	Lead, Total	13	mg/kg dry wt.	1	0.20	0.022		12/01/07 11:59
7440-02-0	Nickel, Total	16	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 11:59
7782-49-2	Selenium, Total	0.16	mg/kg dry wt.	1	0.30	0.089	J L,M	12/01/07 11:59
7440-22-4	Silver, Total	0.044	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 11:59
7440-28-0	Thallium, Total	0.24	mg/kg dry wt.	1	0.10	0.0049		12/01/07 11:59
7440-62-2	Vanadium, Total	42	mg/kg dry wt.	1	0.10	0.034	J,S	12/01/07 11:59

03546

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:47
Solids: 83.28
Laboratory ID: 0711377-14

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.086	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:33

03545

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:47
Solids: 85.90
Laboratory ID: 0711377-15

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.2	mg/kg dry wt.	1	0.20	0.071		12/01/07 12:02
7440-50-8	Copper, Total	13	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 12:02
7439-92-1	Lead, Total	13	mg/kg dry wt.	1	0.20	0.022		12/01/07 12:02
7440-02-0	Nickel, Total	14	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 12:02
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U UL,m	12/01/07 12:02
7440-22-4	Silver, Total	0.052	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 12:02
7440-28-0	Thallium, Total	0.17	mg/kg dry wt.	1	0.10	0.0049		12/01/07 12:02
7440-62-2	Vanadium, Total	31	mg/kg dry wt.	1	0.10	0.034	J,S	12/01/07 12:02

035148

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:47
Solids: 85.90
Laboratory ID: 0711377-15

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.099	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:35

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:30
Solids: 48.28
Laboratory ID: 0711377-16

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	5.3	mg/kg dry wt.	1	0.20	0.071		12/01/07 12:05
7440-50-8	Copper, Total	96	mg/kg dry wt.	5	1.0	0.22	J,s	12/01/07 14:58
7439-92-1	Lead, Total	180	mg/kg dry wt.	5	1.0	0.11	J,f	12/01/07 14:58
7440-02-0	Nickel, Total	27	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 12:05
7782-49-2	Selenium, Total	0.097	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 12:05
7440-22-4	Silver, Total	0.14	mg/kg dry wt.	1	0.10	0.013		12/01/07 12:05
7440-28-0	Thallium, Total	0.092	mg/kg dry wt.	1	0.10	0.0049	J	12/01/07 12:05
7440-62-2	Vanadium, Total	18	mg/kg dry wt.	1	0.10	0.034	J,s	12/01/07 12:05

03550

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:30
Solids: 48.28
Laboratory ID: 0711377-16

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.96	mg/kg dry wt.	1	0.20	0.042		11/28/07 22:42

035419

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:30
Solids: 85.35
Laboratory ID: 0711377-17

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.0	mg/kg dry wt.	1	0.20	0.071		12/01/07 12:08
7440-50-8	Copper, Total	14	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 12:08
7439-92-1	Lead, Total	10	mg/kg dry wt.	1	0.20	0.022		12/01/07 12:08
7440-02-0	Nickel, Total	12	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 12:08
7782-49-2	Selenium, Total	0.10	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 12:08
7440-22-4	Silver, Total	0.046	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 12:08
7440-28-0	Thallium, Total	0.15	mg/kg dry wt.	1	0.10	0.0049		12/01/07 12:08
7440-62-2	Vanadium, Total	25	mg/kg dry wt.	1	0.10	0.034	J,s	12/01/07 12:08

03552

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:30
Solids: 85.35
Laboratory ID: 0711377-17

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.078	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:44

03551

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:35
Solids: 84.43
Laboratory ID: 0711377-18

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.1	mg/kg dry wt.	1	0.20	0.071		12/01/07 12:11
7440-50-8	Copper, Total	11	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 12:11
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022		12/01/07 12:11
7440-02-0	Nickel, Total	14	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 12:11
7782-49-2	Selenium, Total	0.17	mg/kg dry wt.	1	0.30	0.089	J L,M	12/01/07 12:11
7440-22-4	Silver, Total	0.041	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 12:11
7440-28-0	Thallium, Total	0.20	mg/kg dry wt.	1	0.10	0.0049		12/01/07 12:11
7440-62-2	Vanadium, Total	34	mg/kg dry wt.	1	0.10	0.034	J,S	12/01/07 12:11

03554

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:35
Solids: 84.43
Laboratory ID: 0711377-18

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	1.5	mg/kg dry wt.	1	0.20	0.042		11/28/07 22:45

: 09553

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:00
Solids: 60.13
Laboratory ID: 0711377-19

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	6.0	mg/kg dry wt.	1	0.20	0.071		12/01/07 12:14
7440-50-8	Copper, Total	99	mg/kg dry wt.	5	1.0	0.22	J,s	12/01/07 15:08
7439-92-1	Lead, Total	85	mg/kg dry wt.	5	1.0	0.11	J,f	12/01/07 15:08
7440-02-0	Nickel, Total	34	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 12:14
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U UL,m	12/01/07 12:14
7440-22-4	Silver, Total	0.17	mg/kg dry wt.	1	0.10	0.013		12/01/07 12:14
7440-28-0	Thallium, Total	0.094	mg/kg dry wt.	1	0.10	0.0049	J	12/01/07 12:14
7440-62-2	Vanadium, Total	21	mg/kg dry wt.	1	0.10	0.034	J,s	12/01/07 12:14

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:00
Solids: 60.13
Laboratory ID: 0711377-19

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.54	mg/kg dry wt.	1	0.20	0.042		11/28/07 22:47

: 03555

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:10
Solids: 49.06
Laboratory ID: 0711377-20

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	11	mg/kg dry wt.	1	0.20	0.071		12/01/07 12:24
7440-50-8	Copper, Total	210	mg/kg dry wt.	5	1.0	0.22	J,S	12/01/07 15:11
7439-92-1	Lead, Total	180	mg/kg dry wt.	5	1.0	0.11		12/01/07 15:11
7440-02-0	Nickel, Total	48	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 12:24
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U UL,M	12/01/07 12:24
7440-22-4	Silver, Total	0.30	mg/kg dry wt.	1	0.10	0.013		12/01/07 12:24
7440-28-0	Thallium, Total	0.056	mg/kg dry wt.	1	0.10	0.0049	J	12/01/07 12:24
7440-62-2	Vanadium, Total	22	mg/kg dry wt.	1	0.10	0.034	J,S	12/01/07 12:24

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:10
Solids: 49.06
Laboratory ID: 0711377-20

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	1.2	mg/kg dry wt.	1	0.20	0.042		11/28/07 22:48

: 03557

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:15
Solids: 84.67
Laboratory ID: 0711377-21

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.4	mg/kg dry wt.	1	0.20	0.071		12/01/07 12:43
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 12:43
7439-92-1	Lead, Total	13	mg/kg dry wt.	1	0.20	0.022		12/01/07 12:43
7440-02-0	Nickel, Total	16	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 12:43
7782-49-2	Selenium, Total	0.11	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 12:43
7440-22-4	Silver, Total	0.045	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 12:43
7440-28-0	Thallium, Total	0.27	mg/kg dry wt.	1	0.10	0.0049		12/01/07 12:43
7440-62-2	Vanadium, Total	43	mg/kg dry wt.	1	0.10	0.034	J,s	12/01/07 12:43

: 03560

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:15
Solids: 84.67
Laboratory ID: 0711377-21

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.094	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:50

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:15
Solids: 83.78
Laboratory ID: 0711377-22

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714423

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.6	mg/kg dry wt.	1	0.20	0.071		12/01/07 12:46
7440-50-8	Copper, Total	15	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 12:46
7439-92-1	Lead, Total	13	mg/kg dry wt.	1	0.20	0.022		12/01/07 12:46
7440-02-0	Nickel, Total	17	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 12:46
7782-49-2	Selenium, Total	0.18	mg/kg dry wt.	1	0.30	0.089	J L,M	12/01/07 12:46
7440-22-4	Silver, Total	0.045	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 12:46
7440-28-0	Thallium, Total	0.25	mg/kg dry wt.	1	0.10	0.0049		12/01/07 12:46
7440-62-2	Vanadium, Total	41	mg/kg dry wt.	1	0.10	0.034	J,S	12/01/07 12:46

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:15
Solids: 83.78
Laboratory ID: 0711377-22

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714408

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.13	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:52

: 03561

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/14/07 16:00
Solids: 0.00
Laboratory ID: 0711377-23

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3020A Digestion
Prepared: 11/27/07 07:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0714426

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	12/03/07 14:06
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	11/30/07 14:16
7440-39-3	Barium, Total	2.0	ug/L	1	2.0	0.52	U	11/30/07 14:16
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	11/30/07 14:16
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	11/30/07 14:16
7440-47-3	Chromium, Total	2.0	ug/L	1	2.0	0.31	U	12/01/07 01:25
7440-48-4	Cobalt, Total	1.0	ug/L	1	1.0	0.096	U	11/30/07 14:16
7440-50-8	Copper, Total	1.0	ug/L	1	1.0	0.33	U	11/30/07 14:16
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	12/01/07 01:25
7439-96-5	Manganese, Total	1.4	ug/L	1	3.0	0.43	J	11/30/07 14:16
7440-02-0	Nickel, Total	2.0	ug/L	1	2.0	0.28	U	11/30/07 14:16
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	11/30/07 14:16
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	11/30/07 14:16
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	12/03/07 14:06
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	11/30/07 14:16
7440-66-6	Zinc, Total	11	ug/L	1	10	0.84		11/30/07 14:16

SAMPLE ID SUMMARY

USEPA-7471A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-42

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35SB3A	0711293-01
35SB4A	0711313-03
DUP-1	0711313-04
35SB1A	0711313-05
35SB2A	0711313-06
35SB6A	0711313-07
35SB6B	0711313-08
35SB6C	0711313-09
35SB9A	0711313-10
35SB9B	0711313-11
35SB9C	0711313-12
35SB10A	0711313-13
35SB10B	0711313-14
35SB10C	0711313-15
35SB7A	0711377-01
35SB7B	0711377-02
35SB7C	0711377-03
35SB5A	0711377-04
35SB5B	0711377-05
35SB5C	0711377-06
DUP-2	0711377-07
35SB8A	0711377-08
35SB8B	0711377-09
35SB8C	0711377-10
37SB10A	0711377-13
37SB10B	0711377-14
37SB10C	0711377-15
37SB9A	0711377-16
37SB9B	0711377-17
37SB9C	0711377-18
DUP-3	0711377-19
37SB7A	0711377-20
37SB7B	0711377-21
37SB7C	0711377-22

: 04489

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB3A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/12/07 16:06
Solids: 90.68
Laboratory ID: 0711293-01

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.061	mg/kg dry wt.	1	0.050	0.0075		11/20/07 14:22

: 04490

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 07:50
Solids: 83.32
Laboratory ID: 0711313-03

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.3004 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.079	mg/kg dry wt.	1	0.050	0.0075		11/20/07 14:28

: 04491

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 08:00
Solids: 83.87
Laboratory ID: 0711313-04

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.12	mg/kg dry wt.	1	0.050	0.0075		11/20/07 14:33

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB1A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 08:25
Solids: 85.52
Laboratory ID: 0711313-05

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.044	mg/kg dry wt.	1	0.050	0.0075	J	11/20/07 14:38

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB2A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 09:20
Solids: 83.07
Laboratory ID: 0711313-06

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.090	mg/kg dry wt.	1	0.050	0.0075		11/20/07 14:43

: 61494

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 14:45
Solids: 58.85
Laboratory ID: 0711313-07

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.10	mg/kg dry wt.	1	0.050	0.0075		11/20/07 14:58

04495

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB6B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 14:55
Solids: 85.53
Laboratory ID: 0711313-08

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.032	mg/kg dry wt.	1	0.050	0.0075	J	11/20/07 15:04

: 04496

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB6C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 15:05
Solids: 82.73
Laboratory ID: 0711313-09

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.021	mg/kg dry wt.	1	0.050	0.0075	J	11/20/07 15:09

: 04497

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 10:45
Solids: 73.11
Laboratory ID: 0711313-10

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.55	mg/kg dry wt.	1	0.050	0.0075		11/20/07 15:24

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 12:10
Solids: 66.46
Laboratory ID: 0711313-11

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.050	mg/kg dry wt.	1	0.050	0.0075	J	11/20/07 15:29

04499

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 12:00
Solids: 80.32
Laboratory ID: 0711313-12

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.035	mg/kg dry wt.	1	0.050	0.0075	J	11/20/07 15:34

: 04500

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:30
Solids: 50.60
Laboratory ID: 0711313-13

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.67	mg/kg dry wt.	1	0.050	0.0075		11/20/07 15:39

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:38
Solids: 86.20
Laboratory ID: 0711313-14

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.025	mg/kg dry wt.	1	0.050	0.0075	J	11/20/07 15:45

04502

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/13/07 13:45
Solids: 82.38
Laboratory ID: 0711313-15

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/19/07 17:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0714111

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.068	mg/kg dry wt.	1	0.050	0.0075		11/20/07 15:50

: 04503

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:00
Solids: 53.00
Laboratory ID: 0711377-01

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.83	mg/kg dry wt.	1	0.050	0.0075		11/30/07 07:47

04504

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:08
Solids: 87.74
Laboratory ID: 0711377-02

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.026	mg/kg dry wt.	1	0.050	0.0075	J B,P	11/30/07 07:52

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:25
Solids: 86.53
Laboratory ID: 0711377-03

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.10	mg/kg dry wt.	1	0.050	0.0075		11/30/07 07:57

04506

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:10
Solids: 80.92
Laboratory ID: 0711377-04

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.22	mg/kg dry wt.	1	0.050	0.0075		11/30/07 08:01

04587

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB5B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:23
Solids: 83.40
Laboratory ID: 0711377-05

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.023	mg/kg dry wt.	1	0.050	0.0075	J BP	11/30/07 08:06

: 04508

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB5C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:27
Solids: 80.59
Laboratory ID: 0711377-06

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.032	mg/kg dry wt.	1	0.050	0.0075	J B,P	11/30/07 08:11

04509

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 10:00
Solids: 79.15
Laboratory ID: 0711377-07

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.21	mg/kg dry wt.	1	0.050	0.0075		11/30/07 08:16

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:05
Solids: 80.71
Laboratory ID: 0711377-08

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.10	mg/kg dry wt.	1	0.050	0.0075		11/30/07 08:31

04511

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:15
Solids: 82.15
Laboratory ID: 0711377-09

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.059	mg/kg dry wt.	1	0.050	0.0075		11/30/07 08:36

04512

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

35SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 11:20
Solids: 81.09
Laboratory ID: 0711377-10

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.026	mg/kg dry wt.	1	0.050	0.0075	J B,P	11/30/07 08:41

: 04513

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:45
Solids: 50.00
Laboratory ID: 0711377-13

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	2.5	mg/kg dry wt.	10	0.50	0.075		11/30/07 17:47

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:47
Solids: 83.28
Laboratory ID: 0711377-14

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.018	mg/kg dry wt.	1	0.050	0.0075	J B	11/30/07 08:48

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 13:47
Solids: 85.90
Laboratory ID: 0711377-15

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.054	mg/kg dry wt.	1	0.050	0.0075		11/30/07 08:53

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:30
Solids: 48.28
Laboratory ID: 0711377-16

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	1.0	mg/kg dry wt.	2	0.10	0.015		11/30/07 17:53

04517

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:30
Solids: 85.35
Laboratory ID: 0711377-17

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.028	mg/kg dry wt.	1	0.050	0.0075	J B,P	11/30/07 09:03

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:35
Solids: 84.43
Laboratory ID: 0711377-18

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.027	mg/kg dry wt.	1	0.050	0.0075	J B,P	11/30/07 09:08

: 04519

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 14:00
Solids: 60.13
Laboratory ID: 0711377-19

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	1.0	mg/kg dry wt.	2	0.10	0.015		11/30/07 17:58

: 04520

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:10
Solids: 49.06
Laboratory ID: 0711377-20

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	3.3	mg/kg dry wt.	10	0.50	0.075		11/30/07 18:03

: 04521

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:15
Solids: 84.67
Laboratory ID: 0711377-21

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.024	mg/kg dry wt.	1	0.050	0.0075	J B,P	11/30/07 09:29

04522

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 15:15
Solids: 83.78
Laboratory ID: 0711377-22

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0714583

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.026	mg/kg dry wt.	1	0.050	0.0075	J B,P	11/30/07 09:34

04523

SAMPLE ID SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-42

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
EQBK-1	0711313-01
EQBK-2	0711377-23

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

EQBK-1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/13/07 16:00
Solids: 0.00
Laboratory ID: 0711313-01

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7470A Digestion - Total
Prepared: 11/29/07 10:30
Initial/Final: 30 mL / 30 mL
QC Batch: 0714571

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	11/29/07 16:17

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

EQBK-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/14/07 16:00
Solids: 0.00
Laboratory ID: 0711377-23

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7470A Digestion - Total
Prepared: 12/03/07 17:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0714730

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	12/04/07 07:32

04437

SAMPLE ID SUMMARY

MSA 29-3.5.2

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-42

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
35SB7A	0711377-11
35SB7B	0711377-12

04586

INORGANIC ANALYSIS DATA SHEET
MSA 29-3.5.2

35SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:38
Solids: 0.00
Laboratory ID: 0711377-11

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: Method-Specific Prepara
Prepared: 11/27/07 05:30
Initial/Final: 0.45 g / 0.45 mL
QC Batch: 0714382

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-44-0	Carbon, Total Organic	4.0	%	1	0.20	0.047		11/27/07 06:25

04587

INORGANIC ANALYSIS DATA SHEET
MSA 29-3.5.2

35SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/14/07 08:40
Solids: 0.00
Laboratory ID: 0711377-12

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: Method-Specific Prepara
Prepared: 11/27/07 05:30
Initial/Final: 0.19 g / 0.19 mL
QC Batch: 0714382

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-44-0	Carbon, Total Organic	9.0	%	1	0.20	0.047		11/27/07 06:25

04588

DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: RA
Date: 11/16/08
DV Level: II (III) IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: RAAP 10
Project Number: 21354887.40003
Laboratory: TriMatrix
SDG No.: 36440-42
Test Name: VOC
Method No.: 8260B

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Were samples preserved on ice for soils and on ice with HCL for aqueous samples?	✓		
2.2	Have any technical holding times (14 days), determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (every 12 hour period per GCMS, matrix, and level)?	✓		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample]≤ 5X[associated blank]. (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone)	✓		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	✓		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	✓		

Notes: EQBK-1 acetone at 1.9 ug/L. all results < 10X → B2X

MB 11/2/07 acetone 9.18 ug/kg < 10X B, Z
MB 11/19/07 carbon disulfide 2.55 ug/kg < 5X B, Z

4.0 Initial and Continuing Calibration

		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?Are at least five standards included in the calibration curve?	✓		
4.2	Was an initial calibration analyzed at the beginning of each analysis?	✓		
4.3	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.4	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	✓		
4.5	Are all calibration standard %RSDs, correlation coefficient, or % drift within the control limits (%RSD <15%, r>0.995 or r^2>0.99; for 2° source: %D<+20%; and for CCC, %D < 20%)?		✓	
For initial calibration: %RSD > 15%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>20% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.6	Are any CCCs (chloroform, 1,1-DCE, 1,2-DCPA, ethylbenzene, toluene, and vinyl chloride) displaying an RSD greater than 30%? If yes, L(+)/R(-) all associated results.		✓	
4.7	Do any SPCC have an RRF low? (<0.10 for chloromethane, 1,1-dichloroethane, and bromoform or <0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane) If yes, L(+)/R(-) all associated results.		✓	

Notes: second source dichlorodifluoromethane 74%<75%. → all NPS in all samples → UJ/C

also several CC %D's 7 QC with pos bias. See attached. → pos amt results → J/C

5.0 GC/MS Instrument Performance Check

		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	✓		
5.2	Have all samples been analyzed within twelve hours of the BFB tune? If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".	✓		
5.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag "R".	✓		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			✓
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm			
6.3	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/			✓
	1 or more <10% / 1 high/low / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / J / L / K Non-detects: R / UJ / UJ / UJ / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are %R for LCS/LCSD recoveries outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).	U		
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.	✓		

Notes: 1,1,2 – trichloro-1,2,2-trifluoroethane 120% at 144%, 161%, RPD > 30% at 31%. Soil NDs
methyl acetate 131% 130% Prev, J/C
acetone 181% 160% Prev, J/C or BLE

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within +100% or -50% of the mid point calibration standard? If not, J(+)/UJ(-).	✓		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	✓		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	✓		
	For sample results > 5 x RL, use 50% RPD. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 x RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV			

Notes:

	355B4A	DUP-1	RL	RPD
acetone	92	99	24	7.3% OK ✓
Carbon disulfide	3.5	3.5	6	OK ✓
MEK	14	13	24	OK ✓

	355B5A and DUP-2		RL	RPD
acetone	130	210	25	47% ✓
methylene chloride	170	9.6	25	178%
toluene	110	0	62	OK ✓
MEK	0		25	OK ✓

DJ, F in Both samples 21

11.0 Detection Limit Verification		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	✓		
11.2	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated	✓		

Notes: Several samples required re-analysis using a methanol-preserved sample.

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
12.1.1	Number of samples:			
12.1.2	Number of target compounds in each analysis:			
12.1.3	Number of results rejected and not reported:			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100%.			

Notes:

URS

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0714321-BLK2 File ID: BLK1119.D

Prepared: 11/19/07 07:00 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

Analyzed: 11/19/07 09:13 Instrument: 139

QC Batch: 0714321 Sequence: 7112633 Calibration: 7K26005

CAS No.	Analyte	MDL	MRL	Concentration	Q
67-64-1	Acetone	4.2	20	20 ug/kg wet	U
71-43-2	Benzene	0.13	5.0	5.0 ug/kg wet	U
74-97-5	Bromochloromethane	0.13	20	20 ug/kg wet	U
75-27-4	Bromodichloromethane	0.25	5.0	5.0 ug/kg wet	U
75-25-2	Bromoform	0.48	5.0	5.0 ug/kg wet	U
74-83-9	Bromomethane	1.2	5.0	5.0 ug/kg wet	U
75-15-0	Carbon Disulfide	0.26	5.0	2.55 ug/kg wet	J
56-23-5	Carbon Tetrachloride	0.29	5.0	5.0 ug/kg wet	U
108-90-7	Chlorobenzene	0.20	5.0	5.0 ug/kg wet	U
75-00-3	Chloroethane	0.35	20	20 ug/kg wet	U
67-66-3	Chloroform	0.15	5.0	5.0 ug/kg wet	U
74-87-3	Chloromethane	0.24	5.0	5.0 ug/kg wet	U
110-82-7	Cyclohexane	0.69	10	10 ug/kg wet	U
96-12-8	1,2-Dibromo-3-chloropropane	0.82	10	10 ug/kg wet	U
124-48-1	Dibromochloromethane	0.35	5.0	5.0 ug/kg wet	U
106-93-4	1,2-Dibromoethane	0.84	5.0	5.0 ug/kg wet	U
95-50-1	1,2-Dichlorobenzene	0.24	5.0	5.0 ug/kg wet	U
541-73-1	1,3-Dichlorobenzene	0.24	5.0	5.0 ug/kg wet	U
106-46-7	1,4-Dichlorobenzene	0.22	5.0	5.0 ug/kg wet	U
75-71-8	Dichlorodifluoromethane	0.33	5.0	5.0 ug/kg wet	U
75-34-3	1,1-Dichloroethane	0.19	5.0	5.0 ug/kg wet	U
107-06-2	1,2-Dichloroethane	0.30	5.0	5.0 ug/kg wet	U
75-35-4	1,1-Dichloroethene	0.37	5.0	5.0 ug/kg wet	U
156-59-2	cis-1,2-Dichloroethene	0.16	5.0	5.0 ug/kg wet	U
156-60-5	trans-1,2-Dichloroethene	0.23	5.0	5.0 ug/kg wet	U
78-87-5	1,2-Dichloropropane	0.92	5.0	5.0 ug/kg wet	U
10061-01-5	cis-1,3-Dichloropropene	0.25	5.0	5.0 ug/kg wet	U
10061-02-6	trans-1,3-Dichloropropene	0.83	5.0	5.0 ug/kg wet	U
100-41-4	Ethylbenzene	0.12	5.0	5.0 ug/kg wet	U
591-78-6	2-Hexanone	3.0	10	10 ug/kg wet	U

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0714321-BLK4 File ID: BLK1121.D

Prepared: 11/21/07 08:00 Preparation: 5035 Soil Purge & Trap - Initial/Final: 5 g / 5 mL

Analyzed: 11/21/07 11:31 Instrument: 139

QC Batch: 0714321 Sequence: 7112636 Calibration: 7K26005

CAS No.	Analyte	MDL	MRL	Concentration	Q
67-64-1	Acetone	4.2	20	9.18 ug/kg wet	J
71-43-2	Benzene	0.13	5.0	5.0 ug/kg wet	U
74-97-5	Bromochloromethane	0.13	20	20 ug/kg wet	U
75-27-4	Bromodichloromethane	0.25	5.0	5.0 ug/kg wet	U
75-25-2	Bromoform	0.48	5.0	5.0 ug/kg wet	U
74-83-9	Bromomethane	1.2	5.0	5.0 ug/kg wet	U
75-15-0	Carbon Disulfide	0.26	5.0	5.0 ug/kg wet	U
56-23-5	Carbon Tetrachloride	0.29	5.0	5.0 ug/kg wet	U
108-90-7	Chlorobenzene	0.20	5.0	5.0 ug/kg wet	U
75-00-3	Chloroethane	0.35	20	20 ug/kg wet	U
67-66-3	Chloroform	0.15	5.0	5.0 ug/kg wet	U
74-87-3	Chloromethane	0.24	5.0	5.0 ug/kg wet	U
110-82-7	Cyclohexane	0.69	10	10 ug/kg wet	U
96-12-8	1,2-Dibromo-3-chloropropane	0.82	10	10 ug/kg wet	U
124-48-1	Dibromochloromethane	0.35	5.0	5.0 ug/kg wet	U
106-93-4	1,2-Dibromoethane	0.84	5.0	5.0 ug/kg wet	U
95-50-1	1,2-Dichlorobenzene	0.24	5.0	5.0 ug/kg wet	U
541-73-1	1,3-Dichlorobenzene	0.24	5.0	5.0 ug/kg wet	U
106-46-7	1,4-Dichlorobenzene	0.22	5.0	5.0 ug/kg wet	U
75-71-8	Dichlorodifluoromethane	0.33	5.0	5.0 ug/kg wet	U
75-34-3	1,1-Dichloroethane	0.19	5.0	5.0 ug/kg wet	U
107-06-2	1,2-Dichloroethane	0.30	5.0	5.0 ug/kg wet	U
75-35-4	1,1-Dichloroethene	0.37	5.0	5.0 ug/kg wet	U
156-59-2	cis-1,2-Dichloroethene	0.16	5.0	5.0 ug/kg wet	U
156-60-5	trans-1,2-Dichloroethene	0.23	5.0	5.0 ug/kg wet	U
78-87-5	1,2-Dichloropropane	0.92	5.0	5.0 ug/kg wet	U
10061-01-5	cis-1,3-Dichloropropene	0.25	5.0	5.0 ug/kg wet	U
10061-02-6	trans-1,3-Dichloropropene	0.83	5.0	5.0 ug/kg wet	U
100-41-4	Ethylbenzene	0.12	5.0	5.0 ug/kg wet	U
591-78-6	2-Hexanone	3.0	10	10 ug/kg wet	U

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 7112632

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument: 139
Calibration: 7K26005

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	7112632-TUN1	BFB1116.D	11/16/07 08:49
Calibration Check	7112632-CCV1	CCV1116.D	11/16/07 09:22
LCS	0714321-BS1	CCV1116.D	11/16/07 09:22
Blank	0714321-BLK1	BLK1116.D	11/16/07 10:27
35SB4A	0711313-03	31303.D	11/16/07 11:00
DUP-1	0711313-04	31304.D	11/16/07 11:33
35SB6B	0711313-08	31308.D	11/16/07 13:45
35SB6C	0711313-09	31309.D	11/16/07 14:18
35SB9B	0711313-11	31311.D	11/16/07 15:23
35SB9C	0711313-12	31312.D	11/16/07 15:56
35SB10B	0711313-14	31314.D	11/16/07 17:02

MB = ND

: 00228

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 7112633

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument: 139
Calibration: 7K26005

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	7112633-TUN1	BFB1119.D	11/19/07 07:34
Calibration Check	7112633-CCV1	CCV1119.D	11/19/07 08:07
LCS	0714321-BS2	CCV1119.D	11/19/07 08:07
Blank	0714321-BLK2	BLK1119.D	11/19/07 09:13
35SB3A ✓	0711293-01	29301.D	11/19/07 10:19
35SB1A ✓	0711313-05	31305A.D	11/19/07 11:25
35SB10C ✓	0711313-15	31315A.D	11/19/07 14:10

Carbon disulfide 2.55 ug/kg

00230

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 7112634

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument: 139
Calibration: 7K26005

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	7112634-TUN1	BFB1120.D	11/20/07 06:53
Calibration Check	7112634-CCV1	CCV1120.D	11/20/07 07:25
LCS	0714321-BS3	CCV1120.D	11/20/07 07:25
LCS Dup	0714321-BSD3	CCV1120A.D	11/20/07 07:59
Blank	0714321-BLK3	BLK1120A.D	11/20/07 09:37
35SB7B	0711377-02	37702.D	11/20/07 12:22
35SB7C	0711377-03	37703.D	11/20/07 12:56
35SB5B	0711377-05	37705.D	11/20/07 14:02
35SB5C	0711377-06	37706.D	11/20/07 14:35
35SB8B	0711377-09	37709.D	11/20/07 16:14

MB = ND

00232

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 7112636

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument: 139
Calibration: 7K26005

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	7112636-TUN1	BFB1121.D	11/21/07 09:52
Calibration Check	7112636-CCV1	CCV1121.D	11/21/07 10:25
LCS	0714321-BS4	CCV1121.D	11/21/07 10:25
Blank	0714321-BLK4	BLK1121.D	11/21/07 11:31
DUP-2	0711377-07	37707.D	11/21/07 13:10
35SB8C	0711377-10	37710.D	11/21/07 14:16

MB → acetone 9.19 ug/kg

00238

QC BATCH SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-42

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

QC Batch: 0714339 QC Batch Matrix: Water

Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
EQBK-1	0711313-01	11/23/07 12:00	
Trip Blank	0711313-02	11/23/07 12:00	
EQBK-2	0711377-23	11/23/07 12:00	
Trip Blank	0711377-24	11/23/07 12:00	
Blank	0714339-BLK1	11/23/07 12:00	
LCS	0714339-BS1	11/23/07 12:00	

MB = ND

QC BATCH SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
QC Batch: 0714335
QC Batch Matrix: Soil
Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
35SB2A	0711313-06	11/23/07 12:00	
35SB6A	0711313-07	11/23/07 12:00	
35SB9A	0711313-10	11/23/07 12:00	
35SB10A	0711313-13	11/23/07 12:00	
35SB7A	0711377-01	11/23/07 12:00	
35SB5A	0711377-04	11/23/07 12:00	
35SB8A	0711377-08	11/23/07 12:00	
Blank	0714335-BLK1	11/23/07 12:00	
LCS	0714335-BS1	11/23/07 12:00	
35SB2A	0714335-MS1	11/23/07 12:00	
35SB2A	0714335-MSD1	11/23/07 12:00	

MB = ND

00221

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7K26010
Laboratory ID: 7112640-SCV1
Sequence: 7112640
Standard ID: 7110173

Analyte	Expected (ug/L)	Found (ug/L)	% Rec.	QC Limit
Acetone	40.0	35.7	89	75-125
Benzene	40.0	40.2	101	75-125
Bromobenzene	40.0	41.9	105	75-125
Bromochloromethane	40.0	40.7	102	75-125
Bromodichloromethane	40.0	44.2	111	75-125
Bromoform	40.0	38.4	96	75-125
Bromomethane	40.0	40.4	101	75-125
n-Butylbenzene	40.0	43.6	109	75-125
sec-Butylbenzene	40.0	41.3	103	75-125
tert-Butylbenzene	40.0	41.6	104	75-125
Carbon Disulfide	40.0	39.6	99	75-125
Carbon Tetrachloride	40.0	41.8	105	75-125
Chlorobenzene	40.0	39.5	99	75-125
Chloroethane	40.0	37.6	94	75-125
Chloroform	40.0	40.8	102	75-125
Chloromethane	40.0	40.7	102	75-125
2-Chlorotoluene	40.0	42.0	105	75-125
4-Chlorotoluene	40.0	40.4	101	75-125
1,2-Dibromo-3-chloropropane	40.0	39.8	100	75-125
Dibromochloromethane	40.0	38.3	96	75-125
1,2-Dibromoethane	40.0	41.8	105	75-125
Dibromomethane	40.0	41.7	104	75-125
1,2-Dichlorobenzene	40.0	41.2	103	75-125
1,3-Dichlorobenzene	40.0	41.4	104	75-125
1,4-Dichlorobenzene	40.0	39.8	100	75-125
Dichlorodifluoromethane	40.0	29.6	74 *	75-125
1,1-Dichloroethane	40.0	40.3	101	75-125

00615

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7K26012
Laboratory ID: 7112647-SCV1
Sequence: 7112647
Standard ID: 7110173

Analyte	Expected (ug/L)	Found (ug/L)	% Rec.		QC Limit
Acetone	40.0	35.7	89		75-125
Benzene	40.0	40.2	101		75-125
Bromobenzene	40.0	41.9	105		75-125
Bromochloromethane	40.0	40.7	102		75-125
Bromodichloromethane	40.0	44.2	111		75-125
Bromoform	40.0	38.4	96		75-125
Bromomethane	40.0	40.4	101		75-125
n-Butylbenzene	40.0	43.6	109		75-125
sec-Butylbenzene	40.0	41.3	103		75-125
tert-Butylbenzene	40.0	41.6	104		75-125
Carbon Disulfide	40.0	39.6	99		75-125
Carbon Tetrachloride	40.0	41.8	105		75-125
Chlorobenzene	40.0	39.5	99		75-125
Chloroethane	40.0	37.6	94		75-125
Chloroform	40.0	40.8	102		75-125
Chloromethane	40.0	40.7	102		75-125
2-Chlorotoluene	40.0	42.0	105		75-125
4-Chlorotoluene	40.0	40.4	101		75-125
1,2-Dibromo-3-chloropropane	40.0	39.8	100		75-125
Dibromochloromethane	40.0	38.3	96		75-125
1,2-Dibromoethane	40.0	41.8	105		75-125
Dibromomethane	40.0	41.7	104		75-125
1,2-Dichlorobenzene	40.0	41.2	103		75-125
1,3-Dichlorobenzene	40.0	41.4	104		75-125
1,4-Dichlorobenzene	40.0	39.8	100		75-125
Dichlorodifluoromethane	40.0	29.6	74	*	75-125
1,1-Dichloroethane	40.0	40.3	101		75-125

00619

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument ID: 139
Calibration: 7K26005
Lab File ID: CCV1119.D
Calibration Date: 10/30/07 00:00
Sequence: 7112633
Injection Date: 11/19/07
Lab Sample ID: 7112633-CCV1
Injection Time: 08:07

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift		
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)	
2-Hexanone	L	40.0	34.2	0.3616233	0.360198		-14.6	40	
Isopropylbenzene	A	40.0	36.9	2.784334	2.56653		-7.8	25	
Methyl Acetate	A	40.0	48.0	0.1571806	0.188642		20.0	25	
Methyl tert-Butyl Ether	A	40.0	37.0	0.6345868	0.587025		-7.5	25	
Methylcyclohexane	A	40.0	37.8	0.3365695	0.318013		-5.5	25	
Methylene Chloride	L	40.0	43.1	0.2329874	0.220724		7.8	25	
2-Butanone (MEK)	L	40.0	39.5	0.1058064	0.114337		-1.3	40	
4-Methyl-2-pentanone (MIBK)	L	40.0	36.0	0.1916696	0.211756		-10.1	40	
Styrene	A	40.0	36.8	2.039381	1.87583		-8.0	25	
1,1,2,2-Tetrachloroethane	A	40.0	36.3	0.7682494	0.69674	0.3	-9.3	25	
Tetrachloroethene	A	40.0	36.2	0.7618584	0.689565		-9.5	25	
Toluene	A	40.0	36.7	1.054318	0.967536		-8.2	20	
1,2,3-Trichlorobenzene	A	40.0	40.4	0.8910106	0.899103		0.9	25	
1,2,4-Trichlorobenzene	A	40.0	42.3	0.898206	0.950094		5.8	25	
1,1,1-Trichloroethane	A	40.0	36.8	0.3098719	0.285153		-8.0	25	
1,1,2-Trichloroethane	A	40.0	39.8	0.1820985	0.181305		-0.4	25	
Trichloroethene	A	40.0	37.0	0.287691	0.266272		-7.4	25	
Trichlorofluoromethane	A	40.0	36.6	0.2396237	0.218963		-8.6	25	
1,1,2-Trichloro-1,2,2-trifluoroetha	L	40.0	57.4	0.1831505	0.220652		43.6	25	*
Vinyl Chloride	A	40.0	39.6	0.20704	0.204727		-1.1	20	
Xylene (Total)	A	120	109	1.250004	1.13801		-9.0	25	

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

Pos bias

00635

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 139
Lab File ID: CCV1120.D
Sequence: 7112634
Lab Sample ID: 7112634-CCV1

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7K26005
Calibration Date: 10/30/07 00:00
Injection Date: 11/20/07
Injection Time: 07:25

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
cis-1,2-Dichloroethene	A	40.0	39.4	0.2909781	0.28652		-1.5	25
trans-1,2-Dichloroethene	A	40.0	39.0	0.277099	0.270243		-2.5	25
1,2-Dichloropropane	A	40.0	39.9	0.2542669	0.253637		-0.2	20
1,3-Dichloropropane	A	40.0	37.6	0.9678734	0.909575		-6.0	25
2,2-Dichloropropane	L	40.0	41.4	0.3177032	0.30326		3.5	25
1,1-Dichloropropene	A	40.0	39.6	0.3217204	0.31828		-1.1	25
cis-1,3-Dichloropropene	A	40.0	39.9	0.3569673	0.356084		-0.2	25
trans-1,3-Dichloropropene	L	40.0	35.4	0.3069988	0.294445		-11.5	25
Ethylbenzene	A	40.0	39.5	3.016584	2.97826		-1.3	20
Hexachlorobutadiene	A	40.0	47.0	0.5168553	0.607765		17.6	25
2-Hexanone	L	40.0	27.2	0.3616233	0.261889		-32.0	40
Isopropylbenzene	A	40.0	40.5	2.784334	2.82135		1.3	25
4-Isopropyltoluene	A	40.0	43.0	2.588828	2.78466		7.6	25
Methyl Acetate	A	40.0	52.3	0.1571806	0.205675		30.9	25 *
Methyl tert-Butyl Ether	A	40.0	35.4	0.6345868	0.561481		-11.5	25
Methylene Chloride	L	40.0	44.3	0.2329874	0.226075		10.7	25
2-Butanone (MEK)	L	40.0	31.8	0.1058064	0.0888871		-20.6	40
4-Methyl-2-pentanone (MIBK)	L	40.0	34.7	0.1916696	0.202932		-13.2	40
Naphthalene	A	40.0	37.9	2.402171	2.27614		-5.2	25
n-Propylbenzene	A	40.0	41.5	0.8111567	0.841882		3.8	25
Styrene	A	40.0	39.8	2.039381	2.03013		-0.5	25
1,1,1,2-Tetrachloroethane	A	40.0	38.4	0.7284823	0.698607		-4.1	25
1,1,2,2-Tetrachloroethane	A	40.0	37.1	0.7682494	0.71267	0.3	-7.2	25
Tetrachloroethene	A	40.0	40.4	0.7618584	0.768563		0.9	25
Toluene	A	40.0	38.2	1.054318	1.00787		-4.4	20
1,2,3-Trichlorobenzene	A	40.0	43.0	0.8910106	0.95709		7.4	25
1,2,4-Trichlorobenzene	A	40.0	45.8	0.898206	1.02737		14.4	25
1,1,1-Trichloroethane	A	40.0	41.0	0.3098719	0.31751		2.5	25
1,1,2-Trichloroethane	A	40.0	38.8	0.1820985	0.176876		-2.9	25

JIC on samples

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 139
Lab File ID: CCV1120.D
Sequence: 7112634
Lab Sample ID: 7112634-CCV1

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7K26005
Calibration Date: 10/30/07 00:00
Injection Date: 11/20/07
Injection Time: 07:25

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Trichloroethene	A	40.0	39.9	0.287691	0.287019		-0.2	25
Trichlorofluoromethane	A	40.0	41.0	0.2396237	0.245847		2.6	25
1,2,3-Trichloropropane	L	40.0	34.3	0.1988515	0.190414		-14.4	25
1,1,2-Trichloro-1,2,2-trifluoroetha	L	40.0	64.4	0.1831505	0.245937		60.9	25 *
1,2,4-Trimethylbenzene	A	40.0	41.1	2.237911	2.30155		2.8	25
1,3,5-Trimethylbenzene	A	40.0	42.1	2.240505	2.35627		5.2	25
Vinyl Chloride	A	40.0	41.7	0.20704	0.215887		4.3	20
Xylene, Meta + Para	A	80.0	79.7	1.246462	1.24153		-0.4	25
Xylene, Ortho	A	40.0	37.8	1.257089	1.18686		-5.6	25
Xylene (Total)	A	120	117	1.250004	1.22331		-2.1	25

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

00545

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument ID: 139
Calibration: 7K26005
Lab File ID: CCV1121.D
Calibration Date: 10/30/07 00:00
Sequence: 7112636
Injection Date: 11/21/07
Lab Sample ID: 7112636-CCV1
Injection Time: 10:25

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	L	40.0	72.5	5.669036E-02	0.0844468		81.2	40 *
Benzene	A	40.0	35.5	1.001739	0.889536		-11.2	25
Bromochloromethane	A	40.0	38.1	0.2126718	0.202602		-4.7	25
Bromodichloromethane	A	40.0	38.9	0.3087739	0.300496		-2.7	25
Bromoform	A	40.0	35.5	0.5539542	0.491416	0.1	-11.3	25
Bromomethane	L	40.0	36.8	0.2090993	0.165681		-8.0	25
Carbon Disulfide	L	40.0	42.3	0.6652243	0.788832		5.7	25
Carbon Tetrachloride	A	40.0	38.4	0.2862593	0.274852		-4.0	25
Chlorobenzene	A	40.0	35.9	1.949592	1.75144	0.3	-10.2	25
Chloroethane	A	40.0	35.9	0.120347	0.108053		-10.2	25
Chloroform	A	40.0	37.7	0.4112087	0.38761		-5.7	20
Chloromethane	L	40.0	33.3	0.2461084	0.184812	0.1	-16.7	25
Cyclohexane	A	40.0	36.3	0.4140872	0.3759		-9.2	25
1,2-Dibromo-3-chloropropane	A	40.0	35.6	0.1208082	0.107394		-11.1	25
Dibromochloromethane	A	40.0	36.3	0.765283	0.693754		-9.3	25
1,2-Dibromoethane	L	40.0	35.4	0.5538223	0.562445		-11.6	25
1,2-Dichlorobenzene	A	40.0	35.5	1.392101	1.23685		-11.2	25
1,3-Dichlorobenzene	A	40.0	37.1	1.39157	1.29096		-7.2	25
1,4-Dichlorobenzene	A	40.0	35.9	1.461023	1.31222		-10.2	25
Dichlorodifluoromethane	A	40.0	32.8	0.2291124	0.188023		-17.9	25
1,1-Dichloroethane	A	40.0	37.2	0.4541831	0.422131	0.1	-7.1	25
1,2-Dichloroethane	A	40.0	39.8	0.2597308	0.258292		-0.6	25
1,1-Dichloroethene	A	40.0	34.8	0.1663355	0.144893		-12.9	20
cis-1,2-Dichloroethene	A	40.0	36.2	0.2909781	0.263515		-9.4	25
trans-1,2-Dichloroethene	A	40.0	37.0	0.277099	0.25665		-7.4	25
1,2-Dichloropropane	A	40.0	38.2	0.2542669	0.242952		-4.5	20
cis-1,3-Dichloropropene	A	40.0	38.7	0.3569673	0.345028		-3.3	25
trans-1,3-Dichloropropene	L	40.0	35.0	0.3069988	0.291213		-12.4	25
Ethylbenzene	A	40.0	35.5	3.016584	2.67997		-11.2	20

POT Diff

POT JK

00553

LCS / LCS DUPLICATE RECOVERY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0714321-BS2

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 5035 Soil Purge & Trap - MS
Initial/Final: 5 g / 5 mL
QC Batch: 0714321
Sequence: 7112633

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
2-Hexanone	40.0	34.2	85	45 - 145	ug/kg wet
Isopropylbenzene	40.0	36.9	92	75 - 130	ug/kg wet
Methyl Acetate	40.0	48.0	120	70 - 130	ug/kg wet
Methyl tert-Butyl Ether	40.0	37.0	92	63 - 127	ug/kg wet
Methylcyclohexane	40.0	37.8	94	70 - 130	ug/kg wet
Methylene Chloride	40.0	43.1	108	55 - 140	ug/kg wet
2-Butanone (MEK)	40.0	39.5	99	30 - 160	ug/kg wet
4-Methyl-2-pentanone (MIBK)	40.0	36.0	90	45 - 145	ug/kg wet
Styrene	40.0	36.8	92	75 - 125	ug/kg wet
1,1,2,2-Tetrachloroethane	40.0	36.3	91	55 - 130	ug/kg wet
Tetrachloroethene	40.0	36.2	90	65 - 140	ug/kg wet
Toluene	40.0	36.7	92	70 - 125	ug/kg wet
1,2,3-Trichlorobenzene	40.0	40.4	101	60 - 135	ug/kg wet
1,2,4-Trichlorobenzene	40.0	42.3	106	65 - 130	ug/kg wet
1,1,1-Trichloroethane	40.0	36.8	92	70 - 135	ug/kg wet
1,1,2-Trichloroethane	40.0	39.8	100	60 - 125	ug/kg wet
Trichloroethene	40.0	37.0	93	75 - 125	ug/kg wet
Trichlorofluoromethane	40.0	36.6	91	25 - 185	ug/kg wet
1,1,2-Trichloro-1,2,2-trifluoroethane	40.0	57.4	144 *	80 - 120	ug/kg wet
Vinyl Chloride	40.0	39.6	99	60 - 125	ug/kg wet
Xylene (Total)	120	109	91	75 - 125	ug/kg wet

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0714321-BS3

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 5035 Soil Purge & Trap - MS
Initial/Final: 5 g / 5 mL
QC Batch: 0714321
Sequence: 7112634

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
2-Hexanone	40.0	27.2	68	45 - 145	ug/kg wet
Isopropylbenzene	40.0	40.5	101	75 - 130	ug/kg wet
Methyl Acetate	40.0	52.3	131 *	70 - 130	ug/kg wet
Methyl tert-Butyl Ether	40.0	35.4	88	63 - 127	ug/kg wet
Methylcyclohexane	40.0	40.1	100	70 - 130	ug/kg wet
Methylene Chloride	40.0	44.3	111	55 - 140	ug/kg wet
2-Butanone (MEK)	40.0	31.8	79	30 - 160	ug/kg wet
4-Methyl-2-pentanone (MIBK)	40.0	34.7	87	45 - 145	ug/kg wet
Styrene	40.0	39.8	100	75 - 125	ug/kg wet
1,1,2,2-Tetrachloroethane	40.0	37.1	93	55 - 130	ug/kg wet
Tetrachloroethene	40.0	40.4	101	65 - 140	ug/kg wet
Toluene	40.0	38.2	96	70 - 125	ug/kg wet
1,2,3-Trichlorobenzene	40.0	43.0	107	60 - 135	ug/kg wet
1,2,4-Trichlorobenzene	40.0	45.8	114	65 - 130	ug/kg wet
1,1,1-Trichloroethane	40.0	41.0	102	70 - 135	ug/kg wet
1,1,2-Trichloroethane	40.0	38.8	97	60 - 125	ug/kg wet
Trichloroethene	40.0	39.9	100	75 - 125	ug/kg wet
Trichlorofluoromethane	40.0	41.0	103	25 - 185	ug/kg wet
1,1,2-Trichloro-1,2,2-trifluoroethane	40.0	64.4	161 *	80 - 120	ug/kg wet
Vinyl Chloride	40.0	41.7	104	60 - 125	ug/kg wet
Xylene (Total)	120	117	98	75 - 125	ug/kg wet

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

00281

LCS / LCS DUPLICATE RECOVERY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0714321-BSD3

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 5035 Soil Purge & Trap - MS
Initial/Final: 5 g / 5 mL
QC Batch: 0714321
Sequence: 7112634

Analyte	Spike Added ug/kg wet	LCSD Conc.	LCSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
2-Hexanone	40.0	36.1	90	28	30	45 - 145	ug/kg wet
Isopropylbenzene	40.0	41.4	104	2	30	75 - 130	ug/kg wet
Methyl Acetate	40.0	38.8	97	30	30	70 - 130	ug/kg wet
Methyl tert-Butyl Ether	40.0	39.2	98	10	30	63 - 127	ug/kg wet
Methylcyclohexane	40.0	39.7	99	1	30	70 - 130	ug/kg wet
Methylene Chloride	40.0	44.8	112	1	30	55 - 140	ug/kg wet
2-Butanone (MEK)	40.0	42.9	107	30	30	30 - 160	ug/kg wet
4-Methyl-2-pentanone (MIBK)	40.0	39.9	100	14	30	45 - 145	ug/kg wet
Styrene	40.0	39.0	97	2	30	75 - 125	ug/kg wet
1,1,2,2-Tetrachloroethane	40.0	41.0	103	10	30	55 - 130	ug/kg wet
Tetrachloroethene	40.0	38.5	96	5	30	65 - 140	ug/kg wet
Toluene	40.0	39.4	98	3	30	70 - 125	ug/kg wet
1,2,3-Trichlorobenzene	40.0	44.7	112	4	30	60 - 135	ug/kg wet
1,2,4-Trichlorobenzene	40.0	46.0	115	0.6	30	65 - 130	ug/kg wet
1,1,1-Trichloroethane	40.0	40.6	102	0.9	30	70 - 135	ug/kg wet
1,1,2-Trichloroethane	40.0	42.2	106	8	30	60 - 125	ug/kg wet
Trichloroethene	40.0	40.4	101	1	30	75 - 125	ug/kg wet
Trichlorofluoromethane	40.0	41.5	104	1	30	25 - 185	ug/kg wet
1,1,2-Trichloro-1,2,2-trifluoroetha	40.0	46.9	117	31 *	30	80 - 120	ug/kg wet
Vinyl Chloride	40.0	48.2	120	14	30	60 - 125	ug/kg wet
Xylene (Total)	120	117	97	0.6	30	75 - 125	ug/kg wet

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

LCS / LCS DUPLICATE RECOVERY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0714321-BS4

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 5035 Soil Purge & Trap - MS
Initial/Final: 5 g / 5 mL
QC Batch: 0714321
Sequence: 7112636

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Acetone	40.0	72.5	181 *	20 - 160	ug/kg wet
Benzene	40.0	35.5	89	75 - 125	ug/kg wet
Bromochloromethane	40.0	38.1	95	70 - 125	ug/kg wet
Bromodichloromethane	40.0	38.9	97	70 - 130	ug/kg wet
Bromoform	40.0	35.5	89	55 - 135	ug/kg wet
Bromomethane	40.0	36.8	92	30 - 160	ug/kg wet
Carbon Disulfide	40.0	42.3	106	45 - 160	ug/kg wet
Carbon Tetrachloride	40.0	38.4	96	65 - 135	ug/kg wet
Chlorobenzene	40.0	35.9	90	75 - 125	ug/kg wet
Chloroethane	40.0	35.9	90	40 - 155	ug/kg wet
Chloroform	40.0	37.7	94	70 - 125	ug/kg wet
Chloromethane	40.0	33.3	83	50 - 130	ug/kg wet
Cyclohexane	40.0	36.3	91	70 - 130	ug/kg wet
1,2-Dibromo-3-chloropropane	40.0	35.6	89	40 - 135	ug/kg wet
Dibromochloromethane	40.0	36.3	91	65 - 130	ug/kg wet
1,2-Dibromoethane	40.0	35.4	88	70 - 125	ug/kg wet
1,2-Dichlorobenzene	40.0	35.5	89	75 - 120	ug/kg wet
1,3-Dichlorobenzene	40.0	37.1	93	70 - 125	ug/kg wet
1,4-Dichlorobenzene	40.0	35.9	90	70 - 125	ug/kg wet
Dichlorodifluoromethane	40.0	32.8	82	35 - 135	ug/kg wet
1,1-Dichloroethane	40.0	37.2	93	75 - 125	ug/kg wet
1,2-Dichloroethane	40.0	39.8	99	70 - 135	ug/kg wet
1,1-Dichloroethene	40.0	34.8	87	65 - 135	ug/kg wet
cis-1,2-Dichloroethene	40.0	36.2	91	65 - 125	ug/kg wet
trans-1,2-Dichloroethene	40.0	37.0	93	65 - 135	ug/kg wet
1,2-Dichloropropane	40.0	38.2	96	70 - 120	ug/kg wet
cis-1,3-Dichloropropene	40.0	38.7	97	70 - 125	ug/kg wet
trans-1,3-Dichloropropene	40.0	35.0	88	65 - 125	ug/kg wet
Ethylbenzene	40.0	35.5	89	75 - 125	ug/kg wet

Quality Control Results – Volatile Organics by GC/MS

Calibration

All initial instrument calibrations, second source calibration verifications (SCV), and continuing calibration verifications (CCV) were method-compliant for the target analytes with the following exceptions:

1) The recovery (43.6%) of 1,1,2-Trichloro-1,2,2-trifluoroethane in CCV1 associated with analytical sequence 7112633 was outside the 75-125% criterion.

2) The recovery (30.9%) of Methyl Acetate and the recovery (60.9%) of 1,1,2-Trichloro-1,2,2-trifluoroethane in CCV1 associated with analytical sequence 7112634 were outside the 75-125% criterion.

3) The recovery (81.2%) of Acetone in CCV1 associated with analytical sequence 7112636 was outside the 60-140% criterion.

Note: The initial calibration and SCV summaries may include additional compounds that are not target analytes.

Method Blanks

No target analytes were detected above one-half the RL. In addition, there were no J-level detections below one-half the RL with the exception of Acetone and Carbon Disulfide (common laboratory contaminants) in the two separate method blanks.

Surrogates

All surrogate recoveries were in control.

Laboratory Control Samples

Each Laboratory Control Sample (LCS) was fortified with all target analytes. For one QC batch, an LCS Duplicate was also analyzed. All recoveries (and RPDs in the case of the LCS/LCSD) were in control with the exception of those detailed in Narrative Attachment 2.

Matrix Spikes

Sample 35SB2A was fortified with all target analytes. All recoveries and RPDs were in control.

Sample Results

Please see Section B. Due to sample matrix interference resulting in failure of one or more internal standards (confirmed by analysis of the second low-level sample), seven samples required reanalysis using a methanol-preserved sample; see Narrative Attachment 2 for a sample listing. For those samples, raw data-only for the initial analysis and confirmatory analyses (both low concentration) immediately follow the raw data for the reported (methanol-preserved) run.

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Individual sample results relate only to the sample tested.

Quality Control Results – Volatile Organics by GC/MS – (continued)

Corrective Action

No corrective actions were deemed necessary aside from reanalysis of certain samples using the low concentration technique for confirmation of sample matrix interference and reanalysis (and reporting) of those same samples using the high concentration (i.e., methanol-preservation) technique.

Statements of Data Qualification

See Narrative Attachment 2.

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Individual sample results relate only to the sample tested.

STATEMENT OF DATA QUALIFICATIONS

Volatile Organic Compounds by EPA Method 8260B (High Level)

Qualification: Due to sample matrix-related Internal Standard failure, the sample was reanalyzed at dilution. The RL for this analyte has been elevated.

Analysis: USEPA-8260B

Sample/Analyte:

0711313-06 35SB2A
0711313-07 35SB6A
0711313-10 35SB9A
0711313-13 35SB10A
0711377-01 35SB7A
0711377-04 35SB5A
0711377-08 35SB8A

STATEMENT OF DATA QUALIFICATIONS

Volatile Organic Compounds by EPA Method 8260B

Qualification: The LCS/LCSD RPD exceeded the control limit. A positive result for this analyte in any sample from the associated QC batch is considered estimated. Non-detectable results are not qualified.

Analysis: USEPA-8260B

Sample/Analyte:	
0711377-02 35SB7B	1,1,2-Trichloro-1,2,2-trifluoroethane
0711377-03 35SB7C	1,1,2-Trichloro-1,2,2-trifluoroethane
0711377-05 35SB5B	1,1,2-Trichloro-1,2,2-trifluoroethane
0711377-06 35SB5C	1,1,2-Trichloro-1,2,2-trifluoroethane
0711377-09 35SB8B	1,1,2-Trichloro-1,2,2-trifluoroethane

Qualification: The LCS recovery exceeded the control limit but it was within the marginal exceedance for a compound that is not a project-specific analyte of concern. The result for this analyte in any sample from the associated QC batch is not considered qualified.

Analysis: USEPA-8260B

Sample/Analyte:	
0711377-02 35SB7B	Methyl Acetate
0711377-03 35SB7C	Methyl Acetate
0711377-05 35SB5B	Methyl Acetate
0711377-06 35SB5C	Methyl Acetate
0711377-09 35SB8B	Methyl Acetate

Qualification: The LCS recovery exceeded both the control limit and the marginal exceedance for a compound that is not a project-specific analyte of concern. The result for this analyte in any sample from the associated QC batch is considered qualified.

Analysis: USEPA-8260B

Sample/Analyte:	
0711293-01 35SB3A	1,1,2-Trichloro-1,2,2-trifluoroethane
0711313-05 35SB1A	1,1,2-Trichloro-1,2,2-trifluoroethane
0711313-15 35SB10C	1,1,2-Trichloro-1,2,2-trifluoroethane
0711377-02 35SB7B	1,1,2-Trichloro-1,2,2-trifluoroethane
0711377-03 35SB7C	1,1,2-Trichloro-1,2,2-trifluoroethane
0711377-05 35SB5B	1,1,2-Trichloro-1,2,2-trifluoroethane
0711377-06 35SB5C	1,1,2-Trichloro-1,2,2-trifluoroethane
0711377-07 DUP-2	Acetone
0711377-09 35SB8B	1,1,2-Trichloro-1,2,2-trifluoroethane
0711377-10 35SB8C	Acetone

Qualification: The analyte concentration in the associated MB for this common lab contaminant was greater than or equal to the RL. The positive sample result, which was less than 5 times the MB value, is considered estimated.

Analysis: USEPA-8260B

Sample/Analyte:	
0711293-01 35SB3A	Carbon Disulfide
0711313-05 35SB1A	Carbon Disulfide
0711313-15 35SB10C	Carbon Disulfide

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: RA
Date: 1/16/07
DV Level: II (III) IV
Review Document:
_X_ SW-846
_X_ NFG - Region III Modifications
_X_ Project QAPP/SAP

Project Name: RAAP 10
Project Number: 21354857.40003
Laboratory: TVI Matrix
SDG No.: 360140-42
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 °C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per batch)?	✓		
3.2	Do any blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank] (or 10 times for the common phthalate contaminants).	✓		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	✓		

Notes: MBs → acetophenone 0.05 ug/L, di-n-butyl phthalate 4.43 ug/L, bis(2-ethyl)...9.17 ug/L
MB → bis(2-ethylhexyl)phthalate 3 ug/kg

<5 x 1 B, T

EQBK-1 butylbenzyl phthalate 0.038 x10 = .38 ug/L
diethyl phthalate 0.038 x10 = .38
naphthalene 0.028 x5 = 0.14

<<10x B, T

EQBK-2 benzaldehyde 0.61 ug/L x5 = 3.05
diethyl phthalate 0.047 x10 = 0.47

, and were above FB results, no action. URS

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis?	✓		
4.4	Are all calibration standard %RSD ≤15%, r>0.995, or r^2<0.99), second source ±30% or %D(≤20%) within the control limits?		✓	
For initial calibration: %RSD > 15% but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>30% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.5	Are any SPCCs RF < 0.05 and/or CCC >30%? If yes reject all associated data.		✓	

Notes:

CC 11/28107

3,3-dichlorobenzidine 29.4% 720% neg bias

also results ND, UJ/C

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	✓		
5.2	Are DFTPP monitored ions within specification? If no, flag R.	✓		
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune? If no, flag R.	✓		
5.4	Have ion abundance criteria for DFTPP been met for each instrument used? If no, flag R.	✓		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?		✓	
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?		✓	
6.3	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)	✓		
	If No, for 2 or 3 %Rs > UCL, K(+) only; for 2 or 3 %Rs < LCL, but > 10%, L(+)/UL (-); for 2 or 3 %Rs mixed high/low, J(+)/UJ(-); for %R < 10%, L(+)/R(-).			

Notes: 355B6A nitrobenzene-d5 114%.7100, no action. one failure
Surr diluted out for 355B9A (DF=5), L, UL/S Surr diluted 355B10A (DF=50) No action
355B10C Phenol-d6 38%.<40%.), 2-fluorobiphenyl 44%.<45) no action one from each fraction
Surr diluted out 355B7A (DF=25), No action. Surr diluted out 355B7C (DF=5) L, UL/S

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate outside the QC limits?		✓	
7.4	Are there any RPD for matrix spike and matrix spike duplicate outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS/MSD results in conjunction with other QC criteria to determine the need for qualification of the data.			

Notes: No MS/MSD %Rs were reported since parent 355B2A was analyzed at DF. No action.

→ Surr diluted out 355B5A (Df=25), No action
〃 〃 DUP-2 〃 〃
〃 〃 355B8A 〃 〃

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).	✓		
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.	✓		

Notes: for batch 714041 caprolactam <64% at 13%, 15% R, J in EBs
di-n-butyl phthalate >115%. at 116%. Prev, B, J

for batch 714466 RPD for 4-Chloroaniline >30%. at 62%. all NDs, No action

URS

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard areas within +100% and -50% of the mid point initail calibration? If No, J(+)/UJ(-).	✓		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration?			
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.	✓		

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Are all analyte duplicate results within control limits (use RPD limits of matrix spikes)? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		✓	

Notes: 355B4A , DUP-1 RL

	355B4A	DUP-1	RL		355B4A	DUP-1	RL
benzo(a)anthracene	8	7.9	100 ukv	bis-2-ethylhexyl	16	16	1000 ukv
Chrysene	6	7.9	100 ukv	Pyrene	8	7.9	ukv
di-n-butyl phthalate	12	9.9	1000 ukv	benzo(a) pyren	ND	7.9	100 ukv
diethyl phthalate	4	4	1000 ukv	benzo(b) fluoranthene	ND	16	100 ukv

11.0 Detection Limit Verification		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	✓		

Notes: 355B5A and DUP-2 RL

di-n-butyl phthale	4700	5000	63000 ukv

DLs raised for several samples due to dilutions

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
12.1.1	Number of samples: 23			
12.1.2	Number of target compounds in each analysis: 67			
12.1.3	Number of results rejected and not reported: 2			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 99%			

Notes:

QC BATCH SUMMARY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42

Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004

QC Batch: 0714041
QC Batch Matrix: Water
Preparation: 3510C Liquid-Liquid Extraction

Sample Name	Lab Sample ID	Date Prepared	Observations
EQBK-1	0711313-01	11/19/07 07:02	
EQBK-2	0711377-23	11/19/07 07:02	
Blank	0714041-BLK1	11/19/07 07:02	
LCS	0714041-BS1	11/19/07 07:02	
LCS Dup	0714041-BSD1	11/19/07 07:02	

00828

METHOD BLANK DATA SHEET
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0714041-BLK1 File ID: 714040B1.D

Prepared: 11/19/07 07:02 Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1000 mL / 1 mL

Analyzed: 11/26/07 10:55 Instrument: 195

QC Batch: 0714041 Sequence: 7112784 Calibration: 7K27035

CAS No.	Analyte	MDL	MRL	Concentration	Q
83-32-9	Acenaphthene	0.013	0.50	0.50 ug/L	U
208-96-8	Acenaphthylene	0.012	0.50	0.50 ug/L	U
98-86-2	Acetophenone	0.043	5.0	0.0500 ug/L	J
120-12-7	Anthracene	0.014	0.50	0.50 ug/L	U
1912-24-9	Atrazine	0.026	5.0	5.0 ug/L	U
100-52-7	Benzaldehyde	0.051	5.0	5.0 ug/L	U
56-55-3	Benzo(a)anthracene	0.037	0.50	0.50 ug/L	U
50-32-8	Benzo(a)pyrene	0.023	0.50	0.50 ug/L	U
205-99-2	Benzo(b)fluoranthene	0.040	0.50	0.50 ug/L	U
207-08-9	Benzo(k)fluoranthene	0.036	0.50	0.50 ug/L	U
191-24-2	Benzo(g,h,i)perylene	0.022	0.50	0.50 ug/L	U
92-52-4	1,1'-Biphenyl	0.015	5.0	5.0 ug/L	U
101-55-3	4-Bromophenyl Phenyl Ether	0.026	5.0	5.0 ug/L	U
85-68-7	Butyl Benzyl Phthalate	0.029	5.0	5.0 ug/L	U
105-60-2	Caprolactam	0.14	5.0	5.0 ug/L	U
86-74-8	Carbazole	0.018	5.0	5.0 ug/L	U
59-50-7	4-Chloro-3-methylphenol	0.021	5.0	5.0 ug/L	U
106-47-8	4-Chloroaniline	0.021	5.0	5.0 ug/L	U
111-91-1	Bis(2-chloroethoxy)methane	0.016	5.0	5.0 ug/L	U
111-44-4	Bis(2-chloroethyl) Ether	0.016	5.0	5.0 ug/L	U
108-60-1	Bis(2-chloroisopropyl) Ether	0.047	5.0	5.0 ug/L	U
91-58-7	2-Chloronaphthalene	0.012	5.0	5.0 ug/L	U
95-57-8	2-Chlorophenol	0.016	5.0	5.0 ug/L	U
7005-72-3	4-Chlorophenyl Phenyl Ether	0.016	5.0	5.0 ug/L	U
218-01-9	Chrysene	0.020	0.50	0.50 ug/L	U
53-70-3	Dibenz(a,h)anthracene	0.026	0.50	0.50 ug/L	U
132-64-9	Dibenzofuran	0.016	5.0	5.0 ug/L	U
84-74-2	Di-n-butyl Phthalate	0.38	5.0	4.43 ug/L	J
91-94-1	3,3'-Dichlorobenzidine	0.21	5.0	5.0 ug/L	U
120-83-2	2,4-Dichlorophenol	0.015	5.0	5.0 ug/L	U

: 00825

METHOD BLANK DATA SHEET
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0714041-BLK1 File ID: 714040B1.D

Prepared: 11/19/07 07:02 Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1000 mL / 1 mL

Analyzed: 11/26/07 10:55 Instrument: 195

QC Batch: 0714041 Sequence: 7112784 Calibration: 7K27035

CAS No.	Analyte	MDL	MRL	Concentration	Q
84-66-2	Diethyl Phthalate	0.034	5.0	5.0 ug/L	U
105-67-9	2,4-Dimethylphenol	0.33	5.0	5.0 ug/L	U
131-11-3	Dimethyl Phthalate	0.016	5.0	5.0 ug/L	U
534-52-1	4,6-Dinitro-2-methylphenol	0.12	5.0	5.0 ug/L	U
51-28-5	2,4-Dinitrophenol	1.5	5.0	5.0 ug/L	U
121-14-2	2,4-Dinitrotoluene	0.21	5.0	5.0 ug/L	U
606-20-2	2,6-Dinitrotoluene	0.050	5.0	5.0 ug/L	U
117-84-0	Di-n-octyl Phthalate	0.34	5.0	5.0 ug/L	U
117-81-7	Bis(2-ethylhexyl) Phthalate	0.41	5.0	9.17 ug/L	
206-44-0	Fluoranthene	0.016	0.50	0.50 ug/L	U
86-73-7	Fluorene	0.011	0.50	0.50 ug/L	U
118-74-1	Hexachlorobenzene	0.019	5.0	5.0 ug/L	U
87-68-3	Hexachlorobutadiene	0.018	5.0	5.0 ug/L	U
77-47-4	Hexachlorocyclopentadiene	0.13	5.0	5.0 ug/L	U
67-72-1	Hexachloroethane	0.038	5.0	5.0 ug/L	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.014	0.50	0.50 ug/L	U
78-59-1	Isophorone	0.031	5.0	5.0 ug/L	U
91-57-6	2-Methylnaphthalene	0.015	5.0	5.0 ug/L	U
95-48-7	2-Methylphenol	0.14	5.0	5.0 ug/L	U
106-44-5	4-Methylphenol	0.16	5.0	5.0 ug/L	U
91-20-3	Naphthalene	0.023	0.50	0.50 ug/L	U
88-74-4	2-Nitroaniline	0.12	5.0	5.0 ug/L	U
99-09-2	3-Nitroaniline	0.13	5.0	5.0 ug/L	U
100-01-6	4-Nitroaniline	0.14	5.0	5.0 ug/L	U
98-95-3	Nitrobenzene	0.026	5.0	5.0 ug/L	U
100-02-7	4-Nitrophenol	1.3	5.0	5.0 ug/L	U
88-75-5	2-Nitrophenol	0.026	5.0	5.0 ug/L	U
86-30-6	N-Nitroso-diphenylamine	0.019	5.0	5.0 ug/L	U
621-64-7	N-Nitroso-di-n-propylamine	0.030	5.0	5.0 ug/L	U
87-86-5	Pentachlorophenol	0.19	5.0	5.0 ug/L	U

00826

QC BATCH SUMMARY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
QC Batch: 0714308
QC Batch Matrix: Soil
Preparation: 3550B Sonication Extraction

Sample Name	Lab Sample ID	Date Prepared	Observations
35SB3A	0711293-01	11/26/07 07:13	
35SB4A	0711313-03	11/26/07 07:13	
DUP-1	0711313-04	11/26/07 07:13	
35SB1A	0711313-05	11/26/07 07:13	
35SB2A	0711313-06	11/26/07 07:13	
35SB6A	0711313-07	11/26/07 07:13	
35SB6B	0711313-08	11/26/07 07:13	
35SB6C	0711313-09	11/26/07 07:13	
35SB9A	0711313-10	11/26/07 07:13	
35SB9B	0711313-11	11/26/07 07:13	
35SB9C	0711313-12	11/26/07 07:13	
35SB10A	0711313-13	11/26/07 07:13	
35SB10B	0711313-14	11/26/07 07:13	
35SB10C	0711313-15	11/26/07 07:13	
Blank	0714308-BLK2	11/26/07 07:13	
LCS	0714308-BS2	11/26/07 07:13	

MB-ND

: 00832

QC BATCH SUMMARY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
QC Batch: 0714466
QC Batch Matrix: Soil
Preparation: 3550B Sonication Extraction

Sample Name	Lab Sample ID	Date Prepared	Observations
35SB7A	0711377-01	11/28/07 07:07	stopped boiling at 12 mL
35SB7B	0711377-02	11/28/07 07:07	
35SB7C	0711377-03	11/28/07 07:07	
35SB5A	0711377-04	11/28/07 07:07	stopped boiling at 12 mL
35SB5B	0711377-05	11/28/07 07:07	
35SB5C	0711377-06	11/28/07 07:07	
DUP-2	0711377-07	11/28/07 07:07	stopped boiling at 14 mL
35SB8A	0711377-08	11/28/07 07:07	stopped boiling at 5 mL
35SB8B	0711377-09	11/28/07 07:07	
35SB8C	0711377-10	11/28/07 07:07	
Blank	0714466-BLK1	11/28/07 07:07	
LCS	0714466-BS1	11/28/07 07:07	
LCS Dup	0714466-BSD1	11/28/07 07:07	

00835

METHOD BLANK DATA SHEET
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-42

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0714466-BLK1 File ID: 714466B1.D

Prepared: 11/28/07 07:07 Preparation: 3550B Sonication Extract Initial/Final: 30 g / 1 mL

Analyzed: 11/30/07 17:25 Instrument: 195

QC Batch: 0714466 Sequence: 7120441 Calibration: 7K30001

CAS No.	Analyte	MDL	MRL	Concentration	Q
84-66-2	Diethyl Phthalate	0.37	170	170 ug/kg wet	U
105-67-9	2,4-Dimethylphenol	5.7	170	170 ug/kg wet	U
131-11-3	Dimethyl Phthalate	0.34	170	170 ug/kg wet	U
534-52-1	4,6-Dinitro-2-methylphenol	36	170	170 ug/kg wet	U
51-28-5	2,4-Dinitrophenol	33	330	330 ug/kg wet	U
121-14-2	2,4-Dinitrotoluene	13	170	170 ug/kg wet	U
606-20-2	2,6-Dinitrotoluene	1.6	170	170 ug/kg wet	U
117-84-0	Di-n-octyl Phthalate	9.8	170	170 ug/kg wet	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1.3	170	3.00 ug/kg wet	J
206-44-0	Fluoranthene	3.8	17	17 ug/kg wet	U
86-73-7	Fluorene	0.28	17	17 ug/kg wet	U
118-74-1	Hexachlorobenzene	0.80	170	170 ug/kg wet	U
87-68-3	Hexachlorobutadiene	0.69	170	170 ug/kg wet	U
77-47-4	Hexachlorocyclopentadiene	3.9	170	170 ug/kg wet	U
67-72-1	Hexachloroethane	0.80	170	170 ug/kg wet	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.70	67	67 ug/kg wet	U
78-59-1	Isophorone	0.40	170	170 ug/kg wet	U
91-57-6	2-Methylnaphthalene	0.48	170	170 ug/kg wet	U
95-48-7	2-Methylphenol	8.1	170	170 ug/kg wet	U
106-44-5	4-Methylphenol	9.1	170	170 ug/kg wet	U
91-20-3	Naphthalene	0.23	17	17 ug/kg wet	U
88-74-4	2-Nitroaniline	13	170	170 ug/kg wet	U
99-09-2	3-Nitroaniline	11	170	170 ug/kg wet	U
100-01-6	4-Nitroaniline	23	170	170 ug/kg wet	U
98-95-3	Nitrobenzene	1.5	170	170 ug/kg wet	U
100-02-7	4-Nitrophenol	11	330	330 ug/kg wet	U
88-75-5	2-Nitrophenol	12	170	170 ug/kg wet	U
86-30-6	N-Nitroso-diphenylamine	0.80	170	170 ug/kg wet	U
621-64-7	N-Nitroso-di-n-propylamine	0.71	170	170 ug/kg wet	U
87-86-5	Pentachlorophenol	3.7	330	330 ug/kg wet	U

00834

CONTINUING CALIBRATION CHECK
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 195
Lab File ID: 10A1130A.D
Sequence: 7120444
Lab Sample ID: 7120444-CCV2

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7K30001
Calibration Date: 11/28/07 08:11
Injection Date: 11/30/07
Injection Time: 22:01

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Aniline	A	10.0	9.40	2.103835	1.97747		-6.0	25
4-Chloroaniline	A	10.0	9.44	0.4024555	0.37987		-5.6	40
3,3´-Dichlorobenzidine	A	10.0	7.06	0.4573712	0.323032		-29.4	25 *
2-Nitroaniline	A	10.0	9.81	0.3638672	0.356785		-1.9	40
3-Nitroaniline	A	10.0	9.16	0.2847163	0.260801		-8.4	40
4-Nitroaniline	A	10.0	8.24	0.2791947	0.229965		-17.6	40
N-Nitroso-dimethylamine	A	10.0	9.38	0.8138841	0.849749		4.4	25
N-Nitroso-diphenylamine	A	10.0	9.60	0.7710821	0.739958		-4.0	20
N-Nitroso-di-n-propylamine	A	10.0	8.52	0.9586682	0.90374	0.05	-5.7	25

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

: 01850

LCS / LCS DUPLICATE RECOVERY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

Laboratory ID: 0714041-BS1

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3510C Liquid-Liquid Extraction
Initial/Final: 1000 mL / 1 mL
QC Batch: 0714041
Sequence: 7112784

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Acenaphthene	10.0	6.30	63	45 - 110	ug/L
Acenaphthylene	10.0	6.46	65	50 - 105	ug/L
Acetophenone	10.0	6.61	66	54 - 113	ug/L
Anthracene	10.0	6.70	67	55 - 110	ug/L
Atrazine	10.0	7.27	73	61 - 139	ug/L
Benzaldehyde	10.0	7.14	71	25 - 141	ug/L
Benzo(a)anthracene	10.0	6.50	65	55 - 110	ug/L
Benzo(a)pyrene	10.0	6.36	64	55 - 110	ug/L
Benzo(b)fluoranthene	10.0	6.36	64	45 - 120	ug/L
Benzo(k)fluoranthene	10.0	6.51	65	45 - 125	ug/L
Benzo(g,h,i)perylene	10.0	5.86	59	40 - 125	ug/L
1,1'-Biphenyl	10.0	6.48	65	59 - 114	ug/L
4-Bromophenyl Phenyl Ether	10.0	6.87	69	50 - 115	ug/L
Butyl Benzyl Phthalate	10.0	7.82	78	45 - 115	ug/L
Caprolactam	10.0	1.26	13 *	64 - 140	ug/L
Carbazole	10.0	7.20	72	50 - 115	ug/L
4-Chloro-3-methylphenol	10.0	6.33	63	45 - 110	ug/L
4-Chloroaniline	10.0	6.59	66	15 - 110	ug/L
Bis(2-chloroethoxy)methane	10.0	6.77	68	45 - 105	ug/L
Bis(2-chloroethyl) Ether	10.0	6.48	65	35 - 110	ug/L
Bis(2-chloroisopropyl) Ether	10.0	7.03	70	25 - 130	ug/L
2-Chloronaphthalene	10.0	6.38	64	50 - 105	ug/L
2-Chlorophenol	10.0	6.52	65	35 - 105	ug/L
4-Chlorophenyl Phenyl Ether	10.0	6.53	65	50 - 110	ug/L
Chrysene	10.0	6.40	64	55 - 110	ug/L
Dibenz(a,h)anthracene	10.0	5.71	57	40 - 125	ug/L
Dibenzofuran	10.0	6.75	68	55 - 105	ug/L
Di-n-butyl Phthalate	10.0	11.6	116 *	55 - 115	ug/L
3,3'-Dichlorobenzidine	20.0	14.6	73	20 - 110	ug/L

LCS / LCS DUPLICATE RECOVERY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

Laboratory ID: 0714041-BSD1

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3510C Liquid-Liquid Extraction
Initial/Final: 1000 mL / 1 mL
QC Batch: 0714041
Sequence: 7112784

Analyte	Spike Added ug/L	LCSD Conc.	LCSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Acenaphthene	10.0	5.96	60	6	30	45 - 110	ug/L
Acenaphthylene	10.0	6.21	62	4	30	50 - 105	ug/L
Acetophenone	10.0	6.11	61	8	30	54 - 113	ug/L
Anthracene	10.0	6.34	63	6	30	55 - 110	ug/L
Atrazine	10.0	7.14	71	2	30	61 - 139	ug/L
Benzaldehyde	10.0	6.54	65	9	30	25 - 141	ug/L
Benzo(a)anthracene	10.0	6.14	61	6	30	55 - 110	ug/L
Benzo(a)pyrene	10.0	6.18	62	3	30	55 - 110	ug/L
Benzo(b)fluoranthene	10.0	6.55	66	3	30	45 - 120	ug/L
Benzo(k)fluoranthene	10.0	6.26	63	4	30	45 - 125	ug/L
Benzo(g,h,i)perylene	10.0	5.66	57	3	30	40 - 125	ug/L
1,1'-Biphenyl	10.0	6.15	62	5	30	59 - 114	ug/L
4-Bromophenyl Phenyl Ether	10.0	6.99	70	2	30	50 - 115	ug/L
Butyl Benzyl Phthalate	10.0	7.19	72	8	30	45 - 115	ug/L
Caprolactam	10.0	1.47	15 *	15	30	64 - 140	ug/L
Carbazole	10.0	6.72	67	7	30	50 - 115	ug/L
4-Chloro-3-methylphenol	10.0	6.04	60	5	30	45 - 110	ug/L
4-Chloroaniline	10.0	6.32	63	4	30	15 - 110	ug/L
Bis(2-chloroethoxy)methane	10.0	6.39	64	6	30	45 - 105	ug/L
Bis(2-chloroethyl) Ether	10.0	5.88	59	10	30	35 - 110	ug/L
Bis(2-chloroisopropyl) Ether	10.0	6.57	66	7	30	25 - 130	ug/L
2-Chloronaphthalene	10.0	5.97	60	7	30	50 - 105	ug/L
2-Chlorophenol	10.0	6.04	60	8	30	35 - 105	ug/L
4-Chlorophenyl Phenyl Ether	10.0	6.22	62	5	30	50 - 110	ug/L
Chrysene	10.0	6.34	63	0.9	30	55 - 110	ug/L
Dibenz(a,h)anthracene	10.0	5.61	56	2	30	40 - 125	ug/L
Dibenzofuran	10.0	6.25	62	8	30	55 - 105	ug/L
Di-n-butyl Phthalate	10.0	8.85	88	27	30	55 - 115	ug/L
3,3´-Dichlorobenzidine	20.0	14.2	71	3	30	20 - 110	ug/L

00813

LCS / LCS DUPLICATE RECOVERY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0714466-BSD1

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3550B Sonication Extraction
Initial/Final: 30 g / 1 mL
QC Batch: 0714466
Sequence: 7120441

Analyte	Spike Added ug/kg wet	LCSD Conc.	LCSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Acenaphthene	320	305	95	1	30	45 - 110	ug/kg wet
Acenaphthylene	320	317	99	3	30	45 - 105	ug/kg wet
Acetophenone	333	299	90	2	30	50 - 150	ug/kg wet
Anthracene	320	318	99	0.3	30	55 - 105	ug/kg wet
Atrazine	333	363	109	0.6	30	61 - 146	ug/kg wet
Benzaldehyde	333	415	125	1	30	50 - 150	ug/kg wet
Benzo(a)anthracene	320	309	97	0.9	30	50 - 110	ug/kg wet
Benzo(a)pyrene	320	306	96	2	30	50 - 110	ug/kg wet
Benzo(b)fluoranthene	320	326	102	4	30	45 - 115	ug/kg wet
Benzo(k)fluoranthene	320	348	109	7	30	45 - 125	ug/kg wet
Benzo(g,h,i)perylene	320	242	76	1	30	40 - 125	ug/kg wet
1,1'-Biphenyl	333	322	97	2	30	60 - 131	ug/kg wet
4-Bromophenyl Phenyl Ether	333	348	104	1	30	45 - 115	ug/kg wet
Butyl Benzyl Phthalate	333	328	98	4	30	50 - 125	ug/kg wet
Caprolactam	333	306	92	1	30	62 - 112	ug/kg wet
Carbazole	320	344	108	3	30	45 - 115	ug/kg wet
4-Chloro-3-methylphenol	333	259	78	0.5	30	45 - 115	ug/kg wet
4-Chloroaniline	333	134	40	62 *	30	10 - 95	ug/kg wet
Bis(2-chloroethoxy)methane	333	319	96	3	30	45 - 110	ug/kg wet
Bis(2-chloroethyl) Ether	333	293	88	0.9	30	40 - 105	ug/kg wet
Bis(2-chloroisopropyl) Ether	333	326	98	3	30	20 - 115	ug/kg wet
2-Chloronaphthalene	333	313	94	1	30	45 - 105	ug/kg wet
2-Chlorophenol	333	328	98	2	30	45 - 105	ug/kg wet
4-Chlorophenyl Phenyl Ether	333	313	94	3	30	45 - 110	ug/kg wet
Chrysene	320	320	100	2	30	55 - 110	ug/kg wet
Dibenz(a,h)anthracene	320	247	77	2	30	40 - 125	ug/kg wet
Dibenzofuran	333	321	96	3	30	50 - 105	ug/kg wet
Di-n-butyl Phthalate	333	354	106	2	30	55 - 110	ug/kg wet
3,3'-Dichlorobenzidine	667	236	35	26	30	10 - 130	ug/kg wet

00822

Quality Control Results – Semivolatile Organics by GC/MS

Calibration

All initial instrument calibrations, second source calibration verifications (SCV), and continuing calibration verifications (CCV) were method-compliant for the target analytes.

Note: the initial calibration and second source summaries list all compounds present in the calibration standards and not just target analytes.

Method Blanks

No target analyte was detected above one-half the RL with the exception of Di-n-butyl Phthalate and Bis(2-ethylhexyl) Phthalate in the aqueous method blank. Both compounds are considered common laboratory contaminants. Bis(2-ethylhexyl) Phthalate was detected below one-half the RL in one of the soil method blanks. One method blank was mis-fortified with internal standard; see Narrative Attachment 2 for details.

Surrogates

For sample extracts that did not require a dilution of greater than 5X (or a combination of dilution and final extract volume which resulted in an effective dilution of greater than 5X), all surrogate recoveries were reported. Normally, surrogate recoveries can be obtained at such a dilution. However due to sample matrix (background spectra) and/or possible low recoveries, not all recoveries for all samples at a 5X dilution were measurable. The recovery (110%) of one surrogate in one of the soil method blanks exceeded the upper control limit. Where a sample extract required an equivalent dilution in excess of 5X, surrogate recoveries cannot be determined (in any case) and are not reported. See Narrative Attachment 2 for additional detail.

Laboratory Control Samples

Multiple Laboratory Control Samples (LCS) were fortified with all target analytes. In two cases, an LCS Duplicate was analyzed. All recoveries (and RPDs in the case of an LCSD) were in control with the exception of the recoveries (13%, 15%) for Caprolactam in one LCS/LCSD pair. The recovery for Di-n-butyl Phthalate (116%) in the LCS from that pair was within the marginal exceedance limit.

Matrix Spikes

Sample 35SB2A was fortified with all target analytes, however, due to the need for dilution, spike recoveries could not be determined. All see Narrative Attachment 2.

Sample Results

Please see Section C.

Corrective Action

No corrective actions, aside from reanalysis at dilution, were feasible.

Statements of Data Qualification

See Narrative Attachment 2.

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Individual sample results relate only to the sample tested.

STATEMENT OF DATA QUALIFICATIONS

Semivolatile Organic Compounds by EPA Method 8270C

Qualification: The LCS/LCSD RPD exceeded the control limit. A positive result for this analyte in any sample from the associated QC batch is considered estimated. Non-detectable results are not qualified.

Analysis: USEPA-8270C

0714466-BSD1 4-Chloroaniline

Qualification: The LCS recovery exceeded the control limit but it was within the marginal exceedance for a compound that is not a project-specific analyte of concern. The result for this analyte in any sample from the associated QC batch is not considered qualified.

Analysis: USEPA-8270C

0714041-BS1 Di-n-butyl Phthalate

Qualification: The LCS recovery exceeded both the control limit and the marginal exceedance for a compound that is not a project-specific analyte of concern. The result for this analyte in any sample from the associated QC batch is considered qualified.

Analysis: USEPA-8270C

0714041-BS1 Caprolactam
0714041-BSD1 Caprolactam

Qualification: The Internal Standard amount was erroneously doubled by the analyst. Sample and surrogate results will be multiplied by a factor of two to compensate for the error. No data qualifications are necessary.

Analysis: USEPA-8270C

0714308-BLK2

Qualification: Matrix QC results are not available due to sample dilution.

Analysis: USEPA-8270C

Sample/Analyte: 0711313-06 35SB2A

Qualification: The reporting limit for this sample is elevated due to an analytical interference which was a direct result of the sample matrix. Sample had to be diluted due to the gelatinous nature of the extract..

Analysis: USEPA-8270C

Sample/Analyte: 0711377-01 35SB7A
0711377-03 35SB7C
0711377-04 35SB5A
0711377-07 DUP-2
0711377-08 35SB8A
0711377-10 35SB8C

Qualification: One or more surrogate recoveries for the sample exceeded the upper control limit. Positive results are considered estimated. Non-detect results are not qualified.

Analysis: USEPA-8270C

0714308-BLK2

Qualification: Surrogate results are unavailable due to sample matrix interference(s), resulting in a dilution. Surrogate concentrations were diluted below the calibration range.

Analysis: USEPA-8270C

Sample/Analyte: 0711313-07 35SB6A
0711313-10 35SB9A
0711313-13 35SB10A
0711313-15 35SB10C
0711377-01 35SB7A

Continued on next page

STATEMENT OF DATA QUALIFICATIONS

Semivolatile Organic Compounds by EPA Method 8270C (Continued)

Qualification: Surrogate results are unavailable due to sample matrix interference(s), resulting in a dilution. Surrogate concentrations were diluted below the calibration range.

Analysis: USEPA-8270C

Sample/Analyte:
0711377-03 35SB7C
0711377-04 35SB5A
0711377-07 DUP-2
0711377-08 35SB8A
0711377-10 35SB8C

DATA VALIDATION WORKSHEET

Pesticides/~~PCBs~~

Reviewer: RA
Date: 11/25/08
DV Level: II (III) IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
X project QAPP

Project Name: RAAP 10
Project Number: 21354887
Laboratory: TN Matrix
SDG No.: 36440-42
Test Name: Pest
Method No.: 8081

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.	✓		
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes: Sample 355BSA was re-extracted 13 days after the ht had expired. J/UJ/R use original results.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (one per 20 samples or batch and matrix)?	✓		
3.2	Do any blanks have positive results? If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank].		✓	
3.3	Do any field equipment blanks have positive results? If yes, use same rules above.			

Notes: EQBK-2 Endosulfan I 0.00062 ug/L. All NDs, No action

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve for 1016, 1260, toxaphene, and technical chlordane; and at least one point for the other arochlors reported? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the control limits?		✓	
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes: Second source sequence 7113009 alpha-BHC and column QC of 120 at 124 w/a Pos. bias. all NDs, No action.

also see attached Sep ad CC %D's >QC w/a Pos. bias all NDs, No action.

5.0 GC/ECD Instrument Performance Check		Yes	No	NA
5.1	Has a Performance Evaluation Mixture (PEM) been analyzed at the beginning, every 12 hours, and at the end of every sequence.	✓		
5.2	Is the 4,4'-DDT breakdown </= to 20%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non detect DDT results, DDD/DDE - R(+).	✓		
5.3	Is the endrin breakdown </= to 20%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	✓		
5.4	Is the combined breakdowns less than or equal to 30%? If No, for positive DDT/endrin results, DDT/endrin-L(+), DDD/DD/endrin aldehyde/endrin ketone - NJ(+). For non-detect DDT/endrin results, DDD/DDE/endrin aldehyde/endrin ketone - R(+).	✓		

Notes:

Both surr < QC
tetrachloro-m-xylene 47%)
decachlorobiphenyl 46% in 375B7A L,UL,S

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	✓		
6.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks? Advisory limit: 60-150%.		✓	
6.3	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?	✓		
6.4	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		✓	

# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
1 out	high/low	No action	No action
2 out	2 high same column	K	No action
	2 low same column	L, UL	No action
	mixed same column	J, UJ	No action
	2 high diff columns	J	Not applicable
	2 low diff columns	J, UJ	Not applicable
	mixed diff columns	Professional judgement	Not applicable
3 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	2 high, 1 low	K (2 high)	J (1 low 2nd column)
	2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
	other mixed	J, UJ	Not applicable
4 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	Mixed	J, UJ	Not applicable
	If any recovery is >0% and <10% then L(+)/R(-).		
	If any recovery is 0% then R(+/-).		

Notes: Tetrachloro-m-Xylene <70%. 355B6A 59%. No action one failure:
〃 〃 〃 355B9A 61%. 〃 〃
〃 〃 〃 355B10A 68%. 〃 〃
〃 〃 〃 355B5A 59%. 〃 〃
375B10A 59%.

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes: MS/MSD ; RPD > QC for 355B2A
4,4-DDE 129%. ; 4,4-DDT 254%.) 253%.) dieldrin 137%.) 129%., toxaphene 153%.) 246%.) 44%. ⟹ all NDs in parent ⟹ No action
MS/MSD < QC for beta-BHC 57%.) 49%.) ND in Parent ⟹ UJ, M

URS

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			

Notes:

9.0 Field Duplicate

		Yes	No	NA
9.2	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: 355B4A, DUP-1 both NDs ✓ 355B5A DUP-2 both NDs ✓ 375B9A DUP-3 RL Endrin 4.8 2.2 5.5 OK ✓

10.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns <40%? If No, J(+).		✓	
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		

Notes: heptachlor epoxide 355B2A 12%) endrin DUP-3 58.5%, 375B7A 46.6%.) endosulfan I 85.1% EQBK-2. J/q unless prev flagged for q surr. anomaly.

11.0 Data Completeness

		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
11.1.1	Number of samples: Pest_____ PCB_____			
11.1.2	Number of target compounds in each analysis: PEST_____ PCB_____			
11.1.3	Number of results rejected and not reported: Pest_____ PCB_____			
11.1.4	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = Pest 100% PCB_____			

Notes:

HOLDING TIME SUMMARY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-42

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Method: Organochlorine Pesticides by EPA Method 8081A

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
35SB3A	11/12/07	11/13/07		11/26/07	14	14	12/16/07	20	40	
EQBK-1	11/13/07	11/14/07		11/16/07	3	7	11/29/07	13	40	
35SB4A	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
DUP-1	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB1A	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB2A	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB6A	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB6B	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB6C	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB9A	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB9B	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB9C	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB10A	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB10B	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB10C	11/13/07	11/14/07		11/27/07	14	14	12/16/07	19	40	
35SB7A	11/14/07	11/15/07		11/27/07	13	14	12/17/07	21	40	
35SB7B	11/14/07	11/15/07		11/27/07	13	14	12/17/07	21	40	
35SB7C	11/14/07	11/15/07		11/27/07	13	14	12/17/07	20	40	
35SB5A	11/14/07	11/15/07		11/27/07	13	14	12/17/07	20	40	
35SB5A	11/14/07	11/15/07		12/11/07	27	14	01/08/08	28	40	*
35SB5B	11/14/07	11/15/07		11/27/07	13	14	12/17/07	20	40	

05960

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Calibration: 7K30006
Sequence: 7113009

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Laboratory ID: 7113009-SCV2
Standard ID: 7080436

Analyte	Expected (ug/mL)	Found (ug/mL)	% Rec.	QC Limit
alpha-BHC	0.0400	0.0473	118	80-120
alpha-BHC [2C]	0.0400	0.0484	121	80-120
beta-BHC	0.0400	0.0443	111	80-120
beta-BHC [2C]	0.0400	0.0428	107	80-120
gamma-BHC (Lindane)	0.0400	0.0460	115	80-120
gamma-BHC (Lindane) [2C]	0.0400	0.0467	117	80-120
delta-BHC	0.0400	0.0461	115	80-120
delta-BHC [2C]	0.0400	0.0449	112	80-120
alpha-Chlordane	0.0400	0.0434	109	80-120
alpha-Chlordane [2C]	0.0400	0.0424	106	80-120
gamma-Chlordane	0.0400	0.0445	111	80-120
gamma-Chlordane [2C]	0.0400	0.0433	108	80-120
4,4'-DDD	0.0400	0.0434	109	80-120
4,4'-DDD [2C]	0.0400	0.0412	103	80-120
4,4'-DDE	0.0400	0.0444	111	80-120
4,4'-DDE [2C]	0.0400	0.0423	106	80-120
4,4'-DDT	0.0400	0.0421	105	80-120
4,4'-DDT [2C]	0.0400	0.0414	104	80-120
Aldrin	0.0400	0.0459	115	80-120
Aldrin [2C]	0.0400	0.0450	113	80-120
Dieldrin	0.0400	0.0441	110	80-120
Dieldrin [2C]	0.0400	0.0430	108	80-120
Endosulfan I	0.0400	0.0443	111	80-120
Endosulfan I [2C]	0.0400	0.0434	109	80-120
Endosulfan II	0.0400	0.0426	107	80-120
Endosulfan II [2C]	0.0400	0.0410	103	80-120
Endosulfan Sulfate	0.0400	0.0415	104	80-120

06695

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7L28006
Laboratory ID: 7122807-SCV1
Sequence: 7122807
Standard ID: 7080436

Endosulfan Sulfate [2C]	0.0400	0.0414	104	80-120
Endrin	0.0400	0.0411	103	80-120
Endrin [2C]	0.0400	0.0404	101	80-120
Endrin Aldehyde	0.0400	0.0420	105	80-120
Endrin Aldehyde [2C]	0.0400	0.0410	103	80-120
Endrin Ketone	0.0400	0.0421	105	80-120
Endrin Ketone [2C]	0.0400	0.0419	105	80-120
Heptachlor	0.0400	0.0413	103	80-120
Heptachlor [2C]	0.0400	0.0400	100	80-120
Heptachlor Epoxide	0.0400	0.0403	101	80-120
Heptachlor Epoxide [2C]	0.0400	0.0396	99	80-120
Methoxychlor	0.0400	0.0421	105	80-120
Methoxychlor [2C]	0.0400	0.0411	103	80-120
Tetrachloro-m-xylene	0.0400	0.0406	102	80-120
Tetrachloro-m-xylene [2C]	0.0400	0.0406	102	80-120
Decachlorobiphenyl	0.0400	0.0484	121 *	80-120
Decachlorobiphenyl [2C]	0.0400	0.0478	120	80-120

* Values outside of QC limits

surr. no action

: 06715

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7L28006
Laboratory ID: 7122808-SCV2
Sequence: 7122808
Standard ID: 7100399

Analyte	Expected (ug/mL)	Found (ug/mL)	% Rec.	QC Limit
Toxaphene	1.00	0.936	94	80-120
Toxaphene [2C]	1.00	1.18	118	80-120
Tetrachloro-m-xylene	0.100	0.124	124 *	80-120
Tetrachloro-m-xylene [2C]	0.100	0.128	128 *	80-120
Decachlorobiphenyl	0.100	0.119	119	80-120
Decachlorobiphenyl [2C]	0.100	0.119	119	80-120

* Values outside of QC limits

Surrogate
No action ✓

06723

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 199
Lab File ID: A61_121-0
Sequence: 7121830
Lab Sample ID: 7121830-CCV3

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7L17005
Calibration Date: 12/15/07 12:02
Injection Date: 12/18/07
Injection Time: 03:28

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC	A	0.0400	0.0503	7550781	9502530		25.8	20 *
beta-BHC	A	0.0400	0.0457	2803578	3200870		14.2	20
gamma-BHC (Lindane)	A	0.0400	0.0483	6737820	8144760		20.9	20 *
delta-BHC	A	0.0400	0.0485	5868680	7120060		21.3	20 *
alpha-Chlordane	A	0.0400	0.0456	5192204	5918340		14.0	20
gamma-Chlordane	A	0.0400	0.0458	5411350	6194870		14.5	20
4,4'-DDD	A	0.0400	0.0465	3429186	3983840		16.2	20
4,4'-DDE	A	0.0400	0.0470	4737821	5565480		17.5	20
4,4'-DDT	A	0.0400	0.0446	3851409	4294180		11.5	20
Aldrin	A	0.0400	0.0474	6352499	7526880		18.5	20
Dieldrin	A	0.0400	0.0452	4972222	5614420		12.9	20
Endosulfan I	A	0.0400	0.0453	4874078	5516430		13.2	20
Endosulfan II	A	0.0400	0.0441	3803388	4190290		10.2	20
Endosulfan Sulfate	A	0.0400	0.0434	3369525	3653960		8.4	20
Endrin	A	0.0400	0.0461	4255450	4900740		15.2	20
Endrin Aldehyde	A	0.0400	0.0431	2947047	3176440		7.8	20
Endrin Ketone	A	0.0400	0.0426	3801852	4051070		6.6	20
Heptachlor	A	0.0400	0.0470	7026359	8266440		17.6	20
Heptachlor Epoxide	A	0.0400	0.0455	5513840	6275380		13.8	20
Methoxychlor	A	0.0400	0.0440	1989893	2187050		9.9	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk
* Values outside of QC limits

all NPs, No action

06817

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument ID: 199
Calibration: 7L17005
Lab File ID: B61_121-0
Calibration Date: 12/15/07 12:02
Sequence: 7121830
Injection Date: 12/18/07
Lab Sample ID: 7121830-CCV3
Injection Time: 03:28

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC [2C]	A	0.0400	0.0483	7891120	9524440		20.7	20 *
beta-BHC [2C]	A	0.0400	0.0435	3022346	3285590		8.7	20
gamma-BHC (Lindane) [2C]	A	0.0400	0.0463	7105153	8221530		15.7	20
delta-BHC [2C]	A	0.0400	0.0461	6107308	7041320		15.3	20
alpha-Chlordane [2C]	A	0.0400	0.0434	5220747	5669900		8.6	20
gamma-Chlordane [2C]	A	0.0400	0.0445	5471476	6080910		11.1	20
4,4'-DDD [2C]	A	0.0400	0.0455	3460591	3940070		13.9	20
4,4'-DDE [2C]	A	0.0400	0.0458	4799882	5490260		14.4	20
4,4'-DDT [2C]	A	0.0400	0.0448	3702919	4143190		11.9	20
Aldrin [2C]	A	0.0400	0.0456	6569919	7490890		14.0	20
Dieldrin [2C]	A	0.0400	0.0437	4963061	5417690		9.2	20
Endosulfan I [2C]	A	0.0400	0.0437	4887793	5344380		9.3	20
Endosulfan II [2C]	A	0.0400	0.0435	3739929	4067130		8.7	20
Endosulfan Sulfate [2C]	A	0.0400	0.0438	3400097	3726500		9.6	20
Endrin [2C]	A	0.0400	0.0450	3946214	4444030		12.6	20
Endrin Aldehyde [2C]	A	0.0400	0.0432	2885528	3113560		7.9	20
Endrin Ketone [2C]	A	0.0400	0.0439	3651417	4005280		9.7	20
Heptachlor [2C]	A	0.0400	0.0459	6670354	7649860		14.7	20
Heptachlor Epoxide [2C]	A	0.0400	0.0439	5712204	6265270		9.7	20
Methoxychlor [2C]	A	0.0400	0.0439	1866150	2048400		9.8	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk
* Values outside of QC limits

all NDs
No action

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument ID: 199
Calibration: 7L28006
Lab File ID: A61_360-0
Calibration Date: 12/24/07 09:46
Sequence: 7122808
Injection Date: 12/25/07
Lab Sample ID: 7122808-CCV3
Injection Time: 08:17

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC	A	0.0400	0.0496	7708385	9558620		24.0	20 *
beta-BHC	A	0.0400	0.0467	2713407	3169370		16.8	20
gamma-BHC (Lindane)	A	0.0400	0.0473	6845908	8103340		18.4	20
delta-BHC	A	0.0400	0.0503	5514248	6928010		25.6	20 *
alpha-Chlordane	A	0.0400	0.0433	5428480	5872960		8.2	20
gamma-Chlordane	A	0.0400	0.0436	5654722	6160090		8.9	20
4,4'-DDD	A	0.0400	0.0491	3040041	3730480		22.7	20 *
4,4'-DDE	A	0.0400	0.0496	4239070	5259640		24.1	20 *
4,4'-DDT	A	0.0400	0.0446	3622752	4040260		11.5	20
Aldrin	A	0.0400	0.0454	6625954	7515440		13.4	20
Dieldrin	A	0.0400	0.0433	5177123	5609470		8.4	20
Endosulfan I	A	0.0400	0.0424	5149017	5452170		5.9	20
Endosulfan II	A	0.0400	0.0424	3958959	4192980		5.9	20
Endosulfan Sulfate	A	0.0400	0.0417	3451922	3595660		4.2	20
Endrin	A	0.0400	0.0434	4502195	4880060		8.4	20
Endrin Aldehyde	A	0.0400	0.0425	3005698	3193070		6.2	20
Endrin Ketone	A	0.0400	0.0415	3900643	4051630		3.9	20
Heptachlor	A	0.0400	0.0468	7181262	8402880		17.0	20
Heptachlor Epoxide	A	0.0400	0.0444	5718522	6348480		11.0	20
Methoxychlor	A	0.0400	0.0451	1783596	2011670		12.8	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

all DRs/ Dodgion

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument ID: 199
Calibration: 7L28006
Lab File ID: B61_360-0
Calibration Date: 12/24/07 09:46
Sequence: 7122808
Injection Date: 12/25/07
Lab Sample ID: 7122808-CCV3
Injection Time: 08:17

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC [2C]	A	0.0400	0.0487	7801813	9500700		21.8	20 *
beta-BHC [2C]	A	0.0400	0.0445	2903154	3230760		11.3	20
gamma-BHC (Lindane) [2C]	A	0.0400	0.0469	7013466	8219020		17.2	20
delta-BHC [2C]	A	0.0400	0.0480	5728712	6877310		20.0	20
alpha-Chlordane [2C]	A	0.0400	0.0422	5404814	5697450		5.4	20
gamma-Chlordane [2C]	A	0.0400	0.0425	5652975	6007580		6.3	20
4,4'-DDD [2C]	A	0.0400	0.0463	3363853	3896410		15.8	20
4,4'-DDE [2C]	A	0.0400	0.0456	4549057	5182670		13.9	20
4,4'-DDT [2C]	A	0.0400	0.0436	3555790	3878000		9.1	20
Aldrin [2C]	A	0.0400	0.0449	6657364	7471340		12.2	20
Dieldrin [2C]	A	0.0400	0.0428	5218586	5588880		7.1	20
Endosulfan I [2C]	A	0.0400	0.0424	5041551	5345190		6.0	20
Endosulfan II [2C]	A	0.0400	0.0418	4027009	4205310		4.4	20
Endosulfan Sulfate [2C]	A	0.0400	0.0410	3635761	3723940		2.4	20
Endrin [2C]	A	0.0400	0.0432	4228653	4567530		8.0	20
Endrin Aldehyde [2C]	A	0.0400	0.0411	3066503	3151890		2.8	20
Endrin Ketone [2C]	A	0.0400	0.0411	3943356	4053840		2.8	20
Heptachlor [2C]	A	0.0400	0.0465	6439060	7478870		16.1	20
Heptachlor Epoxide [2C]	A	0.0400	0.0434	5824965	6322230		8.5	20
Methoxychlor [2C]	A	0.0400	0.0433	1789353	1935770		8.2	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

NDs, NO action

06862

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument ID: 199
Calibration: 8A11004
Lab File ID: A63_287-0
Calibration Date: 01/07/08 09:38
Sequence: 8011111
Injection Date: 01/08/08
Lab Sample ID: 8011111-CCV4
Injection Time: 09:35

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Toxaphene	Q	0.500	0.604	105298.1	123096		20.8	20 *

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

ND

: 06889

CONTINUING CALIBRATION CHECK

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument ID: 199
Calibration: 8A11004
Lab File ID: B63_287-0
Calibration Date: 01/07/08 09:38
Sequence: 8011111
Injection Date: 01/08/08
Lab Sample ID: 8011111-CCV4
Injection Time: 09:35

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Toxaphene [2C]	Q	0.500	0.606	167370.3	191216		21.2	20 *

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

: 06892

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

35SB2A

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-42

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 10 mL

Laboratory ID: 0714305-MS3

QC Batch: 0714305

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
alpha-BHC	16.1	ND	17.5	109	60 - 125	ug/kg dry
alpha-BHC [2C]	16.1	ND	14.8	92	60 - 125	ug/kg dry
beta-BHC	16.1	ND	9.15	57 *	60 - 125	ug/kg dry
beta-BHC [2C]	16.1	ND	8.43	53 *	60 - 125	ug/kg dry
gamma-BHC (Lindane)	16.1	ND	13.9	87	60 - 125	ug/kg dry
gamma-BHC (Lindane) [2C]	16.1	ND	13.9	87	60 - 125	ug/kg dry
delta-BHC	16.1	ND	10.8	67	55 - 130	ug/kg dry
delta-BHC [2C]	16.1	ND	10.2	64	55 - 130	ug/kg dry
alpha-Chlordane	16.1	ND	14.3	89	65 - 120	ug/kg dry
alpha-Chlordane [2C]	16.1	ND	13.6	85	65 - 120	ug/kg dry
gamma-Chlordane	16.1	ND	14.4	90	65 - 125	ug/kg dry
gamma-Chlordane [2C]	16.1	ND	19.1	119	65 - 125	ug/kg dry
4,4'-DDD	16.1	ND	13.3	83	30 - 135	ug/kg dry
4,4'-DDD [2C]	16.1	ND	14.5	90	30 - 135	ug/kg dry
4,4'-DDE	16.1	ND	20.7	129 *	70 - 125	ug/kg dry
4,4'-DDE [2C]	16.1	ND	15.2	95	70 - 125	ug/kg dry
4,4'-DDT	16.1	ND	21.2	132	45 - 140	ug/kg dry
4,4'-DDT [2C]	16.1	ND	40.8	254 *	45 - 140	ug/kg dry
Aldrin	16.1	ND	14.6	91	45 - 140	ug/kg dry
Aldrin [2C]	16.1	ND	14.3	89	45 - 140	ug/kg dry
Dieldrin	16.1	ND	21.9	137 *	65 - 125	ug/kg dry
Dieldrin [2C]	16.1	ND	16.4	102	65 - 125	ug/kg dry
Endosulfan I	16.1	ND	13.0	81	15 - 135	ug/kg dry
Endosulfan I [2C]	16.1	ND	12.3	76	15 - 135	ug/kg dry
Endosulfan II	16.1	ND	14.0	88	35 - 140	ug/kg dry
Endosulfan II [2C]	16.1	ND	22.3	139	35 - 140	ug/kg dry
Endosulfan Sulfate	16.1	ND	10.4	65	60 - 135	ug/kg dry
Endosulfan Sulfate [2C]	16.1	ND	11.5	72	60 - 135	ug/kg dry
Endrin	16.1	ND	14.4	90	60 - 135	ug/kg dry
Endrin [2C]	16.1	ND	17.7	110	60 - 135	ug/kg dry
Endrin Aldehyde	16.1	ND	11.8	74	35 - 145	ug/kg dry
Endrin Aldehyde [2C]	16.1	ND	12.1	75	35 - 145	ug/kg dry
Endrin Ketone	16.1	ND	12.4	77	65 - 135	ug/kg dry

05924

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY
USEPA-8081A

35SB2A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Preparation: 3550B Sonication Extraction
Initial/Final: 30 g / 10 mL
Laboratory ID: 0714305-MSD3
QC Batch: 0714305

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
alpha-BHC	16.1	17.1	106	2	30	60 - 125	ug/kg dry
alpha-BHC [2C]	16.1	14.3	89	4	30	60 - 125	ug/kg dry
beta-BHC	16.1	7.86	49 *	15	30	60 - 125	ug/kg dry
beta-BHC [2C]	16.1	7.34	46 *	14	30	60 - 125	ug/kg dry
gamma-BHC (Lindane)	16.1	13.5	84	3	30	60 - 125	ug/kg dry
gamma-BHC (Lindane) [2C]	16.1	13.4	84	4	30	60 - 125	ug/kg dry
delta-BHC	16.1	10.6	66	2	30	55 - 130	ug/kg dry
delta-BHC [2C]	16.1	10.2	63	0.4	30	55 - 130	ug/kg dry
alpha-Chlordane	16.1	14.0	88	2	30	65 - 120	ug/kg dry
alpha-Chlordane [2C]	16.1	13.1	82	4	30	65 - 120	ug/kg dry
gamma-Chlordane	16.1	14.1	88	2	30	65 - 125	ug/kg dry
gamma-Chlordane [2C]	16.1	17.9	112	6	30	65 - 125	ug/kg dry
4,4'-DDD	16.1	15.0	93	12	30	30 - 135	ug/kg dry
4,4'-DDD [2C]	16.1	14.2	89	2	30	30 - 135	ug/kg dry
4,4'-DDE	16.1	19.7	123	5	30	70 - 125	ug/kg dry
4,4'-DDE [2C]	16.1	14.9	93	2	30	70 - 125	ug/kg dry
4,4'-DDT	16.1	20.2	126	5	30	45 - 140	ug/kg dry
4,4'-DDT [2C]	16.1	37.4	233 *	9	30	45 - 140	ug/kg dry
Aldrin	16.1	14.2	88	3	30	45 - 140	ug/kg dry
Aldrin [2C]	16.1	13.9	87	3	30	45 - 140	ug/kg dry
Dieldrin	16.1	20.7	129 *	6	30	65 - 125	ug/kg dry
Dieldrin [2C]	16.1	15.7	98	4	30	65 - 125	ug/kg dry
Endosulfan I	16.1	12.8	80	2	30	15 - 135	ug/kg dry
Endosulfan I [2C]	16.1	11.8	74	4	30	15 - 135	ug/kg dry
Endosulfan II	16.1	12.8	80	10	30	35 - 140	ug/kg dry
Endosulfan II [2C]	16.1	20.8	130	7	30	35 - 140	ug/kg dry
Endosulfan Sulfate	16.1	9.55	60	8	30	60 - 135	ug/kg dry
Endosulfan Sulfate [2C]	16.1	10.5	66	9	30	60 - 135	ug/kg dry
Endrin	16.1	15.4	96	7	30	60 - 135	ug/kg dry
Endrin [2C]	16.1	17.0	106	4	30	60 - 135	ug/kg dry
Endrin Aldehyde	16.1	11.1	69	6	30	35 - 145	ug/kg dry
Endrin Aldehyde [2C]	16.1	11.8	73	3	30	35 - 145	ug/kg dry
Endrin Ketone	16.1	11.7	73	6	30	65 - 135	ug/kg dry
Endrin Ketone [2C]	16.1	11.3	71	3	30	65 - 135	ug/kg dry

05926

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

35SB2A

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-42

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 10 mL

Laboratory ID: 0714305-MSD4

QC Batch: 0714305

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Toxaphene	401	614	153 *	44 *	30	40 - 150	ug/kg dry
Toxaphene [2C]	401	985	246 *	59 *	30	40 - 150	ug/kg dry

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 05929

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Sequence: 7121726
Instrument: 199
Matrix: Soil
Calibration: 7L17005

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
Calibration Check (7121726-CCV1)		**Lab File ID: A61_079-0**		**Analyzed: 12/16/07 09:37**			
Tetrachloro-m-xylene	7.55	7.60	-0.05	+/-1.0	108	80 - 120	
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	102	80 - 120	
Decachlorobiphenyl	21.65	21.70	-0.05	+/-1.0	106	80 - 120	
Decachlorobiphenyl [2C]	25.08	25.16	-0.08	+/-1.0	107	80 - 120	
Calibration Check (7121726-CCV2)		**Lab File ID: A61_080-0**		**Analyzed: 12/16/07 10:13**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	96	80 - 120	
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	94	80 - 120	
Decachlorobiphenyl	21.65	21.70	-0.05	+/-1.0	91	80 - 120	
Decachlorobiphenyl [2C]	25.09	25.16	-0.07	+/-1.0	91	80 - 120	
35SB2A (0711313-06)		**Lab File ID: A61_081-0**		**Analyzed: 12/16/07 10:48**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	73	70 - 125	
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	73	70 - 125	
Decachlorobiphenyl	21.65	21.70	-0.05	+/-1.0	75	55 - 130	
Decachlorobiphenyl [2C]	25.09	25.16	-0.07	+/-1.0	82	55 - 130	
35SB6A (0711313-07)		**Lab File ID: A61_082-0**		**Analyzed: 12/16/07 11:24**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	59	70 - 125	*
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	60	70 - 125	*
Decachlorobiphenyl	21.65	21.70	-0.05	+/-1.0	63	55 - 130	
Decachlorobiphenyl [2C]	25.09	25.16	-0.07	+/-1.0	82	55 - 130	
35SB6B (0711313-08)		**Lab File ID: A61_083-0**		**Analyzed: 12/16/07 11:59**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	100	70 - 125	
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	102	70 - 125	
Decachlorobiphenyl	21.66	21.70	-0.04	+/-1.0	101	55 - 130	
Decachlorobiphenyl [2C]	25.09	25.16	-0.07	+/-1.0	103	55 - 130	
35SB6C (0711313-09)		**Lab File ID: A61_084-0**		**Analyzed: 12/16/07 12:35**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	91	70 - 125	
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	91	70 - 125	
Decachlorobiphenyl	21.66	21.70	-0.04	+/-1.0	102	55 - 130	
Decachlorobiphenyl [2C]	25.09	25.16	-0.07	+/-1.0	106	55 - 130	

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Sequence: 7121726
Instrument: 199
Matrix: Soil
Calibration: 7L17005

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
35SB9A (0711313-10)		**Lab File ID: A61_085-0**		**Analyzed: 12/16/07 13:10**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	61	70 - 125	*
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	60	70 - 125	*
Decachlorobiphenyl	21.66	21.70	-0.04	+/-1.0	58	55 - 130	
Decachlorobiphenyl [2C]	25.10	25.16	-0.06	+/-1.0	70	55 - 130	
35SB9B (0711313-11)		**Lab File ID: A61_086-0**		**Analyzed: 12/16/07 13:46**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	84	70 - 125	
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	84	70 - 125	
Decachlorobiphenyl	21.66	21.70	-0.04	+/-1.0	84	55 - 130	
Decachlorobiphenyl [2C]	25.09	25.16	-0.07	+/-1.0	91	55 - 130	
35SB9C (0711313-12)		**Lab File ID: A61_087-0**		**Analyzed: 12/16/07 14:21**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	93	70 - 125	
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	92	70 - 125	
Decachlorobiphenyl	21.66	21.70	-0.04	+/-1.0	96	55 - 130	
Decachlorobiphenyl [2C]	25.09	25.16	-0.07	+/-1.0	100	55 - 130	
35SB10A (0711313-13)		**Lab File ID: A61_088-0**		**Analyzed: 12/16/07 14:57**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	68	70 - 125	*
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	66	70 - 125	*
Decachlorobiphenyl	21.65	21.70	-0.05	+/-1.0	72	55 - 130	
Decachlorobiphenyl [2C]	25.09	25.16	-0.07	+/-1.0	83	55 - 130	
35SB10B (0711313-14)		**Lab File ID: A61_089-0**		**Analyzed: 12/16/07 15:33**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	95	70 - 125	
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	94	70 - 125	
Decachlorobiphenyl	21.65	21.70	-0.05	+/-1.0	96	55 - 130	
Decachlorobiphenyl [2C]	25.09	25.16	-0.07	+/-1.0	99	55 - 130	
35SB10C (0711313-15)		**Lab File ID: A61_090-0**		**Analyzed: 12/16/07 16:08**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	85	70 - 125	
Tetrachloro-m-xylene [2C]	8.88	8.92	-0.04	+/-1.0	86	70 - 125	
Decachlorobiphenyl	21.66	21.70	-0.04	+/-1.0	89	55 - 130	
Decachlorobiphenyl [2C]	25.09	25.16	-0.07	+/-1.0	97	55 - 130	

05903

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Sequence: 7121830
Instrument: 199
Matrix: Soil
Calibration: 7L17005

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
35SB5C (0711377-06)		**Lab File ID: A61_103-0**		**Analyzed: 12/17/07 16:48**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	96	70 - 125	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	96	70 - 125	
Decachlorobiphenyl	21.66	21.70	-0.04	+/-1.0	94	55 - 130	
Decachlorobiphenyl [2C]	25.10	25.16	-0.06	+/-1.0	100	55 - 130	
35SB5B (0711377-05)		**Lab File ID: A61_104-0**		**Analyzed: 12/17/07 17:23**			
Tetrachloro-m-xylene	7.56	7.60	-0.04	+/-1.0	95	70 - 125	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	94	70 - 125	
Decachlorobiphenyl	21.66	21.70	-0.04	+/-1.0	93	55 - 130	
Decachlorobiphenyl [2C]	25.10	25.16	-0.06	+/-1.0	99	55 - 130	
35SB5A (0711377-04)		**Lab File ID: A61_105-0**		**Analyzed: 12/17/07 17:59**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	59	70 - 125	*
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	59	70 - 125	*
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	61	55 - 130	
Decachlorobiphenyl [2C]	25.10	25.16	-0.06	+/-1.0	68	55 - 130	
35SB7C (0711377-03)		**Lab File ID: A61_106-0**		**Analyzed: 12/17/07 18:34**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	83	70 - 125	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	81	70 - 125	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	83	55 - 130	
Decachlorobiphenyl [2C]	25.10	25.16	-0.06	+/-1.0	88	55 - 130	
35SB7B (0711377-02)		**Lab File ID: A61_107-0**		**Analyzed: 12/17/07 19:10**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	96	70 - 125	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	93	70 - 125	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	95	55 - 130	
Decachlorobiphenyl [2C]	25.10	25.16	-0.06	+/-1.0	99	55 - 130	
35SB7A (0711377-01)		**Lab File ID: A61_108-0**		**Analyzed: 12/17/07 19:45**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	70	70 - 125	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	67	70 - 125	*
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	72	55 - 130	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	91	55 - 130	

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Sequence: 7121830
Instrument: 199
Matrix: Soil
Calibration: 7L17005

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
Calibration Check (7121830-CCV1)		**Lab File ID: A61_109-0**		**Analyzed: 12/17/07 20:21**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	108	80 - 120	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	104	80 - 120	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	100	80 - 120	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	106	80 - 120	
Calibration Check (7121830-CCV2)		**Lab File ID: A61_110-0**		**Analyzed: 12/17/07 20:56**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	98	80 - 120	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	94	80 - 120	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	87	80 - 120	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	89	80 - 120	
37SB10C (0711377-15)		**Lab File ID: A61_111-0**		**Analyzed: 12/17/07 21:32**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	72	70 - 125	
Tetrachloro-m-xylene [2C]	8.90	8.92	-0.02	+/-1.0	71	70 - 125	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	70	55 - 130	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	74	55 - 130	
37SB10B (0711377-14)		**Lab File ID: A61_112-0**		**Analyzed: 12/17/07 22:08**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	98	70 - 125	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	96	70 - 125	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	96	55 - 130	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	100	55 - 130	
37SB10A (0711377-13)		**Lab File ID: A61_113-0**		**Analyzed: 12/17/07 22:43**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	59	70 - 125	*
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	59	70 - 125	*
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	59	55 - 130	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	79	55 - 130	
35SB8C (0711377-10)		**Lab File ID: A61_114-0**		**Analyzed: 12/17/07 23:19**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	98	70 - 125	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	97	70 - 125	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	96	55 - 130	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	102	55 - 130	

05909

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Sequence: 7121830
Instrument: 199
Matrix: Soil
Calibration: 7L17005

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
35SB8B (0711377-09)		**Lab File ID: A61_115-0**		**Analyzed: 12/17/07 23:54**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	98	70 - 125	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	95	70 - 125	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	96	55 - 130	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	101	55 - 130	
35SB8A (0711377-08)		**Lab File ID: A61_116-0**		**Analyzed: 12/18/07 00:30**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	71	70 - 125	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	68	70 - 125	*
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	70	55 - 130	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	76	55 - 130	
DUP-2 (0711377-07)		**Lab File ID: A61_117-0**		**Analyzed: 12/18/07 01:05**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	80	70 - 125	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	77	70 - 125	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	77	55 - 130	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	87	55 - 130	
LCS (0714462-BS2)		**Lab File ID: A61_118-0**		**Analyzed: 12/18/07 01:41**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	92	70 - 125	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	91	70 - 125	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	79	55 - 130	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	85	55 - 130	
Calibration Check (7121830-CCV3)		**Lab File ID: A61_121-0**		**Analyzed: 12/18/07 03:28**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	120	80 - 120	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	114	80 - 120	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	113	80 - 120	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	118	80 - 120	
Calibration Check (7121830-CCV4)		**Lab File ID: A61_122-0**		**Analyzed: 12/18/07 04:03**			
Tetrachloro-m-xylene	7.57	7.60	-0.03	+/-1.0	99	80 - 120	
Tetrachloro-m-xylene [2C]	8.89	8.92	-0.03	+/-1.0	95	80 - 120	
Decachlorobiphenyl	21.67	21.70	-0.03	+/-1.0	90	80 - 120	
Decachlorobiphenyl [2C]	25.11	25.16	-0.05	+/-1.0	92	80 - 120	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Sequence: 7121833
Instrument: 199
Matrix: Soil
Calibration: 7L17005

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
37SB7A (0711377-20)		**Lab File ID: A61_129-0**		**Analyzed: 12/18/07 08:12**			
Tetrachloro-m-xylene	7.58	7.60	-0.02	+/-1.0	47	70 - 125	*
Tetrachloro-m-xylene [2C]	8.91	8.92	-0.01	+/-1.0	46	70 - 125	*
Decachlorobiphenyl	21.68	21.70	-0.02	+/-1.0	46	55 - 130	*
Decachlorobiphenyl [2C]	25.12	25.16	-0.04	+/-1.0	61	55 - 130	
37SB7B (0711377-21)		**Lab File ID: A61_130-0**		**Analyzed: 12/18/07 08:48**			
Tetrachloro-m-xylene	7.58	7.60	-0.02	+/-1.0	96	70 - 125	
Tetrachloro-m-xylene [2C]	8.90	8.92	-0.02	+/-1.0	97	70 - 125	
Decachlorobiphenyl	21.68	21.70	-0.02	+/-1.0	92	55 - 130	
Decachlorobiphenyl [2C]	25.14	25.16	-0.02	+/-1.0	99	55 - 130	
Calibration Check (7121833-CCV1)		**Lab File ID: A61_131-0**		**Analyzed: 12/18/07 09:23**			
Tetrachloro-m-xylene	7.61	7.60	0.01	+/-1.0	110	80 - 120	
Tetrachloro-m-xylene [2C]	8.94	8.92	0.02	+/-1.0	106	80 - 120	
Decachlorobiphenyl	21.73	21.70	0.03	+/-1.0	104	80 - 120	
Decachlorobiphenyl [2C]	25.19	25.16	0.03	+/-1.0	111	80 - 120	
Calibration Check (7121833-CCV2)		**Lab File ID: A61_132-0**		**Analyzed: 12/18/07 09:59**			
Tetrachloro-m-xylene	7.62	7.60	0.02	+/-1.0	105	80 - 120	
Tetrachloro-m-xylene [2C]	8.95	8.92	0.03	+/-1.0	103	80 - 120	
Decachlorobiphenyl	21.73	21.70	0.03	+/-1.0	94	80 - 120	
Decachlorobiphenyl [2C]	25.20	25.16	0.04	+/-1.0	95	80 - 120	

: 05913

STATEMENT OF DATA QUALIFICATIONS

Organochlorine Pesticides by EPA Method 8081A

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8081A

Sample/Analyte:	
0711313-06 35SB2A	4,4'-DDE
0711313-06 35SB2A	4,4'-DDT [2C]
0711313-06 35SB2A	beta-BHC
0711313-06 35SB2A	beta-BHC [2C]
0711313-06 35SB2A	Dieldrin
0711313-06 35SB2A	Toxaphene
0711313-06 35SB2A	Toxaphene [2C]

Qualification: The RPD between the MS and MSD results exceeded the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8081A

Sample/Analyte:	
0711313-06 35SB2A	Toxaphene
0711313-06 35SB2A	Toxaphene [2C]

Qualification: The RPD between the detected values from the primary and confirmation analyses exceeded 40%. The higher concentration result has been reported.

Analysis: USEPA-8081A

Sample/Analyte:	
0711313-06 35SB2A	Heptachlor Epoxide [2C]
0711377-19 DUP-3	Endrin [2C]
0711377-20 37SB7A	Endrin [2C]
0711377-23 EQBK-2	Endosulfan I

Qualification: Concentration exceeds calibration range

Analysis: USEPA-8081A

0714305-MSD4	Toxaphene [2C]

Qualification: One or more surrogate recoveries for the sample were less than the lower control limit but greater than or equal to 10%. All results are considered estimated.

Analysis: USEPA-8081A

Sample/Analyte:
0711313-07 35SB6A
0711313-10 35SB9A
0711313-13 35SB10A
0711377-01 35SB7A
0711377-04 35SB5A
0711377-08 35SB8A
0711377-13 37SB10A
0711377-20 37SB7A
0714305-MSD4

Qualification: This sample was re-extracted due to low surrogate recovery in the initial extract. The re-extracted sample also had low surrogate recovery, confirming matrix interference. The original sample extract result was reported.

Analysis: USEPA-8081A

Sample/Analyte:
0711313-07 35SB6A
0711313-10 35SB9A
0711313-13 35SB10A

Continued on next page

STATEMENT OF DATA QUALIFICATIONS

Organochlorine Pesticides by EPA Method 8081A (Continued)

Qualification: This sample was re-extracted due to low surrogate recovery in the initial extract. The re-extracted sample also had low surrogate recovery, confirming matrix interference. The original sample extract result was reported.

Analysis: USEPA-8081A

Sample/Analyte: 0711377-01 35SB7A
0711377-08 35SB8A
0711377-13 37SB10A
0711377-20 37SB7A

Qualification: This sample was re-extracted due to low surrogate recovery in the initial extract. The re-extracted sample had acceptable surrogate recovery, but was extracted outside of the EPA holding time. The initial and re-extraction sample extract result was report

Analysis: USEPA-8081A

Sample/Analyte: 0711377-04RE1 35SB5A

Quality Control Results – Chlorinated Pesticides

Note: second column (confirmation) data is identified as "compound[2C]".

Calibration

Initial instrument calibrations, second source verification (SCV), and continuing calibration verifications (CCV) for both the primary and confirmation columns were method-compliant for all target analytes (including Toxaphene) with the following exceptions:

1) The confirmation column recovery (121%) of alpha-BHC in the SCV associated with analytical sequence 713009 was outside the 80-120% criterion.

2) The primary column recovery for three of the four BHC isomers in CCV3 associated with analytical sequence 7121830 were outside (i.e., increasing response) the 80-120% criterion.

3) The confirmation column recovery for alpha-BHC in CCV3 associated with analytical sequence 7121830 was outside (i.e., increasing response) the 80-120% criterion.

4) The primary column recovery for four compounds in CCV3 associated with analytical sequence 7122808 were outside (i.e., increasing response) the 80-120% criterion.

5) The confirmation column recovery for alpha-BHC in CCV3 associated with analytical sequence 7122808 was outside (i.e., increasing response) the 80-120% criterion.

6) The primary and confirmation column recoveries for Toxaphene in CCV4 associated with analytical sequence 8011111 were outside (i.e., increasing response) the 80-120% criterion.

Note: There were many more CCVs analyzed and reported than those listed above.

Method Blanks

No target analytes were detected.

Surrogates

All surrogate recoveries were in control for both the primary column and confirmation column runs with the exception of one surrogate (TCMX) in seven samples and both surrogates in one additional sample; see Narrative Attachment 2 and Surrogate Standard and RT Summaries for details. All affected samples were re-extracted and re-analyzed, confirming sample matrix interference.

Laboratory Control Samples

Multiple Laboratory Control Samples (LCS) were fortified with all target analytes. An LCS and an LCSD for the one multi-component analyte (i.e., Toxaphene) were separately extracted/analyzed. All recoveries (and RPD for Toxaphene) were in control for both the primary column and confirmation column runs.

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Individual sample results relate only to the sample tested.

Quality Control Results – Chlorinated Pesticides – (continued)

Matrix Spikes

Sample 35SB2A was fortified with all target analytes, including Toxaphene. Most recoveries for both the primary column and confirmation column runs were in control. All RPDs were in control except for Toxaphene. See Narrative Attachment 2 and matrix spike summary forms for details.

Sample Results

Please see Section I. Sample 35SB5A required re-extraction and reanalysis due to low surrogate recovery with re-extraction past the fourteen day extraction holding time but within twice that time. Both sets of results for this sample have been reported. For the remaining samples that were also re-extracted, only results from the initial extraction have been reported.

Corrective Action

Corrective action involving the re-extraction and analysis of multiple samples due to one or more low surrogate recoveries was deemed necessary.

Statements of Data Qualification

See Narrative Attachment 2.

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Individual sample results relate only to the sample tested.

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 35SB2A LAB SAMPLE # 0711313-06

	COLUMN 1	COLUMN 2
Inst.ID:	199	199
Column:	RTX CLP PEST	RTX CLP PEST2
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/L)	RPD
Heptachlor Epoxide	1	13.32	13.32	13.36	1.60000	121.0%
	2	15.26	15.25	15.31	6.50000	

07032

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: Dup-3 LAB SAMPLE # 0711377-19

	COLUMN 1	COLUMN 2
Inst.ID:	199	199
Column:	TX CLP PEST	RTX CLP PEST2
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/L)	RPD
Endrin	1	15.56	15.54	15.60	1.20000	58.8%
	2	17.88	17.85	17.91	2.20000	

07035

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 37SB7A LAB SAMPLE # 0711377-20

	COLUMN 1	COLUMN 2
Inst.ID:	199	199
Column:	ΓX CLP PEST	RTX CLP PEST2
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/L)	RPD
Endrin	1	15.56	15.54	15.60	5.10000	46.6%
	2	17.87	17.85	17.91	8.20000	

07036

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: EQBK-2 LAB SAMPLE # 0711377-23

	COLUMN 1	COLUMN 2
Inst.ID:	199	199
Column:	RTX CLP PEST	RTX CLP PEST2
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/L)	RPD
Endosulfan I	1	14.28	14.24	14.30	0.00620	85.1%
	2	16.29	16.27	16.33	0.00250	

07037

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: RA
Date: 1/17/07
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
X project QAPP

Project Name: RAAP 10
Project Number: 21354887
Laboratory: TriMatrix
SDG No.: 30440-42
Test Name: PCBs
Method No.: 8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (one per 20 samples or batch and matrix)?	✓		
3.2	Do any blanks have positive results? If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank].		✓	
3.3	Do any field equipment blanks have positive results? If yes, use same rules above.		✓	

Notes:

URS

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve for 1016, 1260, toxaphene, and technical chlordane; and at least one point for the other arochlors reported? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the control limits?	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 GC/ECD Instrument Performance Check		Yes	No	NA
5.1	Has a Performance Evaluation Mixture (PEM) been analyzed at the beginning, every 12 hours, and at the end of every sequence.			/
5.2	Is the 4,4'-DDT breakdown </= to 20%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non detect DDT results, DDD/DDE - R(+).			/
5.3	Is the endrin breakdown </= to 20%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).			/
5.4	Is the combined breakdowns less than or equal to 30%? If No, for positive DDT/endrin results, DDT/endrin-L(+), DDD/DD/endrin aldehyde/endrin ketone - NJ(+). For non-detect DDT/endrin results, DDD/DDE/endrin aldehyde/endrin ketone - R(+).			/

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	✓		
6.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks? Advisory limit: 60-150%.		✓	
6.3	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?		✓	
6.4	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		✓	

# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
1 out	high/low	No action	No action
2 out	2 high same column	K	No action
	2 low same column	L, UL	No action
	mixed same column	J, UJ	No action
	2 high diff columns	J	Not applicable
	2 low diff columns	J, UJ	Not applicable
	mixed diff columns	Professional judgement	Not applicable
3 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	2 high, 1 low	K (2 high)	J (1 low 2nd column)
	2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
	other mixed	J, UJ	Not applicable
4 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	Mixed	J, UJ	Not applicable
If any recovery is >0% and <10% then L(+)/R(-).			
If any recovery is 0% then R(+/-).			

Notes: 355B6A decachlorobiphenyl 45%<60%. > 375B7A 47%.)
355B9A " 47%. "
355B5A " 54%.
375B6A " 59%.
~~[illegible]~~ See attached LCS

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			

Notes:

9.0 Field Duplicate

		Yes	No	NA
9.2	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		✓	

Notes: 355B4A > DUP-1 RPD RL
PCB-1254 69 170 40 OKV
375B9A RL DUP-3
PCB-1254 560 65 290 OKV
355B5A > DUP-2 RL
PCB-1254 88 260 41
out → J,f

10.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns <40%? If No, J(+).		✓	
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?			

Notes: PCB-1254 >40% in 355B1A 51% > 355B9A 58.8% > 355B9C 42.4% >
355B7A 57.8 %. → J,g. ~~Reanalysis to higher RDL not necessary~~

11.0 Data Completeness

		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
11.1.1	Number of samples: Pest_____ PCB_____			
11.1.2	Number of target compounds in each analysis: PEST_____ PCB_____			
11.1.3	Number of results rejected and not reported: Pest_____ PCB_____			
11.1.4	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = Pest_____ PCB 100%			

Notes:

STATEMENT OF DATA QUALIFICATIONS

Polychlorinated Biphenyls (PCBs) by EPA Method 8082

Qualification: The RPD between the detected values from the primary and confirmation analyses exceeded 40%. The higher concentration result has been reported.

Analysis: USEPA-8082

Sample/Analyte:		
0711313-05	35SB1A	PCB-1254 [2C]
0711313-10	35SB9A	PCB-1254
0711377-01	35SB7A	PCB-1254

Qualification: One or more surrogate recoveries for the sample were less than the lower control limit but greater than or equal to 10%. All results are considered estimated.

Analysis: USEPA-8082

Sample/Analyte:

0711313-07 35SB6A
0711313-10 35SB9A
0711313-13 35SB10A
0711377-01 35SB7A
0711377-04 35SB5A
0711377-08 35SB8A
0711377-13 37SB10A
0711377-16 37SB9A
0711377-20 37SB7A

Qualification: This sample was re-extracted due to low surrogate recovery in the initial extract. The re-extracted sample also had low surrogate recovery, confirming matrix interference. The original sample extract result was reported.

Analysis: USEPA-8082

Sample/Analyte:

0711313-07 35SB6A
0711313-10 35SB9A
0711313-13 35SB10A
0711377-01 35SB7A
0711377-04 35SB5A
0711377-08 35SB8A
0711377-13 37SB10A
0711377-16 37SB9A
0711377-20 37SB7A

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Sequence: 7120470
Instrument: 144
Matrix: Water
Calibration: 7L04020

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
35SB8A (0711377-08)		**Lab File ID: A189140-0**		**Analyzed: 12/03/07 13:13**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	69	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	59	60 - 125	*
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	70	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	69	32 - 129	
35SB8B (0711377-09)		**Lab File ID: A189141-0**		**Analyzed: 12/03/07 13:31**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	96	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	89	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	94	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	104	32 - 129	
35SB8C (0711377-10)		**Lab File ID: A189142-0**		**Analyzed: 12/03/07 13:48**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	101	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	96	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	96	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	112	32 - 129	
Calibration Check (7120470-CCV2)		**Lab File ID: A189143-0**		**Analyzed: 12/03/07 14:05**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	102	80 - 120	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	105	80 - 120	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	99	80 - 120	
Tetrachloro-m-xylene [2C]	2.66	2.65	0.01	+/-1.0	92	80 - 120	
37SB10A (0711377-13)		**Lab File ID: A189144-0**		**Analyzed: 12/03/07 14:22**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	59	60 - 125	*
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	49	60 - 125	*
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	59	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	56	32 - 129	
37SB10B (0711377-14)		**Lab File ID: A189145-0**		**Analyzed: 12/03/07 14:39**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	99	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	89	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	94	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	108	32 - 129	

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 7120470
Matrix: Water

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument: 144
Calibration: 7L04020

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
37SB10C (0711377-15)		**Lab File ID: A189146-0**		**Analyzed: 12/03/07 14:57**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	74	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	70	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	71	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	70	32 - 129	
37SB9A (0711377-16)		**Lab File ID: A189147-0**		**Analyzed: 12/03/07 15:14**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	63	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	54	60 - 125	*
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	68	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	62	32 - 129	
37SB9B (0711377-17)		**Lab File ID: A189148-0**		**Analyzed: 12/03/07 15:31**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	98	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	90	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	96	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	111	32 - 129	
37SB9C (0711377-18)		**Lab File ID: A189149-0**		**Analyzed: 12/03/07 15:48**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	98	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	93	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	92	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	99	32 - 129	
DUP-3 (0711377-19)		**Lab File ID: A189150-0**		**Analyzed: 12/03/07 16:06**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	79	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	73	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	79	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	90	32 - 129	
37SB7A (0711377-20)		**Lab File ID: A189151-0**		**Analyzed: 12/03/07 16:23**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	47	60 - 125	*
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	41	60 - 125	*
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	49	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	48	32 - 129	

04690

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 7120751
Matrix: Soil

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument: 144
Calibration: 7L07016

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
35SB2A (0711313-06)		**Lab File ID: A190045-0**		**Analyzed: 12/06/07 19:59**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	67	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	65	60 - 125	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	69	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	65	32 - 129	
35SB6B (0711313-08)		**Lab File ID: A190047-0**		**Analyzed: 12/06/07 20:33**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	89	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	84	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	91	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	96	32 - 129	
35SB6C (0711313-09)		**Lab File ID: A190048-0**		**Analyzed: 12/06/07 20:50**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	93	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	87	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	80	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	77	32 - 129	
35SB9A (0711313-10)		**Lab File ID: A190049-0**		**Analyzed: 12/06/07 21:08**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	47	60 - 125	*
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	36	60 - 125	*
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	56	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	51	32 - 129	
Calibration Check (7120751-CCV1)		**Lab File ID: A190050-0**		**Analyzed: 12/06/07 21:25**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	99	80 - 120	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	90	80 - 120	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	92	80 - 120	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	96	80 - 120	
35SB9B (0711313-11)		**Lab File ID: A190051-0**		**Analyzed: 12/06/07 21:42**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	78	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	73	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	76	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	75	32 - 129	

04695

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Sequence: 7120751
Instrument: 144
Matrix: Soil
Calibration: 7L07016

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
35SB9C (0711313-12)		**Lab File ID: A190052-0**		**Analyzed: 12/06/07 21:59**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	88	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	83	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	89	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	90	32 - 129	
35SB10A (0711313-13)		**Lab File ID: A190053-0**		**Analyzed: 12/06/07 22:17**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	64	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	58	60 - 125	*
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	62	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	60	32 - 129	
35SB10B (0711313-14)		**Lab File ID: A190054-0**		**Analyzed: 12/06/07 22:34**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	92	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	85	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	91	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	93	32 - 129	
35SB10C (0711313-15)		**Lab File ID: A190055-0**		**Analyzed: 12/06/07 22:51**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	76	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	67	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	81	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	79	32 - 129	
35SB7A (0711377-01)		**Lab File ID: A190056-0**		**Analyzed: 12/06/07 23:08**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	60	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	40	60 - 125	*
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	71	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	62	32 - 129	
35SB7B (0711377-02)		**Lab File ID: A190057-0**		**Analyzed: 12/06/07 23:26**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	91	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	71	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	90	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	94	32 - 129	

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 7120751
Matrix: Soil

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument: 144
Calibration: 7L07016

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
35SB7C (0711377-03)		**Lab File ID: A190058-0**		**Analyzed: 12/06/07 23:43**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	74	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	64	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	77	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	77	32 - 129	
35SB5A (0711377-04)		**Lab File ID: A190059-0**		**Analyzed: 12/07/07 00:00**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	54	60 - 125	*
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	44	60 - 125	*
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	54	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	51	32 - 129	
35SB5B (0711377-05)		**Lab File ID: A190060-0**		**Analyzed: 12/07/07 00:17**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	86	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	77	60 - 125	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	91	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	95	32 - 129	
Calibration Check (7120751-CCV2)		**Lab File ID: A190061-0**		**Analyzed: 12/07/07 00:34**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	104	80 - 120	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	98	80 - 120	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	94	80 - 120	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	100	80 - 120	
35SB5C (0711377-06)		**Lab File ID: A190062-0**		**Analyzed: 12/07/07 00:52**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	89	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	87	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	94	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	99	32 - 129	
Matrix Spike (0714306-MS1)		**Lab File ID: A190063-0**		**Analyzed: 12/07/07 01:09**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	72	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	71	60 - 125	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	75	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	74	32 - 129	

: 04697

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Sequence: 8010337
Instrument: 144
Matrix: Soil
Calibration: 7L07016

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
Initial Cal Check (8010337-ICV7)		**Lab File ID: A190098A-0**		**Analyzed: 12/07/07 13:06**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	91	80 - 120	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	102	80 - 120	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	95	80 - 120	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	86	80 - 120	
35SB6A (0711313-07)		**Lab File ID: A190099-0**		**Analyzed: 12/07/07 13:43**			
Decachlorobiphenyl	9.27	9.26	0.01	+/-1.0	45	60 - 125	*
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	57	60 - 125	*
Tetrachloro-m-xylene	1.53	1.51	0.02	+/-1.0	51	32 - 129	
Tetrachloro-m-xylene [2C]	2.63	2.65	-0.02	+/-1.0	53	32 - 129	
Calibration Check (8010337-CCV1)		**Lab File ID: A190102A-0**		**Analyzed: 12/07/07 14:35**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	91	80 - 120	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	93	80 - 120	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	92	80 - 120	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	88	80 - 120	

: 04700

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 35SB1A LAB SAMPLE # 0711313-05

	COLUMN 1	COLUMN 2
Inst.ID:	144	144
Column:	RTX CLP2	RTX CLP
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/Kg)	RPD
Aroclor 1254	1	5.77			19	51.0%
	2	6.62			32	

05844

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 35SB9A LAB SAMPLE # 0711313-10

	COLUMN 1	COLUMN 2
Inst.ID:	144	144
Column:	RTX CLP2	RTX CLP
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/Kg)	RPD
Aroclor 1254	1	5.77			330	58.8%
	2	8.74			180	

: 05847

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 35SB9C LAB SAMPLE # 0711313-12

	COLUMN 1	COLUMN 2
Inst.ID:	144	144
Column:	RTX CLP2	RTX CLP
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/Kg)	RPD
Aroclor 1254	1	5.77			13	42.4%
	2	8.12			20	

05849

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 35SB7A LAB SAMPLE # 0711377-01

	COLUMN 1	COLUMN 2
Inst.ID:	144	144
Column:	RTX CLP2	RTX CLP
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/Kg)	RPD
Aroclor 1254	1	5.77			580	57.8%
	2	7.40			320	

05353

Quality Control Results – Polychlorinated Biphenyls

Note: second column (confirmation) data is identified as "compound[2C]".

Calibration

Initial instrument calibrations, second source verification (SCV), and continuing calibration verifications (CCV) for both the primary and confirmation columns were method-compliant.

Method Blanks

No target analytes were detected.

Surrogates

All surrogate recoveries were in control for both the primary column and confirmation column runs with the exception of Decachlorobiphenyl for nine samples; see report forms and Narrative Attachment 2 for details. The affected samples were re-extracted and analyzed; the same surrogate also recovered low confirming sample matrix interference.

Laboratory Control Samples

The Laboratory Control Samples (LCS) were fortified with Aroclors 1016 and 1260. All recoveries were in control.

Matrix Spikes

Sample 35SB2A was fortified with Aroclors 1016 and 1260. All recoveries and RPDs for both the primary column and confirmation column runs were in control.

Sample Results

Please see Section H. Nine samples required re-extraction and reanalysis due to a low surrogate recovery, confirming matrix interference.

Corrective Action

Corrective action involved the re-extraction and reanalysis of nine samples due to low surrogate recoveries for one of two surrogates.

Statements of Data Qualification

See Narrative Attachment 2.

This report shall not be reproduced except in full, without written authorization of TriMatrix Laboratories, Inc.
Individual sample results relate only to the sample tested.

DATA VALIDATION WORKSHEET

Explosives

Reviewer: RA
Date: 1/17/07
DV Level: II III IV
Review Document:
_X__ Region III Modified for National Functional Guidelines
_X__ SW-846
_X__ Project QAPP/SAP

Project Name: KAAP 10
Project Number: 21354887.40003
Laboratory: Trimatrix
SDG No.: 36440-42
Test Name: Explosives
Method No.: 8330

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 ^{O}C, then flag L(+)/UL(-).			
1.4	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 Laboratory Control Sample (LCS)		Yes	No	NA
5.1	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.2	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
5.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.	✓		

Notes: batch 714136 3-nitrotoluene RPD 34%, 30%.
all results ND, no action

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			✓
6.3	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			✓

	<10%	low	high
Positives	L	L	K
Non-detects	R	UL	No action

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.2	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
7.3	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	Action: No action is required based on MS/MSd failure alone. Note in the report and use professional judgement.			

Notes: The MS/MSD for 355B2A %Rs < 80% for
2,6-Dinitrotoluene 75%, 75%.
2-nitrotoluene 77%, 77%
4-amino-2,6-dinitrotoluene 72%, 75%.
and Parent NDs → UJ/M

8.0 Field Duplicate		Yes	No	NA
8.1	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: 355B4A, DUP-1 Both NDs ✓ | 355B5A, DUP-2 RL | 375B9A DUP-3 both NDs

2,4-DNT	0.24	0.46	2.50 KV ✓
Octahydro-	0.33	0.29	OKV

1315

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes, is all positive identifications were confirmed in second column? Apply J flag if RPD >40% between first and second columns.	✓		
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes: RPDs > 40% for HMX in several samples → J/g
higher results should be used.

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
10.1.1	Number of samples:			
10.1.2	Number of target compounds in each analysis: 14			
10.1.3	Number of results rejected or not reported:			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%			

Notes:

LCS / LCS DUPLICATE RECOVERY
USEPA-8330

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

Laboratory ID: 0714136-BSD1

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 8330 Extraction
Initial/Final: 770 mL / 10 mL
QC Batch: 0714136
Sequence: 7121601

Analyte	Spike Added ug/L	LCSD Conc.	LCSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
1,3,5-Trinitrobenzene	2.60	2.31	89	5	30	65 - 140	ug/L
1,3-Dinitrobenzene	2.60	2.37	91	11	30	45 - 160	ug/L
2,4,6-Trinitrotoluene	2.60	2.67	103	23	30	50 - 145	ug/L
2,4-Dinitrotoluene	2.60	2.79	107	22	30	60 - 135	ug/L
2,6-Dinitrotoluene	2.60	2.92	112	26	30	60 - 135	ug/L
2-Amino-4,6-dinitrotoluene	5.19	5.42	104	25	30	50 - 155	ug/L
2-Nitrotoluene	2.60	2.29	88	2	30	45 - 135	ug/L
3-Nitrotoluene	2.60	2.84	109	34 *	30	50 - 130	ug/L
4-Amino-2,6-dinitrotoluene	2.60	2.79	107	26	30	55 - 155	ug/L
4-Nitrotoluene	2.60	2.38	92	9	30	50 - 130	ug/L
Hexahydro-1,3,5-trinitro-1,3,5-tria	2.60	2.38	92	13	30	50 - 160	ug/L
Methyl-2,4,6-trinitrophenylnitram	2.60	2.16	83	6	30	20 - 175	ug/L
Nitrobenzene	2.60	2.41	93	15	30	50 - 140	ug/L
Octahydro-1,3,5,7-tetranitro-1,3,5	2.60	2.40	93	10	30	80 - 115	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

02159

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8330

35SB2A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-42

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 8330 Extraction

Initial/Final: 2 g / 20 mL

Laboratory ID: 0714010-MS1

QC Batch: 0714010

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
1,3,5-Trinitrobenzene	2.00	ND	1.84	92	75 - 125	mg/kg dry wt.
1,3-Dinitrobenzene	2.00	ND	1.86	93	80 - 125	mg/kg dry wt.
2,4,6-Trinitrotoluene	2.00	ND	1.77	88	55 - 140	mg/kg dry wt.
2,4-Dinitrotoluene	2.00	ND	1.63	82	80 - 125	mg/kg dry wt.
2,6-Dinitrotoluene	2.00	ND	1.50	75 *	80 - 120	mg/kg dry wt.
2-Amino-4,6-dinitrotoluene	4.00	ND	3.21	80	80 - 125	mg/kg dry wt.
2-Nitrotoluene	2.00	ND	1.53	77 *	80 - 125	mg/kg dry wt.
3-Nitrotoluene	2.00	ND	1.61	80	75 - 120	mg/kg dry wt.
4-Amino-2,6-dinitrotoluene	2.00	ND	1.44	72 *	80 - 125	mg/kg dry wt.
4-Nitrotoluene	2.00	ND	1.60	80	75 - 125	mg/kg dry wt.
Hexahydro-1,3,5-trinitro-1,3,5-tria	2.00	ND	1.61	80	70 - 135	mg/kg dry wt.
Methyl-2,4,6-trinitrophenylnitram	2.00	ND	1.79	89	10 - 150	mg/kg dry wt.
Nitrobenzene	2.00	ND	1.86	93	75 - 125	mg/kg dry wt.
Octahydro-1,3,5,7-tetranitro-1,3,5	2.00	ND	2.01	100	75 - 125	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 02154

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY
USEPA-8330

35SB2A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 8330 Extraction
Initial/Final: 2 g / 20 mL

Laboratory ID: 0714010-MSD1
QC Batch: 0714010

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
1,3,5-Trinitrobenzene	2.00	1.87	94	2	30	75 - 125	mg/kg dry wt.
1,3-Dinitrobenzene	2.00	1.87	94	0.9	30	80 - 125	mg/kg dry wt.
2,4,6-Trinitrotoluene	2.00	1.73	87	2	30	55 - 140	mg/kg dry wt.
2,4-Dinitrotoluene	2.00	1.64	82	0.6	30	80 - 125	mg/kg dry wt.
2,6-Dinitrotoluene	2.00	1.51	75 *	0.7	30	80 - 120	mg/kg dry wt.
2-Amino-4,6-dinitrotoluene	4.00	3.23	81	0.6	30	80 - 125	mg/kg dry wt.
2-Nitrotoluene	2.00	1.48	74 *	3	30	80 - 125	mg/kg dry wt.
3-Nitrotoluene	2.00	1.69	84	5	30	75 - 120	mg/kg dry wt.
4-Amino-2,6-dinitrotoluene	2.00	1.50	75 *	4	30	80 - 125	mg/kg dry wt.
4-Nitrotoluene	2.00	1.58	79	2	30	75 - 125	mg/kg dry wt.
Hexahydro-1,3,5-trinitro-1,3,5-tria	2.00	1.66	83	3	30	70 - 135	mg/kg dry wt.
Methyl-2,4,6-trinitrophenylnitram	2.00	1.81	91	2	30	10 - 150	mg/kg dry wt.
Nitrobenzene	2.00	1.85	93	0.1	30	75 - 125	mg/kg dry wt.
Octahydro-1,3,5,7-tetranitro-1,3,5	2.00	2.03	102	1	30	75 - 125	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 021155

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 35SB7A LAB SAMPLE # 0711377-01

	COLUMN 1	COLUMN 2
Inst.ID:	221	221
Column:	AcclaimE1	AcclaimE2
ID(mm):		

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/L)	RPD
HMX	1	6.61	6.11	6.71	4.43000	44.6%
	2	7.71	6.95	8.01	6.97000	

02451

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 35SB7C LAB SAMPLE # 0711377-03

	COLUMN 1	COLUMN 2
Inst.ID:	221	221
Column:	AcclaimE1	AcclaimE2
ID(mm):		

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/L)	RPD
HMX	1	6.61	6.11	6.71	0.26900	62.6%
	2	7.88	7.39	8.45	0.51400	

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 35SB5A LAB SAMPLE # 0711377-04

	COLUMN 1	COLUMN 2
Inst.ID:	221	221
Column:	AcclaimE1	AcclaimE2
ID(mm):		

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/L)	RPD
HMX	1	6.60	6.11	6.71	0.32600	65.1%
	2	7.71	6.95	8.01	0.64100	

02453

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: DUP-2 LAB SAMPLE # 0711377-07

	COLUMN 1	COLUMN 2
Inst.ID:	221	221
Column:	AcclaimE1	AcclaimE2
ID(mm):		

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/L)	RPD
HMX	1	6.71	6.11	6.71	0.28700	60.2%
	2	7.74	6.95	8.01	0.53400	

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 35SB8A LAB SAMPLE # 0711377-08

	COLUMN 1	COLUMN 2
Inst.ID:	221	221
Column:	AcclaimE1	AcclaimE2
ID(mm):		

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/L)	RPD
HMX	1	6.70	6.32	6.92	0.39500	49.5%
	2	7.66	6.95	8.01	0.65500	

02455

STATEMENT OF DATA QUALIFICATIONS

Nitroaromatics & Nitramines by EPA Method 8330

Qualification:	The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.	
Analysis:	USEPA-8330	
Sample/Analyte:	0711313-06 35SB2A	2,6-Dinitrotoluene
	0711313-06 35SB2A	2-Nitrotoluene
	0711313-06 35SB2A	4-Amino-2,6-dinitrotoluene
Qualification:	The LCS/LCSD RPD exceeded the control limit. A positive result for this analyte in any sample from the associated QC batch is considered estimated. Non-detectable results are not qualified.	
Analysis:	USEPA-8330	
	0714136-BSD1	3-Nitrotoluene

Quality Control Results – Nitroaromatic Explosives

Calibration

All initial instrument calibrations, second source calibration verifications (SCV), and continuing calibration verifications (CCV) for the primary column were method-compliant. Initial instrument calibration, SCV, and applicable CCVs associated with the confirmation analysis were also in control.

Note: Confirmation column data (QC and instrument calibration summaries plus raw data) follows the primary column summaries and raw data.

Method Blanks

No target analytes were detected.

Surrogates

All surrogate recoveries were in control.

Laboratory Control Samples

Each Laboratory Control Sample (LCS) was fortified with both target analytes. For one QC batch, an LCS Duplicate was also analyzed. All recoveries (and RPDs in the case of the LCS/LCSD) were in control with the exception of the RPD (34%) for 3-Nitrotoluene.

Matrix Spikes

Sample 35SB2A was fortified with both target analytes. All recoveries and RPDs were in control with the exception of both recoveries (ranging from 72% to 77%) for three analytes; see the MS/MSD summary form and Narrative Attachment 2 for details.

Sample Results

Please see Section D. Nine samples required confirmation analysis for one or more target analytes.

Corrective Actions

No corrective actions were deemed necessary.

Statements of Data Qualification

See Narrative Attachment 2.

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Individual sample results relate only to the sample tested.

DATA VALIDATION WORKSHEET

Nitroglycerin

Reviewer: RA
Date: 1/17/07
DV Level: II (III) IV
Review Document:
_X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
____ Project QAPP/SAP

All QC OK, No flags

Project Name: RAAP 10
Project Number:
Laboratory: Trimatrix
SDG No.: 36440-42
Test Name: Nitroglycerin (PETN)
Method No.: 8332-HPLC

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. %	✓		
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	✓		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	✓		
	Action: If the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			✓
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		✓	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		✓	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	✓		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	✓		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	✓		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	✓		
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			✓
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).	✓		
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	✓		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	✓		
5.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			✓
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			✓
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
6.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	✓		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		✓	
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: 355B4A, DUP-1 both NDs ✓ 355B5A DUP-2 both NDs ✓ 375B9A DUP-3 both NDs ✓

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes, is all positive identifications were confirmed in second column? Apply J flag if RPD >40% between first and second columns.	✓		
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes:

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)	✓		
10.1.1	Number of samples:			
10.1.3	Number of results rejected and not reported:			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%			
	% Completeness =			

Notes:

Quality Control Results – PETN and Nitroglycerin

Calibration

All initial instrument calibrations, second source calibration verifications (SCV), and continuing calibration verifications (CCV) for the primary column were method-compliant. Initial instrument calibration, SCV, and applicable CCVs associated with the confirmation analysis were also in control.

Note: for the SCV, the DoD QSM limit of 80-120% was used for assessment although the summary forms lists 85-115%.

Note: Confirmation column data (QC and instrument calibration summaries plus raw data) follows the primary column summaries and raw data.

Method Blanks

No target analytes were detected.

Surrogates

All surrogate recoveries were in control.

Laboratory Control Samples

Each Laboratory Control Sample (LCS) was fortified with both target analytes. For one QC batch, an LCS Duplicate was also analyzed. All recoveries (and RPDs in the case of the LCS/LCSD) were in control.

Matrix Spikes

Sample 35SB2A was fortified with both target analytes. All recoveries and RPDs were in control.

Sample Results

Please see Section E. Sample 35SB6A required confirmation analysis for Nitroglycerin.

Corrective Actions

No corrective actions were deemed necessary.

Statements of Data Qualification

No statements were generated.

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Individual sample results relate only to the sample tested.

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-42
Project No.: 23548087

Project Name: RAAP 10
Reviewer: RA
Date: 1/18/08

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓			✓			✓					
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓			✓			✓					
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓			✓			✓				
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{o}C $\pm$ 2 ^{o}C)	✓			✓			✓					
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓			✓			✓					

Note: _____

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		✓			✓			✓				

Note: _____

URS

3.0 Instrument Calibration		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	✓			✓			✓					
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	✓			✓			✓					
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.												
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	✓			✓			✓					
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	✓			✓			✓					
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	✓			✓			✓					
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	✓			✓								
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K												

Note: _____

URS

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓			✓			✓					
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	✓			✓			✓					
4.3	Are there reported MB or ICB/CCBs values > MDL?	✓			✓			✓					
	Sample Results > MDL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > MDL?		✓			✓			✓				
	Sample Results Non-detects > MDL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± MDL?	✓			✓				✓				
	Sample Results > MDL												
	< 5X Blank Contamination B												

No action

Note: 6010 → MB Calcium 26.6 mg/kg, iron 1.24 mg/kg, Zn 1.47 mg/kg, Ca, 5.75, Fe 1.19 mg/kg (all 5x), EQBKs pos → Ca, Fe, Pb, Mn, Ni, Zn (all 5x), No action
6020 → MB lead, copper, zn, pos zn <5x → B/P in EQBK-1
Hg → MB, Hg at 0.00791 mg/kg <5x → B/P

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	✓			✓								
5.2	Are the ICS AB recoveries within 80% - 120%?	✓			✓								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	✓			✓								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			✓			✓						
	If not...												
	Action: Not Spiked Analytes: < -MDL L(+)/UL(-); > MDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note:

URS

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	✓			✓			✓					
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		✓			✓			✓				

Action:	Solid		Aqueous		
	< LCL	> UCL	< 50%	50% - 79%	> 120%
	L(+)/UL(-)	K(+)	L(+)/R(-)	L(+)/UL(-)	K(+)

Note:

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	✓			✓			✓					
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	✓			✓			✓					

Note:

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	✓			✓			✓					
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous matrices or lab limits for soil matrices?		✓			✓		✓					
	%R > 125% / 30%< %R < 74% / < 30%												
	Positive: K / L / L												
	Non-detect: None / UL / R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	✓			✓			✓					

Note: 6010 → MS for 355B2A 1.R7 QC for Ba at 135%. all Pos → Klm
6020 → MS/MSD for 355B2A LQC for Se at 72%, 72%,) LJUL m

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	✓			✓			✓					

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	✓			✓								
10.2	Was a five-fold dilution performed?	✓			✓								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).		✓			✓							

Note: 6010 → Serial dilution for 375B7C 7QC for zinc at 11%. all POS → JLS
6020 → 〃 〃 for 355B2A 7QC copper, 14%, Ni 13%.) POS → JLS
6020 → 〃 for 355B7B 7QC Ni 11%, V, 11%

11.0 Field Duplicate Samples

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	✓			✓			✓					
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report		✓			✓		✓					

Note: 6010 → 355B4A/DUP-1 Ca 67% RPD → J, F — 375B9A DUP-3

6020 → 375B9A, DUP-3 Pb 71% → J, F — Hg 1 1 OK ✓

Hg → 355B4A, DUP-1 RL ✓ 355B5A, DUP-2 RPD

Hg 0.079 0.12 0.05 ✓ OK Hg → ND's, B, P

12.0 Result Verification/ Internal Standards/ Tune

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	✓			✓			✓					
12.2	Were all dilution reflected in the positive results and detection limits?	✓			✓			✓					
12.3	Were the Internal Standard recoveries within 30-120%	✓			✓								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	✓											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	✓											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	✓											

Note: _____

13.0 Completeness Calculation

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	✓			✓			✓					
13.1.1	Number of samples: _____												
13.1.2	Number of target compounds in each analysis: _____												
13.1.3	Number of results rejected and not reported: _____												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%												

Note: _____

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714219-BLK1
File ID: 7112701-014
Prepared: 11/20/07 07:00
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 11/27/07 09:03
Instrument: 116
QC Batch: 0714219
Sequence: 7112701
Calibration: 7K28020

CAS No.	Analyte	MDL	MRL	Concentration	Q
7429-90-5	Aluminum, Total	2.1	10	10 mg/kg dry wt.	U
7440-39-3	Barium, Total	0.17	1.0	1.0 mg/kg dry wt.	U
7440-70-2	Calcium, Total	4.2	50	26.6 mg/kg dry wt.	J
7439-89-6	Iron, Total	0.48	10	1.24 mg/kg dry wt.	J
7439-95-4	Magnesium, Total	5.0	50	50 mg/kg dry wt.	U
7439-96-5	Manganese, Total	0.16	1.0	1.0 mg/kg dry wt.	U
7440-23-5	Sodium, Total	13	100	100 mg/kg dry wt.	U

Ca → 133
Fe → 6.2

: 03034

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714219-BLK1
File ID: 7112701-014
Prepared: 11/20/07 07:00
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 11/27/07 09:05
Instrument: 116
QC Batch: 0714219
Sequence: 7112701
Calibration: 7K28020

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-41-7	Beryllium, Total	0.021	1.0	1.0 mg/kg dry wt.	U
7440-43-9	Cadmium, Total	0.11	2.0	2.0 mg/kg dry wt.	U
7440-47-3	Chromium, Total	0.72	5.0	5.0 mg/kg dry wt.	U
7440-48-4	Cobalt, Total	0.37	2.0	2.0 mg/kg dry wt.	U
7440-66-6	Zinc, Total	1.0	5.0	1.47 mg/kg dry wt.	J

Zn → 7.35

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714264-BLK1
File ID: 7112701-038
Prepared: 11/20/07 07:00
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 11/27/07 11:38
Instrument: 116
QC Batch: 0714264
Sequence: 7112701
Calibration: 7K28020

CAS No.	Analyte	MDL	MRL	Concentration	Q
7429-90-5	Aluminum, Total	2.1	10	10 mg/kg dry wt.	U
7440-39-3	Barium, Total	0.17	1.0	1.0 mg/kg dry wt.	U
7440-70-2	Calcium, Total	4.2	50	5.75 mg/kg dry wt.	J
7439-89-6	Iron, Total	0.48	10	1.19 mg/kg dry wt.	J
7439-95-4	Magnesium, Total	5.0	50	50 mg/kg dry wt.	U
7439-96-5	Manganese, Total	0.16	1.0	1.0 mg/kg dry wt.	U
7440-23-5	Sodium, Total	13	100	100 mg/kg dry wt.	U

Ca → 28.75

Fe → 5.95

03037

EQBK 11/13/07

Ca	130	650
Fe	9.8	49
Pb	0.98	(4.9)
Mn	0.66	3.3
Ni	0.32	(1.6)
Zn	5.3	26.5

EQBK 11/14/07

Ca	270	1350
Fe	9	45
Mn	1.4	7
Zn	11	55

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6010B

35SB2A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-42

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 3050B Digestion

Initial/Final: 0.5003 g / 50 mL

Laboratory ID: 0714219-MS1

QC Batch: 0714219

OK sample conc. 7 4x spike

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Aluminum, Total	125	22400	26100	2930 *	80 - 120	mg/kg dry wt.
Barium, Total	25.0	97.8	132	135 *	80 - 120	mg/kg dry wt.
Beryllium, Total	2.50	0.590	3.27	107	80 - 120	mg/kg dry wt.
Cadmium, Total	25.0	1.36	24.9	94 OK	80 - 120	mg/kg dry wt.
Calcium, Total	1250	11000	12600	126 V*	80 - 120	mg/kg dry wt.
Chromium, Total	25.0	35.1	59.3	97	80 - 120	mg/kg dry wt.
Cobalt, Total	25.0	7.86	30.9	92	80 - 120	mg/kg dry wt.
Magnesium, Total	1250	5980	7400	114 OK	80 - 120	mg/kg dry wt.
Manganese, Total	25.0	507	554	189 V*	80 - 120	mg/kg dry wt.
Sodium, Total	1250	59.1	1370	105	80 - 120	mg/kg dry wt.
Zinc, Total	25.0	146	165	73 V*	80 - 120	mg/kg dry wt.

OK

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

030449

SERIAL DILUTION
USEPA-6010B

37SB7C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
% Solids: 83.78
Laboratory ID: 7112701-SRD2
QC Batch: 7112701
Lab Source ID: 0711377-22
Sequence: 7112701

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Barium, Total	1.14		1.14		0.0		mg/L	10
Beryllium, Total	0.00927	J	0.0109	J	18.0 #		mg/L	10
Cadmium, Total	0.0242		0.0209	J	14.0 #		mg/L	10
Calcium, Total	18.9		19.3		2.0		mg/L	10
Chromium, Total	0.315		0.334		6.0 #		mg/L	10
Cobalt, Total	0.123		0.126		2.0 #		mg/L	10
Magnesium, Total	49.9		50.3		1.0		mg/L	10
Manganese, Total	3.32		3.36		1.0		mg/L	10
Sodium, Total	1.05		1.07	J	2.0 #		mg/L	10
Zinc, Total	0.797		0.883		11.0	*	mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 03068

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Job ____ Project No. ____ Sheet ____ of ____

Description ____ Computed by ____ Date ____

____ Checked by ____ Date ____

Method 6010 Field Dups

	355B4A	DUP-1	RL	RPD Reference
Al	22000	24000	10	9% OKV
Ba	150	130	1	14% OKV
Be	0.82	0.70	1	OKV
Cd	1.5	1.9	2	OKV
Ca	9200	4600	50	(67%)
Cr	31	40	5	25% OKV
Co	12	9.8	2	OKV
Fe	29000	29000	10	0% OKV
Mg	5900	3600	50	48% OKV
Mn	750	600	1	22% OKV
K	1700	1400	50	19% OKV
Na	43	34	100	OKV
Zn	110	83	5	28% OKV

	355B5A	DUP-2	RL	RPD
Al	20000	20000	10	0% OKV
Ba	170	170	1	0% OKV
Be	0.77	0.85	1	OKV
Cd	1.7	1.8	2	OKV
Ca	8700	5300	50	48% OKV
Cr	93	72	5	25% OKV
Co	12	11	2	OKV
Fe	27000	27000	10	OKV
Mg	5500	3800	50	36% OKV
Mn	640	620	1	3% OKV
K	1600	1600	50	OKV
Na	51	46	100	OKV
Zn	160	160	5	OKV

all OKV

→

URS

Page ____ of ____

Job ____ Project No. ____ Sheet ____ of ____

Description ____ Computed by ____ Date ____

____ Checked by ____ Date ____

Reference

Method 6010 Field Dups (Cont.)

	375B9A	and	DUP-3	RL	RPD
Al	18000		19000	1	5% V
Ba	88		90	1	OK V
Be	0.94		0.91	2	OK V
Cd	1		0.86	50	OK V
Ca	12000		18000	5	40% V
Cr	110		120	2	9% V
Co	4		4.3	10	OK V
Fe	18000		20,000	50	10% V
Mg	4100		4500	1	9% V
Mn	140		150	50	7% V
K	1400		1500	100	7% V
Na	57		64	5	11% V
Zn	90		84		7% V

STATEMENT OF DATA QUALIFICATIONS

Total Metals by EPA 6000/7000 Series Methods

Qualification:	The MS or MSD recovery, but not both, was outside the control limit. The RPD is within the control limit. The unspiked sample result is considered estimated.	
Analysis:	USEPA-6010B	
Sample/Analyte:	0711313-06 35SB2A	Chromium
	0711313-06 35SB2A	Magnesium
Qualification:	The analyte concentration in the associated MB was greater than or equal to 1/2 the RL. The positive sample result, which was greater than 5 times the MB value, is not considered estimated.	
Analysis:	USEPA-6010B	
Sample/Analyte:	0711293-01 35SB3A	Calcium
	0711313-03 35SB4A	Calcium
	0711313-04 DUP-1	Calcium
	0711313-05 35SB1A	Calcium
	0711313-06 35SB2A	Calcium
	0711313-07 35SB6A	Calcium
	0711313-08 35SB6B	Calcium
	0711313-09 35SB6C	Calcium
	0711313-10 35SB9A	Calcium
	0711313-11 35SB9B	Calcium
	0711313-12 35SB9C	Calcium
	0711313-13 35SB10A	Calcium
	0711313-14 35SB10B	Calcium
	0711313-15 35SB10C	Calcium
Qualification:	The % difference in results between the sample and a serial dilution of the sample exceeded the control limit. Sample matrix interference is suspected and the reported result is considered estimated.	
Analysis:	USEPA-6010B	
Sample/Analyte:	0711377-22 37SB7C	Zinc
Analysis:	USEPA-6020A	
Sample/Analyte:	0711313-06 35SB2A	Copper
	0711313-06 35SB2A	Nickel
	0711377-02 35SB7B	Nickel
	0711377-02 35SB7B	Vanadium
Qualification:	This analyte was not present in this sample at a concentration greater than 50 times the MDL, therefore serial dilution is not required.	
Analysis:	USEPA-6010B	
Sample/Analyte:	0711377-22 37SB7C	Beryllium
	0711377-22 37SB7C	Cadmium
Qualification:	This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.	
Analysis:	USEPA-6020A	
Sample/Analyte:	0711313-06 35SB2A	Arsenic
	0711377-02 35SB7B	Arsenic
	0711377-02 35SB7B	Thallium
Qualification:	The MS and/or MSD recovery was outside the control limit. The non-spiked sample result is considered estimated.	
Analysis:	USEPA-6010B	
Sample/Analyte:	0711313-06 35SB2A	Barium

Continued on next page

STATEMENT OF DATA QUALIFICATIONS

Total Metals by EPA 6000/7000 Series Methods (Continued)

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample result is considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:	
0711313-06 35SB2A	Arsenic
0711313-06 35SB2A	Selenium

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was greater than or equal to 4 times the spiked amount; the non-spiked sample result is not qualified.

Analysis: USEPA-6010B

Sample/Analyte:	
0711313-06 35SB2A	Aluminum
0711313-06 35SB2A	Calcium
0711313-06 35SB2A	Iron
0711313-06 35SB2A	Manganese
0711313-06 35SB2A	Zinc

Quality Control Results – ICP Metals

Calibration

All instrument calibrations and continuing calibrations were method-compliant. Note: instrument reports for ICP include the listing of initial calibration correlation coefficients and internal standard recoveries; those values may either be imbedded with raw data from each run or included as a summary (also within the instrument printout).

Note: TriMatrix interprets the QSM requirement for a "low-level calibration check standard" as one pertaining to a one-point initial calibration. Given that a multi-point initial calibration was performed, the specification for a low-level calibration check either does not apply or has been satisfied since the lowest calibration standard is equivalent in concentration to the reporting limit.

Method Blanks

No target analytes were detected at a concentration greater than one-half the RL with the exception of Calcium; it was detected at less than the RL in one of the blanks.

Internal Standard Response

Internal standard responses for all standards, samples, and quality control samples were method-compliant.

Laboratory Control Samples

Each Laboratory Control Sample (LCS) and, for several batches, LCS Duplicates were fortified with all target analytes. All recoveries (and RPDs in the case of LCSDs) were in control.

Matrix Spikes

Sample 35SB2A was fortified with all target analytes. Some recoveries were outside the control limit; all RPDs were in control. See the MS/MSD summary and see Narrative Attachment 2 for details.

Serial Dilutions and Post-Digestion Spikes

Serial dilution (SD) and post-digestion spike (PDS) analysis was performed on the sample employed for MS/MSD analysis as well as on sample 37SB7C; all values were in control~~, with the exception of the SD value for Zinc for 37SB7C~~. ~~RA 1/16/07~~ LCS+V RA 1/18/07

Sample Results

Please see Section F.

Note: Method 6020A was the predominant method used for the analysis of target analytes for aqueous samples (including equipment blanks). This was discussed with the Client prior to receipt of any samples.

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Individual sample results relate only to the sample tested.

Quality Control Results – ICP Metals – (continued)

Corrective Action

No corrective actions were deemed necessary.

Statements of Data Qualification

See Narrative Attachment 2.

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Individual sample results relate only to the sample tested.

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714077-BLK1
File ID: 7112789-034
Prepared: 11/19/07 07:35
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 250 mL
Analyzed: 11/27/07 21:06
Instrument: 114
QC Batch: 0714077
Sequence: 7112789
Calibration: 7K28022

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.071	0.20	0.20 mg/kg dry wt.	U
7440-50-8	Copper, Total	0.044	0.20	0.20 mg/kg dry wt.	U
7439-92-1	Lead, Total	0.022	0.20	0.0275 mg/kg dry wt.	J
7440-02-0	Nickel, Total	0.036	0.10	0.10 mg/kg dry wt.	U
7782-49-2	Selenium, Total	0.089	0.30	0.30 mg/kg dry wt.	U
7440-22-4	Silver, Total	0.013	0.10	0.10 mg/kg dry wt.	U
7440-28-0	Thallium, Total	0.0049	0.10	0.10 mg/kg dry wt.	U
7440-62-2	Vanadium, Total	0.034	0.10	0.10 mg/kg dry wt.	U

Pb 0.1375

03625

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714423-BLK1
File ID: 7120112-017
Prepared: 11/27/07 07:00
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 250 mL
Analyzed: 12/01/07 11:12
Instrument: 114
QC Batch: 0714423
Sequence: 7120112
Calibration: 7L03009

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.071	0.20	0.20 mg/kg dry wt.	U
7440-50-8	Copper, Total	0.044	0.20	0.0740 mg/kg dry wt.	J
7439-92-1	Lead, Total	0.022	0.20	0.20 mg/kg dry wt.	U
7440-02-0	Nickel, Total	0.036	0.10	0.10 mg/kg dry wt.	U
7782-49-2	Selenium, Total	0.089	0.30	0.30 mg/kg dry wt.	U
7440-22-4	Silver, Total	0.013	0.10	0.10 mg/kg dry wt.	U
7440-28-0	Thallium, Total	0.0049	0.10	0.10 mg/kg dry wt.	U
7440-62-2	Vanadium, Total	0.034	0.10	0.10 mg/kg dry wt.	U

Cu 0.37

03629

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Water
Laboratory ID: 0714426-BLK1
File ID: 7113030-024
Prepared: 11/27/07 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 11/30/07 14:04
Instrument: 114
QC Batch: 0714426
Sequence: 7113030
Calibration: 7L03010

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.74	3.0	3.0 ug/L	U
7440-39-3	Barium, Total	0.52	2.0	2.0 ug/L	U
7440-41-7	Beryllium, Total	0.31	2.0	2.0 ug/L	U
7440-43-9	Cadmium, Total	0.062	0.20	0.20 ug/L	U
7440-48-4	Cobalt, Total	0.096	1.0	1.0 ug/L	U
7440-50-8	Copper, Total	0.33	1.0	1.0 ug/L	U
7439-96-5	Manganese, Total	0.43	3.0	3.0 ug/L	U
7440-02-0	Nickel, Total	0.28	2.0	2.0 ug/L	U
7782-49-2	Selenium, Total	0.92	3.0	3.0 ug/L	U
7440-22-4	Silver, Total	0.12	0.50	0.50 ug/L	U
7440-62-2	Vanadium, Total	0.83	5.0	5.0 ug/L	U
7440-66-6	Zinc, Total	0.84	10	1.32 ug/L	J

Zn 6.6

03630

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Water
Laboratory ID: 0714543-BLK1
File ID: 7113030-019
Prepared: 11/29/07 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 11/30/07 13:45
Instrument: 114
QC Batch: 0714543
Sequence: 7113030
Calibration: 7L03010

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.74	3.0	3.0 ug/L	U
7440-39-3	Barium, Total	0.52	2.0	2.0 ug/L	U
7440-41-7	Beryllium, Total	0.31	2.0	2.0 ug/L	U
7440-43-9	Cadmium, Total	0.062	0.20	0.20 ug/L	U
7440-48-4	Cobalt, Total	0.096	1.0	1.0 ug/L	U
7440-50-8	Copper, Total	0.33	1.0	1.0 ug/L	U
7439-96-5	Manganese, Total	0.43	3.0	3.0 ug/L	U
7440-02-0	Nickel, Total	0.28	2.0	2.0 ug/L	U
7782-49-2	Selenium, Total	0.92	3.0	3.0 ug/L	U
7440-22-4	Silver, Total	0.12	0.50	0.50 ug/L	U
7440-62-2	Vanadium, Total	0.83	5.0	5.0 ug/L	U
7440-66-6	Zinc, Total	0.84	10	2.31 ug/L	J

Zn 11.55

: 03533

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

35SB2A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-42

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 3050B Digestion

Initial/Final: 0.5002 g / 250 mL

QC Batch: 0714077

Laboratory ID: 0714077-MS1

OK 75-125% ✓

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Arsenic, Total	20.0	3.59	19.3	78 *	80 - 120	mg/kg dry wt.
Copper, Total	20.0	20.5	36.7	81	80 - 120	mg/kg dry wt.
Lead, Total	20.0	54.2	71.9	89	80 - 120	mg/kg dry wt.
Nickel, Total	20.0	15.9	33.1	86	80 - 120	mg/kg dry wt.
Selenium, Total	20.0	0.370	14.7	72 *	80 - 120	mg/kg dry wt.
Silver, Total	20.0	0.270	18.2	90	75 - 120	mg/kg dry wt.
Thallium, Total	20.0	0.224	18.0	89	80 - 120	mg/kg dry wt.
Vanadium, Total	20.0	39.9	61.2	107	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

03636

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY
USEPA-6020A

35SB2A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

SDG: 36440-42
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Initial/Final: 0.5005 g / 250 mL

Laboratory ID: 0714077-MSD1
QC Batch: 0714077

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Arsenic, Total	20.0	18.8	76 *	2	20	80 - 120	mg/kg dry wt.
Copper, Total	20.0	36.6	80	0.3	20	80 - 120	mg/kg dry wt.
Lead, Total	20.0	70.1	80	3	20	80 - 120	mg/kg dry wt.
Nickel, Total	20.0	34.2	92	3	20	80 - 120	mg/kg dry wt.
Selenium, Total	20.0	14.7	72 *	0.3	20	80 - 120	mg/kg dry wt.
Silver, Total	20.0	18.4	91	1	20	75 - 120	mg/kg dry wt.
Thallium, Total	20.0	17.7	87	2	20	80 - 120	mg/kg dry wt.
Vanadium, Total	20.0	59.3	97	3	20	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

03637

SERIAL DILUTION
USEPA-6020A

35SB2A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
% Solids: 83.07
Laboratory ID: 7112789-SRD1
QC Batch: 7112789
Lab Source ID: 0711313-06
Sequence: 7112789

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Arsenic, Total	0.00717		0.00819		14.0 #		mg/L	10
Copper, Total	0.0411		0.0469		14.0	*	mg/L	10
Nickel, Total	0.0319		0.0359		13.0	*	mg/L	10
Selenium, Total	0.000740		0.00170	J	130.0 #		mg/L	10
Silver, Total	0.000541		0.000575	J	6.0 #		mg/L	10
Thallium, Total	0.000449		0.000480	J	7.0 #		mg/L	10
Vanadium, Total	0.0798		0.0866		9.0		mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

03663

SERIAL DILUTION
USEPA-6020A

35SB7B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
% Solids: 87.74
Laboratory ID: 7120112-SRD2
QC Batch: 7120112
Lab Source ID: 0711377-02
Sequence: 7120112

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Arsenic, Total	0.00297		0.00338		14.0 #		mg/L	10
Copper, Total	0.0229		0.0252		10.0		mg/L	10
Lead, Total	0.0260		0.0266		2.0		mg/L	10
Nickel, Total	0.0272		0.0303		11.0	*	mg/L	10
Selenium, Total	0.000235	J	0.0000200	U	91.0 #		mg/L	10
Silver, Total	0.000131	J	0.0000750	U	43.0 #		mg/L	10
Thallium, Total	0.000361		0.000300	J	17.0 #		mg/L	10
Vanadium, Total	0.0746		0.0825		11.0	*	mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 03665

URS

Page ____ of ____

Job ____ Project No. ____ Sheet ____ of ____

Description ____ Computed by ____ Date ____

____ Checked by ____ Date ____

Reference

Method 6020 Field Dups

	355B4A	and	DUP-1	RL	%RPD
As	2.4		3	0.2	OKV
Cu	18		17	0.2	OKV
Pb	97		70	0.4	32%V
Ni	16		15	0.1	6%V
Se	0.31		0.29	0.3	OKV
Ag	0.092		0.085	0.1	OKV
Tl	0.2		0.22	0.1	OKV
V	40		47	0.1	16%V
Sb	0.052		0.20	0.2	OKV

	355B5A	and	DUP-2	RL	RPD
As	3.8		3.4	0.2	OKV
Cu	73		68	0.4	7%V
Pb	240		300	2	22%V
Ni	27		23	0.1	16%V
Se	0.31		0.26	0.3	OKV
Ag	7.4		8.7	0.1	OKV
Tl	0.23		0.24	0.1	OKV
V	38		38	0.1	OKV
Sb	0.5		0.42	0.2	OKV

	375B9A	and	DUP-3	RL	%RPD
As	5.3		6	0.2	OKV
Cu	96		99	1	3%V
(Pb)	180		85	1	71%
Ni	27		34	0.1	23%
Se	0.097		0.3	0.3	OKV
Ag	0.14		0.17	0.1	OKV
Tl	0.092		0.094	0.1	OKV
V	18		21	0.1	15%
Sb	0.96		0.54	0.2	OKV

Quality Control Results – ICP/MS Metals

Calibration

All instrument calibrations and continuing calibrations were method-compliant. Note: instrument reports for ICP/MS include the listing of initial calibration correlation coefficients and internal standard recoveries; those values may either be imbedded with raw data from each run or included as a summary (also within the instrument printout).

Method Blanks

No target analytes were detected at a concentration greater than one-half the RL. Lead, Zinc, and Copper were detected at a concentration less than one-half the RL in separate blanks.

Note: Zinc is considered by TriMatrix to be a common laboratory contaminant.

Internal Standard Response

Internal standard responses for all standards, samples, and quality control samples were method-compliant.

Laboratory Control Samples

Each Laboratory Control Sample (LCS) and, for several batches, LCS Duplicates were fortified with all target analytes. All recoveries (and RPDs in the case of LCSDs) were in control.

Matrix Spikes

Sample 35SB2A was fortified with all target analytes. All recoveries and RPDs were in control with the exception of both recoveries for Arsenic (78%, 76%) and Selenium (72%, 72%).

Serial Dilutions and Post-Digestion Spikes

Serial dilution (SD) and post-digestion spike (PDS) analysis was performed on the sample employed for MS/MSD analysis as well as on sample 37SB7B; all values were in control with the exception of the SD values for Nickel and Vanadium for 37SB7B.

Note: the laboratory has been advised that if a second sample (in addition to that employed for MS/MSD) for PDS and SD is analyzed, it should be the same sample for both ICP and ICPMS.

Sample Results

Please see Section F.

Note: Method 6020A was the predominant method used for the analysis of target analytes for aqueous samples (including equipment blanks). This was discussed with the Client prior to receipt of any samples.

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Individual sample results relate only to the sample tested.

Quality Control Results – ICP/MS Metals – (continued)

Corrective Action

No corrective actions were deemed necessary.

Statements of Data Qualification

See Narrative Attachment 2.

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Individual sample results relate only to the sample tested.

METHOD BLANK DATA SHEET
USEPA-7471A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-42
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714583-BLK1
File ID: v30so-a2-037
Prepared: 11/29/07 17:00
Preparation: 7471A Mercury Digestior
Initial/Final: 0.3 g / 50 mL
Analyzed: 11/30/07 07:32
Instrument: 216
QC Batch: 0714583
Sequence: 7120118
Calibration: 7L01008

CAS No.	Analyte	MDL	MRL	Concentration	Q
7439-97-6	Mercury, Total	0.0075	0.050	0.00791 mg/kg dry wt.	J

0.0395

Quality Control Results – CVAA Hg

Note: Summary forms and raw data for Method 7470A for the aqueous equipment blanks) precedes the forms and raw data for Method 7471A for soil samples.

Calibration

All instrument calibrations and continuing calibrations were method-compliant.

Method Blank

Mercury was not detected at or above one-half the RL. Mercury was detected in one of the aqueous method blanks and in one of the soil method blanks at less than one-half the RL.

Laboratory Control Samples

Each Laboratory Control Sample (LCS) and, for one batch an LCS Duplicate, were fortified with all target analytes. All recoveries (and RPD in the case of LCSD) were in control.

Matrix Spikes

Sample 35SB2A was fortified with Mercury. Both recoveries and the RPD were in control.

Serial Dilution

Serial dilution analysis was not necessary.

Sample Results

Please see Section F.

Corrective Action

No corrective actions were deemed necessary.

Statements of Data Qualification

No statements were generated.

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Individual sample results relate only to the sample tested.

DATA VALIDATION WORKSHEET

Total Organic Carbon

Reviewer: RA
Date: 1/18/07
DV Level: II III IV

Project Name: RAAP 10
Project Number: 21354887
Laboratory: TN Matrix
SDG No.: 36440-42
Test Name: TOC
Method No.: Walkley Black

Review Document:

_X__ Region III Modified for National Functional Guidelines
_X__ Methods of Soil Analyses for soil by Walkley Black
_X__ Project QAPP/SAP

All QC OK ✓

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do sample preservation, collection and storage condition meet method requirement? (4C and <2)	✓		
	If samples were received with the cooler temperature exceeding 20 ^{O}C, then flag L(+)/UL(-).			
1.4	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Have any technical holding times (28 days), determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field / equipment blanks have positive results? If yes, use same rules above.			✓

Notes:

4.0 Calibration		Yes	No	NA
4.1	Was a titration blank analyzed before processing the samples?	✓		
4.2	Is titrant normality within 0.5 +/- 0.05N? If no, J/UJ	✓		

Notes:

5.0 Laboratory Control Sample (LCS)		Yes	No	NA
5.1	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.2	Are there any %R for LCS/LCSD recoveries outside the laboratory's QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
5.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.		✓	

Notes:

6.0 Laboratory Duplicate		Yes	No	NA
6.1	Was a laboratory duplicate analyzed at required frequency (one per 20 samples per batch) ?	✓		
6.2	Is the RPD within the laboratory's QC limits?	✓		
	If no, J flag positive results only.			

Notes:

7.0 Field Duplicate		Yes	No	NA
7.1	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended should be noted during data validation and discussed in the DV report.			

Notes:

8.0 Compound Identification and Detection Limit Verification		Yes	No	NA
8.1	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes:

9.0 Data Completeness		Yes	No	NA
9.1	Is % completeness for certainty? (Control limit 90%)	✓		
9.1.1	Number of samples:			
9.1.2	Number of target compounds in each analysis: 1			
9.1.3	Number of results that are uncertain at comparison criteria standard:			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%.			

Notes:

Quality Control Results – Wet Chemistry

Note: quality control summaries and raw data are presented in the following order in the data package.

Total Organic Carbon (TOC)
Percent Solids

Calibration

Instrument calibrations (i.e., analytical balance) were in control.

Method Blanks

The method blanks were in control.

Laboratory Control Sample (TOC)

The Laboratory Control Sample (LCS) was in control.

Matrix Spikes

Not applicable.

Laboratory Duplicates

TOC

Sample 35SB7B was analyzed in duplicate; the RPD was in control.

Percent Solids

Samples 35SB7A, 35SB2A, and 37SB7A were analyzed in duplicate; the RPDs were in control.

Sample Results

Please see Section G.

Corrective Actions

No corrective actions were needed.

Statements of Data Qualification

No statements were generated.

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Individual sample results relate only to the sample tested.

TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 121985

Page 1 of 2

For Lab Use Only
Cart: 4
VOA Rack/Tray:
Receipt Log No.: 5-9
Project Chemist: WSR
Laboratory Project No.: E 0711293

Client Name: URS / RFAAP
Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230
Phone: 804-965-9000
Fax: 804-965-9764

Project Name: RAAP 10RFI/CMS
Client Project No./P.O. No.: 21354887.20002
Invoice No.: ☐ ~~Client~~ ☐ Other (comments)
Contact/Report To: Tina DeVine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type (corresponds to Container Packing List)	Total	Sample Comments
										A A A A A		
										VOC / Metals / SVOC / PCB/Pest 8330/8332 / % Solids		
										Number of Containers Submitted		
0150			1 35 SB3A (0.5-1.5ft) depth removed per Client 11/14/07 wn	TM1021	11-12-07	~~1600~~		✓	S	B ✓ ✓ ✓ ✓	7	See comment below wn
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

PRESERVATIVES
A NONE pH~5
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp

How Shipped? Hand Carrier FedEx
Tracking No.

Comments: "A" added to Field Sample ID per Client 11/14/07

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	11-12-07	1714						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						Kim Ziegler	11-13-07	8:45

TriMatrixCOC -- COC WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

Fed Ex

TriMatrix Laboratories, Inc.

SAMPLE RECEIVING / LOG-IN CHECKLIST

Client: URS | Project-Submittal No.: new / add to E 0711293
Receipt Record Page/Line No.: 5-9 | Project Chemist: WR | Sample Nos.:

Coolers Received

Recorded by (initials/date): KZ 11-13-07

☑ Cooler ☐ Box ☐ Other ____ | Qty Received: 1

☑ IR Gun (#94) | Thermometer Used ☐ Digital Thermometer (#54) ☐ Other (#____) | ☐ See Additional Cooler Information Form

Cooler No. / Time	Cooler No. / Time	Cooler No. / Time	Cooler No. / Time
TM 1021 / 9:45			
Custody Seals			
☐ none	☐ none	☐ none	☐ none
☑ present / intact	☐ present / intact	☐ present / intact	☐ present / intact
☐ present / not intact	☐ present / not intact	☐ present / not intact	☐ present / not intact
Coolant Location:			
(Dispersed) / Top / Middle / Bottom	Dispersed / Top / Middle / Bottom	Dispersed / Top / Middle / Bottom	Dispersed / Top / Middle / Bottom
Coolant/Temperature Taken Via:			
☑ loose ice / avg 2-3 containers	☐ loose ice / avg 2-3 containers	☐ loose ice / avg 2-3 containers	☐ loose ice / avg 2-3 containers
☐ bagged ice / avg 2-3 containers	☐ bagged ice / avg 2-3 containers	☐ bagged ice / avg 2-3 containers	☐ bagged ice / avg 2-3 containers
☐ blue ice / avg 2-3 containers	☐ blue ice / avg 2-3 containers	☐ blue ice / avg 2-3 containers	☐ blue ice / avg 2-3 containers
☐ none / avg 2-3 containers	☐ none / avg 2-3 containers	☐ none / avg 2-3 containers	☐ none / avg 2-3 containers
Alternate Temperature Taken Via:			
☑ temperature blank (tb)	☐ temperature blank (tb)	☐ temperature blank (tb)	☐ temperature blank (tb)
☐ 1 container	☐ 1 container	☐ 1 container	☐ 1 container
Recorded °C / Correction Factor °C / Actual °C	Recorded °C / Correction Factor °C / Actual °C	Recorded °C / Correction Factor °C / Actual °C	Recorded °C / Correction Factor °C / Actual °C
tb: 1.4 / — / 1.4	tb:	tb:	tb:
tb location: representative / (in ice)	tb location: representative / in ice	tb location: representative / in ice	tb location: representative / in ice
1: 5.8 / — / 5.8	1:	1:	1:
2: 5.9 / — / 5.9	2:	2:	2:
3: 4.8 / — / 4.8	3:	3:	3:
Average °C: 5.5	**Average °C**:	**Average °C**:	**Average °C**:
☑ Cooler ID on COC?	☐ Cooler ID on COC?	☐ Cooler ID on COC?	☐ Cooler ID on COC?
☐ VOC trip blank received?	☐ VOC trip blank received?	☐ VOC trip blank received?	☐ VOC trip blank received?

If any shaded areas checked, complete Sample Receiving Non-Conformance Form

Paperwork Received

☐ No COC received

N/A	Yes	No	
	☑	☐	**Chain of Custody Record(s)?**
	☐		If No, COC initiated by ____
	☑		Rec'd for Lab signed/date/time?
☐	☑		Shipping Document?
☑	☐		Other ____

COC ID Nos.

☑ TriMatrix 121985

☐ Other (name or ID#) ____

Check COC for Accuracy

☐ No analysis requested

Yes	No	
☑	☐	Sample ID matches COC?
☑	☐	Sample date and time matches COC?
☑		Container type completed on COC?
☑	☐	All container types indicated are received?

Sample Condition Summary

☐ Non-TriMatrix containers, see Notes

N/A	Yes	No	
		☑	Broken containers/lids?
		☑	Missing or incomplete labels?
		☑	Illegible information on labels?
		☑	Low volume received?
		☑	Inappropriate containers received?
☑		☐	VOC vials have headspace?
☐		☑	Extra sample locations / containers not listed on COC?

Check Sample Preservation

N/A	Yes	No	
	☑	☐	Average sample temperature ≤6° C?
☑	☐		Completed Sample Preservation Verification Form?
☑	☐		Samples preserved correctly?
☑	☐		If "No", added orange tag?
☑	☐		Received pre-preserved VOC soils?

☐ MeOH ☐ Na_2SO_4

Check for Short Hold-Time Prep/Analyses

☐ Bacteriological
☐ Air Bags
☑ EnCores Methanol Pre-Preserved
☐ Formaldehyde/Aldehyde
☐ Green-tagged Containers
☐ Yellow/White-tagged 1L Ambers (SV Prep-Lab)

AFTER HOURS ONLY:
COPIES OF COC TO LAB AREA(S)
☐ NONE RECEIVED
☑ RECEIVED, COCs TO LAB(S)

Notes

☐ Trip blank received ☐ Trip blank not listed on COC
☐ No COC received, Proj. Chemist reviewed (init./date) ____
☐ No analysis requested, Proj. Chemist completed (init./date) ____

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
11-13-07 845	11-13-07 1000	Yes / (No)

TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 121983 (1)

Page 1 of 1

For Lab Use Only

Cart: L
VOA Rack/Tray: 614 R.
Receipt Log No.: 7-14
Project Chemist: WJR
Laboratory Project No.: E 071313

Client Name: URS / RFAAP
Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230
Phone 804-965-9000
Fax 804-965-9744

Project Name: RAAP 10 RFI/CMS
Client Project No./P.O. No.: 21354887.20002
Invoice No.: ☑ Client ☐ Other (comments)
Contact/Report To: Tina DeVine

Analyses Requested

Container Type (corresponds to Container Packing List)

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	VOC	Metals	SVOC	PCB	Pesticides	Explosives 8330	Nitroglycerin & PETN	Total	Sample Comments
			Number of Containers Submitted							1	6	2	2	2	2	2		
G4	WQ	01	1 EQBK-1	TM 1865	11/13/07	16:00				2	4	2	4	1	4	4	9	
05	WQ	02	2 Trip Blank							1							1	
			3															
			4															
			5															
			6															
			7															
			8															
			9															
			10															

See Comment below WR

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp.

How Shipped? Hand Carrier FedEx
Tracking No.

Comments: Cooler ID = TM 1865
Sample date = 11/13/07
Sample time = 16:00
} for Trip Blank WR

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	11-13-07	1718						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						Kim Ziegler	11-14-07	9:00

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TriMatrix Laboratories, Inc.

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Chain of Custody Record

COC No. 121988 (2)

Page 1 of 1

For Lab Use Only
Cart: 4
VOA Rack/Tray:
Receipt Log No.: 7-14
Project Chemist: WJR
Laboratory Project No.: E 071313

Client Name: URS/RFAAP
Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230
Phone: 804-965-9000
Fax: 804-965-9764

Project Name: RAAP 10 RFI/CMS
Client Project No./P.O. No.: 21354887.20002
Invoice No.: ☒ Client ☐ Other (comments)
Contact/Report To: Tina DeVine

Analyses Requested

Container Type (corresponds to Container Packing List): 21 16 17 17 20 17 17

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	VOC	Metals	SVOC	PCB/PEST 8330/8332	% Solids	SVOC (MS/MSD)	PCB/PEST (MS/MSD)	Total	Sample Comments
				Number of Containers Submitted							3	4	1	1	1				
01	SO	03	1	355B4 (0.5-1.5ft)	TM 1395	11/13/07	0750		X	S	3	4	1	1	1			7	355B4A
02	SO	04	2	DUP 1 (0.5-1.5ft)	TM 1395	11/13/07	—		X	S	3	1	1	1	1			7	DUP-1
01	SO	05	3	355B1 (0.5-1.5ft)	TM 1395	11/13/07	0825		X	S	3	1	1	1	1			7	355B1A
03	SO	06	4	355B2 MS/MSD (0-1ft)	TM 1395	11/13/07	0920		X	S	3	1	1	1	3	1	1	17	355B2A
01	SO	07	5	355B6 (0-1ft)	TM 1395	11/13/07	14:45		X	S	3	1	1	1	1			7	355B6A
01	SO	08	6	355B6 (6-8ft)	TM 1395	11/13/07	14:55		X	S	3	1	1	1	1			7	355B6B
01	SO	09	7	355B6 (14-16ft)	TM 1395	11/13/07	15:05		X	S	3	1	1	1	1			7	355B6C
			8																
			9	DO NOT INCLUDE "MS/MSD" in sample name for 355B2A															
			10		WR														

Modify sample names per sample comments and follow name with listed depth range — Per client 11/14/07 (WR)

Page 1 of 1

⇦ PRESERVATIVES
A NONE pH>2
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature:
Company: URS Corp

How Shipped? Hand Carrier FedEx
Tracking No.

Comments: SVOC (MS/MSD) – 500 ml um glass
PCB/Pest (MS/MSD) – 500 ml um glass
DUP 1 sample time – use 0800 hrs (WR)

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	11-13-07	1720						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						Kim Ziegler	11-14-07	9:00

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Chain of Custody Record

COC No. 121987 (3)

Page 1 of 1

For Lab Use Only
Cart 4
VOA Rack/Tray
Receipt Log No. 714
Project Chemist WDR
Laboratory Project No. E 071313

Client Name	Project Name
URS/RFAAP	RAAP 10 RFI/CMS
Address: 5540 Falmouth St., Suite 201	Client Project No./P.O. No.: 21354887.20002
Richmond, VA 23230	Invoice No. ☒ Client ☐ Other (comments)
Phone 804-965-9000	Contact/Report To: Tina DeVine
Fax 804-965-9764	

Analyses Requested

Container Type (corresponds to Container Packing List): 21 | 16 | 17 | 17 | 20

PRESERVATIVES: A NONE pH>5; B HNO_3 pH<2; C H_2SO_4 pH<2; D 1+1 HCl pH<2; E NaOH pH>12; F ZnAc/NaOH pH>9; G MeOH; H Other (note below)

	Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	VOC	Metals	SVOC	PCB/Pest 8330/8332	% Solids	Number of Containers Submitted	Total	Sample Comments
1	01	SO	10	355B9 (0-1 ft)	TM 1346	11/13/07	10:45		X	S	3	1	1	1	1	7	7	355B9A
2	01	SO	11	355B9 (5-8 ft)	TM 1346	11/13/07	12:10		X	S	3	1	1	1	1	7	7	355B9B
3	01	SO	12	355B9 (14-16 ft)	TM 1346	11/13/07	12:00		X	S	3	1	1	1	1	7	7	355B9C
4	01	SO	13	355B10 (0-1 ft)	TM 1346	11/13/07	13:30		X	S	3	1	1	1	1	7	7	355B10A
5	01	SO	14	355B10 (6-8 ft)	TM 1346	11/13/07	13:38		X	S	3	1	1	1	1	7	7	355B10B
6	01	SO	15	355B10 (14-16 ft)	TM 1346	11/13/07	13:45		X	S	3	1	1	1	1	7	7	355B10C
7																		
8																		
9																		
10																		

Modify sample names per sample comment and follow name with listed depth range — per client 11/14/07 (WR)

Sampled By (print): J. M Carter
Sampler's Signature:
Company: URS Corp.

How Shipped? Hand Carrier FedEx
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	11-13-07	17:19						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						Kim Ziegler	11-14-07	9:00

FedEx

TriMatrixCOC -- COC WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

TriMatrix Laboratories, Inc.

SAMPLE RECEIVING / LOG-IN CHECKLIST

Client: URS
Receipt Record Page/Line No.: 7-4
Project-Submittal No.: new / add to E 0711313
Project Chemist: VAR
Sample Nos.:

Coolers Received

Recorded by (initials/date): Kz 11-14-07

- [x] Cooler
- [ ] Box
- [ ] Other

Qty Received: 3

Thermometer Used: [x] IR Gun (#94) [ ] Digital Thermometer (#54) [ ] Other (#_____)

[ ] See Additional Cooler Information Form

Cooler No. Tm 1865 — Time 10:45

Custody Seals
- [ ] none
- [x] present / intact
- [ ] present / not intact

Coolant Location: Dispersed / Top / Middle / Bottom

Coolant/Temperature Taken Via:
- [x] loose ice / avg 2-3 containers
- [ ] bagged ice / avg 2-3 containers
- [ ] blue ice / avg 2-3 containers
- [ ] none / avg 2-3 containers

Alternate Temperature Taken Via:
- [x] temperature blank (tb)
- [ ] 1 container

	Recorded °C	Correction Factor °C	Actual °C
tb	0.9	—	0.9
tb location: representative / in ice			
1	1.2	—	1.2
2	0.9	—	0.9
3	2.1	—	2.1
Average °C			

- [x] Cooler ID on COC?
- [x] VOC trip blank received?

Cooler No. Tm 1393 — Time 10:50

Custody Seals
- [ ] none
- [x] present / intact
- [ ] present / not intact

Coolant Location: Dispersed / Top / Middle / Bottom

Coolant / Temperature Taken Via:
- [x] loose ice / avg 2-3 containers
- [ ] bagged ice / avg 2-3 containers
- [ ] blue ice / avg 2-3 containers
- [ ] none / avg 2-3 containers

Alternate Temperature Taken Via:
- [x] temperature blank (tb)
- [ ] 1 container

	Recorded °C	Correction Factor °C	Actual °C
tb	1.3	—	1.3
tb location: representative / in ice			
1	2.4	—	2.4
2	2.7	—	2.7
3	2.0	—	2.0
Average °C			2.4

- [x] Cooler ID on COC?
- [ ] VOC trip blank received?

Cooler No. TM 1345 — Time 11:00

Custody Seals
- [ ] none
- [x] present / intact
- [ ] present / not intact

Coolant Location: Dispersed / Top / Middle / Bottom

Coolant / Temperature Taken Via:
- [x] loose ice / avg 2-3 containers
- [ ] bagged ice / avg 2-3 containers
- [ ] blue ice / avg 2-3 containers
- [ ] none / avg 2-3 containers

Alternate Temperature Taken Via:
- [x] temperature blank (tb)
- [ ] 1 container

	Recorded °C	Correction Factor °C	Actual °C
tb	1.2	—	1.2
tb location: representative / in ice			
1	1.2	—	1.2
2	3.6	—	3.6
3	2.1	—	2.1
Average °C			2.3

- [x] Cooler ID on COC?
- [ ] VOC trip blank received?

Cooler No. ____ — Time ____

Custody Seals
- [ ] none
- [ ] present / intact
- [ ] present / not intact

Coolant Location: Dispersed / Top / Middle / Bottom

Coolant / Temperature Taken Via:
- [ ] loose ice / avg 2-3 containers
- [ ] bagged ice / avg 2-3 containers
- [ ] blue ice / avg 2-3 containers
- [ ] none / avg 2-3 containers

Alternate Temperature Taken Via:
- [ ] temperature blank (tb)
- [ ] 1 container

	Recorded °C	Correction Factor °C	Actual °C
tb			
tb location: representative / in ice			
1			
2			
3			
Average °C			

- [ ] Cooler ID on COC?
- [ ] VOC trip blank received?

If any shaded areas checked, complete Sample Receiving Non-Conformance Form

Paperwork Received

[ ] No COC received

N/A	Yes	No	
	[x]	[ ]	Chain of Custody Record(s)?
	[ ]		If No, COC initiated by _____
	[x]		Rec'd for Lab signed/date/time?
[ ]	[x]		Shipping Document?
[x]	[ ]		Other _____

COC ID Nos.

[x] TriMatrix 121983, 121988, 121987

[ ] Other (name or ID#)_____

Check COC for Accuracy

[ ] No analysis requested

Yes	No	
[x]	[ ]	Sample ID matches COC?
[x]	[ ]	Sample date and time matches COC?
[x]	[ ]	Container type completed on COC?
[ ]	[x]	All container types indicated are received?

Sample Condition Summary

[ ] Non-TriMatrix containers, see Notes

N/A	Yes	No	
		[x]	Broken containers/lids?
		[x]	Missing or incomplete labels?
		[x]	Illegible information on labels?
		[x]	Low volume received?
		[x]	Inappropriate containers received?
[ ]		[x]	VOC vials have headspace?
[ ]		[x]	Extra sample locations / containers not listed on COC?

Check Sample Preservation

N/A	Yes	No	
	[x]	[ ]	Average sample temperature ≤6° C?
[ ]	[x]		Completed Sample Preservation Verification Form?
[ ]	[x]	[ ]	Samples preserved correctly?
[x]	[ ]		If "No", added orange tag?
[x]	[ ]		Received pre-preserved VOC soils?

[ ] MeOH [ ] Na_2SO_4

Check for Short Hold-Time Prep/Analyses

- [ ] Bacteriological
- [ ] Air Bags
- [ ] EnCores / Methanol Pre-Preserved
- [ ] Formaldehyde/Aldehyde
- [x] Green-tagged Containers
- [ ] Yellow/White-tagged 1L Ambers (SV Prep-Lab)

metals

AFTER HOURS ONLY:
COPIES OF COC TO LAB AREA(S)
- [ ] NONE RECEIVED
- [x] RECEIVED, COCs TO LAB(S)

Notes

- [ ] Trip blank received [ ] Trip blank not listed on COC
- [ ] No COC received, Proj. Chemist reviewed (init./date) _____
- [ ] No analysis requested, Proj. Chemist completed (init./date) _____

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
11-14-07 9:00	11-14-07 11:20	Yes (No)

TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
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www.trimatrixlabs.com

Chain of Custody Record

COC No. 121982 (1)

Page 1 of 1

For Lab Use Only
Cart: metals
VOA Rack/Tray: 454 B
Receipt Log No.: 11-4
Project Chemist: WVR
Laboratory Project No.: E-071137

Client Name: URS / RFAAP
Address: 5540 Falmouth St., Suite 201
Richmond VA 23230
Phone 804-965-9000
Fax 804-965-9764

Project Name: RAAP 10 RFI/CMS
Client Project No./P.O. No.: 21354887.2002
Invoice No. ☒ Client ☐ Other (comments)
Contact/Report To: Tina DeVine

Analyses Requested

⇦ PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type (corresponds to Container Packing List)										Total	Sample Comments
											A	A	A	A	A							
											VOC	Metals	SVOC	PCB/PEST 8330	% Solids							
											Number of Containers Submitted											
01	SO	01	1	35SB7A (0-1ft) (WVR)	TM1557	11-14-07	0800		X	S	3	1	1	1	1						7	
01	SO	02	2	35SB7B (6-8ft)		11-14-07	0808		X	S	3	1	1	1	1						7	
01	SO	03	3	35SB7C (13.5-15.5ft)		11-14-07	0825		X	S	3	1	1	1	1						7	
01	SO	04	4	35SB5A (0-1ft)		11-14-07	10:10		X	S	3	1	1	1	1						7	
01	SO	05	5	35SB5B (9-11ft)		11-14-07	10:23		X	S	3	1	1	1	1						7	
01	SO	06	6	35SB5C (14-16ft)		11-14-07	10:27		X	S	3	1	1	1	1						7	
02	SO	07	7	DUP-2		11-14-07	— *		X	S	3	1	1	1	1						7	
			8																			
			9																			
			10																			

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp

How Shipped? Hand Carrier FedEx
Tracking No.

Comments: Do not include sample depths in sample name - per client 11/15/07 (WVR)
* Change DUP-2 sample time to 10:00 (WVR 11/15)

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	11-14-07	1717						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						Kim Zieger	11-15-07	8:45

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TriMatrix Laboratories, Inc.

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Chain of Custody Record

COC No. 121980 (2)

Page 1 of 4

For Lab Use Only
Cart: Metals
VOA Rack/Tray: 454 B
Receipt Log No.: 11-4
Project Chemist: WSR
Laboratory Project No.: E-071377

Client Name: URS/RFAAP
Address: 5540 Falmouth St., Suite 201, Richmond, VA 23230
Phone: 804-965-9000
Fax: 804-965-9764

Project Name: RAAP 10 RFI/CMS
Client Project No./P.O. No.: 21354887.2002
Invoice No.: ☑ Client ☐ Other (comments)
Contact/Report To: Tina DeVine

Analyses Requested

PRESERVATIVES: A NONE pH~5; B HNO_3 pH<2; C H_2SO_4 pH<2; D 1+1 HCl pH<2; E NaOH pH>12; F ZnAc/NaOH pH>9; G MeOH; H Other (note below)

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	A VOC (21)	A Metals (16)	A SVOC (17)	A PCB/Pest 8330/8332 (17)	A % Solids (20)	A TOC (20)	A TCLP (Full List)+ Explosives (16/18)	A Paint Filter, Ph (16)	A TCLP Full List + pH (16/17)	Total	Sample Comments
01	SO	08	1 35SB8A (0-1ft)	TM1578	11/14/07	11:05		X	S	3	4	4	4	4					7	
01	SO	09	2 35SB8B (9-11ft)		11/14/07	11:15		X	S	3	4	4	4	4					7	
01	SO	10	3 35SB8C (14-16ft)		11/14/07	11:20		X	S	3	4	4	4	4					7	
06	SO	11	4 35SB7A (0-4ft) Physical Sample		11/14/07	0838		X	S						4				1	
06	SO	12	5 35SB7B (4-8ft) Physical Sample		11/14/07	0840		X	S						4				1	
			~~6 SWMU 35-IDW~~		11/14/07	11:50	X		S							3	1		4	MF
Logged into Sample work order			7 SWMU 35 (SC) sludge composite		11/14/07	11:35	X		S									3	3	35COMP
			8																	
			9																	
			10																	

See sample comment for name change per client 11/15/07 (WR)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp

How Shipped? Hand Carrier FedEx
Tracking No.

Comments: Do not include sample depths in sample name - per client 11/15/07 (WR)

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	11-14-07	1708						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						Kim Ziegler	11/15/07	845

TriMatrixCOC -- COC WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

TriMatrix Laboratories, Inc.

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Chain of Custody Record

COC No. 121981 (3)

Page 1 of 1

For Lab Use Only

Cart: Metals
VOA Rack/Tray: 454 B
Receipt Log No.: 11-4
Project Chemist: WDR
Laboratory Project No.: E-071377

Client Name: URS / RFAAP
Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230
Phone 804-965-9000
Fax 804-965-9764

Project Name: RAAP 10 RFI/CMS
Client Project No./P.O. No.: 21354887.22002
Invoice No.: ☑ Client ☐ Other (comments)
Contact/Report To: Tina DeVine

Analyses Requested

Container Type (corresponds to Container Packing List): 16 17 20

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Number of Containers Submitted: Metals	PCB/PEST 8330/8332	% Solids	Total	Sample Comments
07	SO	13	1	37SB10A (0-1 ft)	TM1578	11/14/07	13:45		X	S	1	1	1	3	
07	SO	14	2	37SB10B (4-5 ft)		11/14/07	13:47		X	S	1	1	1	3	
07	SO	15	3	37SB10C (7-8 ft)		11/14/07	13:47		X	S	1	1	1	3	
07	SO	16	4	37SB9A (0-1 ft)		11/14/07	14:30		X	S	1	1	1	3	
07	SO	17	5	37SB9B (2-3 ft)		11/14/07	14:30		X	S	1	1	1	3	
07	SO	18	6	37SB9C (7-8 ft)		11/14/07	14:35		X	S	1	1	1	3	
08	SO	19	7	DUP-3					X	S	1	1	1	3	
			8												
			9												
			10												

PRESERVATIVES
A NONE pH>2
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp.

How Shipped? Hand Carrier FedEx
Tracking No.: ~~170~~

Comments: DUP-3 sample date and sample time assigned as 11/14/07 @ 14:00 per TriMatrix (WR) Do not include sample depths in sample name - per client 11/15/07.

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	11-14-07	1708						

1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						Kim Ziegler	11/15/07	845

TriMatrixCOC -- COC WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

TriMatrix Laboratories, Inc.

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Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 121979 4

Page 1 of 1

For Lab Use Only
Cart: Metals
VOA Rack/Tray: 454B
Receipt Log No.: 11-4
Project Chemist: WR
Laboratory Project No.: E-071377

Client Name: URS/RFAAP
Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230
Phone 804-965-9000
Fax 804-965-9764

Project Name: RAAD 10 RI/CMS
Client Project No./P.O. No.: 21354887.20002
Invoice No. ~~Client~~ ☐ Other (comments)
Contact/Report To: Tina DeVine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals	PCB/PEST 8330/8082	% Solids	VOC	Metals	SVOC	PCB	Pesticides	Explosives 8330	Nitroglycerin PETN	Total	Sample Comments
			Container Type (corresponds to Container Packing List)							A	A	A	D	B	A	A	A	A	A		
			Number of Containers Submitted							16	17	20	1	6	2	2	2	2	2		
07	SO	20	1 375B7A (0-1 ft)	Tan565	11/14/07	15:10		X	S	1	1	1								3	
07	SO	21	2 375B7B (5.5-6.5 ft)		11/14/07	15:15		X	S	1	1	1								3	
07	SO	22	3 375B7C (7-8 ft)		11/14/07	15:15		X	S	1	1	1								3	
04	WQ	23	4 EQBK-2		11/14/07	16:00							2	1	2	1	1	1	1	9	
05	WQ	24	5 Trip Blank		11/14/07	16:00							1							1	
			6																		
			7																		
			8																		
			9																		
			10																		

Preservatives: A NONE pH~; B HNO_3 pH<2; C H_2SO_4 pH<2; D 1+1 HCl pH<2; E NaOH pH>12; F ZnAc/NaOH pH>9; G MeOH; H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp

How Shipped? Hand Carrier FedEx
Tracking No.

Comments: Do not include sample depths in sample name - per Client 11/15/07 (WR)

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	11-14-07	1724						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						Kim Ziegler	11-15-07	845

TriMatrix Laboratories, Inc.

SAMPLE RECEIVING / LOG-IN CHECKLIST

Client: URS | Project-Submittal No.: new / add to E-07 11377
Receipt Record Page/Line No.: 11-4 | Project Chemist: WOR | Sample Nos.:

Coolers Received

Recorded by (initials/date): LEW 11-15-07

☒ Cooler ☐ Box ☐ Other ____ | Qty Received: 3

☒ IR Gun (#94) | Thermometer Used ☐ Digital Thermometer (#54) ☐ Other (#____) | ☐ See Additional Cooler Information Form

Cooler No.	Time	Custody Seals	Coolant Location	Coolant/Temperature Taken Via	Alternate Temperature Taken Via
TM1378	9:15	☐ none ☑ present / intact ☐ present / not intact	(Dispersed) / Top / Middle / Bottom	☒ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☒ temperature blank (tb) ☐ 1 container
TM1568	9:25	☐ none ☑ present / intact ☐ present / not intact	(Dispersed) / Top / Middle / Bottom	☒ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☒ temperature blank (tb) ☐ 1 container
TM1559	9:30	☐ none ☑ present / intact ☐ present / not intact	(Dispersed) / Top / Middle / Bottom	☒ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☒ temperature blank (tb) ☐ 1 container
		☐ none ☐ present / intact ☐ present / not intact	Dispersed / Top / Middle / Bottom	☐ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☐ temperature blank (tb) ☐ 1 container

Recorded °C	Correction Factor °C	Actual °C	Recorded °C	Correction Factor °C	Actual °C	Recorded °C	Correction Factor °C	Actual °C	Recorded °C	Correction Factor °C	Actual °C
tb 1.1	—	1.1	tb 0.3	—	0.3	tb 1.4	—	1.4	tb		
tb location: representative / in ice			tb location: representative / in ice			tb location: representative / in ice			tb location: representative / in ice		
1 2.2	—	2.2	1 2.4	—	2.4	1 1.9	—	1.9	1		
2 2.3	—	2.3	2 2.7	—	2.7	2 1.9	—	1.9	2		
3 2.1	—	2.1	3 2.4	—	2.4	3 2.0	—	2.0	3		
	Average °C	1.5		Average °C	2.5		Average °C	1.9		Average °C	
☑ Cooler ID on COC?			☑ Cooler ID on COC?			☑ Cooler ID on COC?			☐ Cooler ID on COC?		
☐ VOC trip blank received?			☐ VOC trip blank received?			☑ VOC trip blank received?			☐ VOC trip blank received?		

If any shaded areas checked, complete Sample Receiving Non-Conformance Form

Paperwork Received

☐ No COC received

N/A	Yes	No	
	☑	☐	**Chain of Custody Record(s)?**
	☐	☑	If **No**, COC initiated by ____
	☑		Rec'd for Lab signed/date/time?
☐	☑		Shipping Document?
☐	☐		Other ____

COC ID Nos.

☑ TriMatrix 121982, 121980, 121981, 121979

☐ Other (name or ID#) ____

Check COC for Accuracy

☐ No analysis requested

Yes	No	
☑	☐	Sample ID matches COC?
☑	☐	Sample date and time matches COC?
☑		Container type completed on COC?
☑	☐	All container types indicated are received?

Sample Condition Summary

☐ **Non-TriMatrix containers, see Notes**

N/A	Yes	No	
	☐	☑	Broken containers/lids?
	☐	☑	Missing or incomplete labels?
	☐	☑	Illegible information on labels?
	☐	☑	Low volume received?
	☐	☑	Inappropriate containers received?
☐	☐	☑	VOC vials have headspace?
☐	☐	☑	Extra sample locations / containers not listed on COC?

Check Sample Preservation

N/A	Yes	No	
	☑	☐	Average sample temperature ≤6° C?
☐	☑		Completed Sample Preservation Verification Form?
☐	☑	☐	Samples preserved correctly?
☑	☐		If "No", added orange tag?
☑	☐		Received pre-preserved VOC soils?

☐ MeOH ☐ Na_2SO_4

Check for Short Hold-Time Prep/Analyses

☐ Bacteriological ☑ Vol.
☐ Air Bags
☐ EnCores / Methanol Pre-Preserved
☐ Formaldehyde/Aldehyde
☑ Green-tagged Containers
☐ Yellow/White-tagged 1L Ambers (SV Prep-Lab)

AFTER HOURS ONLY:
COPIES OF COC TO LAB AREA(S)
☐ NONE RECEIVED
☑ RECEIVED, COCs TO LAB(S)

Notes

Sample on line 7, COC 121980 will be logged into a separate work order & SDG (WR)

☑ Trip blank received ☐ Trip blank not listed on COC
☐ No COC received, Proj. Chemist reviewed (init./date) ____
☐ No analysis requested, Proj. Chemist completed (init./date) ____

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
11-15-07 8:45	11-15-07 9:45	(Yes) No

SDG CASE NARRATIVE

URS Corporation
Radford Army Ammunition Plant
RAAP 10 RFI/CMS
Soil Investigation

SDG – 36440-42
JANUARY 14, 2008

This case narrative is applicable to soil and equipment blank samples collected from RAAP 10 at Radford Army Ammunition Plant (the Site), Radford, Virginia by URS Corporation (the Client) and received by TriMatrix Laboratories, Inc. (TriMatrix) on November 13, 14, and 15, 2007. The samples were assigned to TriMatrix project sample delivery group (SDG) 36440-42 for analytical services (the Project) to be performed according to:

a) URS Project #11656421.80000, Subcontract NCA-07-1107, Work Order # 004.

b) the Scope of Work (SOW) for the above,

c) Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 3, January 2006 (by reference)

d) any verbal and written correspondence between the Client and TriMatrix as the Project progressed.

No part of this Project was subcontracted.

Field Sample and Assigned Laboratory Sample ID Summary

For the samples received, a field sample to laboratory sample ID cross-reference table follows below and on the next page.

Field Sample Name	Sample Matrix	Laboratory Sample ID	Date Sampled	Date Received
35SB3A	Soil	0711293-01	11/12/07	11/13/07
EQBK-1	Water	0711313-01	11/13/07	11/14/07
Trip Blank	Water	0711313-02	11/13/07	11/14/07
35SB4A	Soil	0711313-03	11/13/07	11/14/07
DUP-1	Soil	0711313-04	11/13/07	11/14/07
35SB1A	Soil	0711313-05	11/13/07	11/14/07
35SB2A	Soil	0711313-06	11/13/07	11/14/07
35SB6A	Soil	0711313-07	11/13/07	11/14/07
35SB6B	Soil	0711313-08	11/13/07	11/14/07
35SB6C	Soil	0711313-09	11/13/07	11/14/07
35SB9A	Soil	0711313-10	11/13/07	11/14/07
35SB9B	Soil	0711313-11	11/13/07	11/14/07

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Individual sample results relate only to the sample tested.

Field Sample and Assigned Laboratory Sample ID Summary – (continued)

Field Sample Name	Sample Matrix	Laboratory Sample ID	Date Sampled	Date Received
35SB9C	Soil	0711313-12	11/13/07	11/14/07
35SB10A	Soil	0711313-13	11/13/07	11/14/07
35SB10B	Soil	0711313-14	11/13/07	11/14/07
35SB10C	Soil	0711313-15	11/13/07	11/14/07
35SB7A	Soil	0711377-01	11/14/07	11/15/07
35SB7B	Soil	0711377-02	11/14/07	11/15/07
35SB7C	Soil	0711377-03	11/14/07	11/15/07
35SB5A	Soil	0711377-04	11/14/07	11/15/07
35SB5B	Soil	0711377-05	11/14/07	11/15/07
35SB5C	Soil	0711377-06	11/14/07	11/15/07
DUP-2	Soil	0711377-07	11/14/07	11/15/07
35SB8A	Soil	0711377-08	11/14/07	11/15/07
35SB8B	Soil	0711377-09	11/14/07	11/15/07
35SB8C	Soil	0711377-10	11/14/07	11/15/07
35SB7A	Soil	0711377-11	11/14/07	11/15/07
35SB7B	Soil	0711377-12	11/14/07	11/15/07
37SB10A	Soil	0711377-13	11/14/07	11/15/07
37SB10B	Soil	0711377-14	11/14/07	11/15/07
37SB10C	Soil	0711377-15	11/14/07	11/15/07
37SB9A	Soil	0711377-16	11/14/07	11/15/07
37SB9B	Soil	0711377-17	11/14/07	11/15/07
37SB9C	Soil	0711377-18	11/14/07	11/15/07
DUP-3	Soil	0711377-19	11/14/07	11/15/07
37SB7A	Soil	0711377-20	11/14/07	11/15/07
37SB7B	Soil	0711377-21	11/14/07	11/15/07
37SB7C	Soil	0711377-22	11/14/07	11/15/07
EQBK-2	Water	0711377-23	11/14/07	11/15/07
Trip Blank	Water	0711377-24	11/14/07	11/15/07

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Sample Receipt and Log-in

There were three receipt events.

Receipt Event One

On November 13, 2007 at 08:45 hrs, one sample cooler containing one soil sample was received at TriMatrix via FedEx (the carrier). The cooler had been shipped from the Site on November 12.

The external custody seal affixed to the cooler was intact. The sample was received on ice and in good condition. The receipt temperature of the interior of the cooler was measured via a 'temperature blank' shipped in it; the measured temperature, in °C, was 1.4.

Shipping documents included one field chain-of-custody (COC) and associated carrier air bill. Per discussion with the Client, the field sample ID was modified as indicated on the COC.

The sample was assigned to Work Order 0711293 and SDG 36440-42.

Receipt Event Two

On November 14, 2007 at 09:00 hrs, three sample coolers containing multiple soil samples, an equipment blank, and a trip blank were received at TriMatrix via FedEx (the carrier). The coolers had been shipped from the Site on November 13.

The external custody seal affixed to each cooler was intact. The samples were received on ice and in good condition. The receipt temperature of the interior of each cooler was measured via a 'temperature blank' shipped in it; the measured temperatures, in °C, were 0.9, 1.3, and 1.2. No sample was received frozen.

Shipping documents included three field chains-of-custody (COC) and associated carrier air bills. Per Client request, the field sample ID for the soil samples were modified as indicated on the COCs.

Sample 35SB2A was designated by the Client for MS/MSD analysis.

Samples were assigned to Work Order 0711313 and SDG 36440-42.

Receipt Event Three

On November 15, 2007 at 08:45 hrs, three sample coolers containing multiple soil samples, an equipment blank, a trip blank, and a sludge composite sample were received at TriMatrix via FedEx (the carrier). The coolers had been shipped from the Site on November 13. The sludge composite sample was assigned to a separate work order and SDG and is not discussed further in this narrative.

The external custody seal affixed to each cooler was intact. The samples were received on ice and in good condition. The receipt temperature of the interior of each cooler was measured via a 'temperature blank' shipped in it; the measured temperatures, in °C, were 1.1, 0.3, and 1.4. No sample was received frozen.

Shipping documents included three field chains-of-custody (COC) and associated carrier air bills. Per Client request, the field sample ID for the soil samples were modified as indicated on the COCs.

Samples were assigned to Work Order 0711377 and SDG 36440-42.

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All Events

Copies of all referenced receipt and custody documents are provided in Section A of this data package. Correspondence regarding completed sample log-in activities will be found in Attachment 1 of this narrative.

Provision of Sample Receipt Information to Client

A copy of the COCs and receipt checklist were transmitted to the Client within one day of sample receipt. The Client did not request any modification(s) to the analyses, as listed on the COC.

Post-Receipt Sample Custody

Custody of the sample during sample preparation (if applicable) and analysis was assigned to individual analysts. Copies of completed 'internal chain of custody' forms are included in Section A.

Variances

Data Qualifier Flags

Data qualifier flags other than those listed in the DoD QSM were employed or the definition of an existing flag was modified.

J – Estimated: the analyte was detected at a concentration greater than the limit of detection (i.e., MDL) but less than the reporting limit (i.e., MRL).

B – Blank contamination: The analyte was detected above one-half the reporting limit in an associated method blank. The same analyte in the sample was detected at less than five times the method blank concentration. (If a common laboratory contaminant is present in the method blank at a concentration greater than one-half the reporting limit but less than or equal to that reporting limit, any associated sample results are flagged but corrective action is not necessarily taken. A text qualifier is also associated with such a result.)

E – Exceeds calibration range: The analyte response exceeded the calibrated range of the instrument. (With the exception of metals for which only the final non-qualified result is reported, both the initial E-qualified result and final non-qualified result from reanalysis-at-dilution are reported.)

Text Qualifier

A LIMS-generated text qualifier is substituted for many instances in which the DoD QSM "Q" flag would otherwise apply. The text qualifiers are listed in a summary format by parameter with applicable samples identified.

Methods 6010B and 6020A

The acceptance criterion of < 2 x RL is substituted for < 2 x MDL for interference check solution ICS-A.

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Analytical Methods

Sample preparation and analytical methods that were employed are per the SOW.

Method Detection Limits, Target Analytes, and Reporting Limits

All method detection limits (MDL) for analytes in this report are compliant with the DoD QSM specification that each reporting limit (RL) employed is to be at least three times the MDL. In addition, no RL is less than the equivalent concentration of the lowest instrument calibration standard. The target analyte list was specified by the Client. Proposed RLs were submitted by TriMatrix to the Client prior to the receipt of any samples.

Project-specific Analytes of Concern

No project-specific analytes of concern were identified in the SOW, however, it is assumed that Method 8330 and 8332 target analytes are of concern.

Quality Control Limits

Quality control limits specified in the DoD QSM were employed. For cases in which the analyte is not listed in the QSM, internal laboratory control limits were used.

Hold Times

All samples were extracted/digested (where applicable) and analyzed within hold time.

Technical Issues

There were no general technical issues. Any issues unique to a particular parameter will be discussed in the QC section for it.

Sample Result Reporting Convention

Sample results are reported as RL 'U' (e.g., 0.001 U) if the target analyte was not detected above the MDL. If a sample for an organic parameter is reanalyzed and also reported, the second analysis includes the suffix 'REn' where n = the first, second, etc. reanalysis. If a sample is reanalyzed for confirmation purposes, is confirmed, and also reported, the second analysis includes the suffix 'RE1'. If the confirmation was not performed simultaneously, the second set of sample results is reported on a second Form 1 since that confirmation analysis did not occur at the same time and/or date.

Data Qualifier Designation

If applicable, a sample result is qualified with:

- a "U" flag if the analyte was not detected at a concentration greater than the MDL,
- a "B", "J", and/or an "E" flag as defined in the preceding Variance section,
- a LIMS-generated statement of qualification. Qualifying statements, if any, will be found in Attachment 2 to this narrative.

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QC Batch and Analytical Batch Designation

A QC Batch is a seven digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation); it is limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.).

An Analytical Batch (or Sequence) is a seven digit number that associates all samples analyzed as a set under one analytical sequence.

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Data Review and Approval

All data was reviewed and approved by the group supervisor/manager prior to further review by the project chemist.

Data Deliverables

The data deliverables, both hardcopy and electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. The EDD has been issued separate from this hardcopy report.

Walt Roudebush, Project Chemist

1/14/08
Date

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Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCS/LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	g	Laboratory duplicate imprecision
g	Tuning failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	h	Holding time violation
h	Holding time violation	h	Holding time violation	k	Cooler receipt temperature exceeds limits
i	Internal standard failure	i	Internal standard failure	l	LCS recovery failure
k	Cooler receipt temperature exceeds limits	k	Cooler receipt temperature exceeds limits	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination	n	Failed Signal to noise ratio		

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-44 **Fraction:** Pest, PCBs, Explosives, & Metals

Lab: TriMatrix **Project Name** Radford RAAP 10

Reviewer: RA **Date:** January 30, 2008

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the Region III Modifications to the USEPA National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical method employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: For the pesticides analyses, sample 38SB10A was re-extracted 12 days after the holding time had expired. All associated field sample results were non-detects and were flagged "UJ,h". The original sample results should be used.

The second source calibration analyzed for sequence 7113009 displayed a percent recovery (%R) greater than the upper control limit of 120% with a positive bias for alpha-BHC at 121%. The associated field sample results were non-detects and no data qualifying action was required.

The continuing calibration analyzed for sequence 7122808 displayed percent differences (%Ds) greater than the control limit of 20% with a positive bias for alpha-BHC at 24% and 21.8%, delta-BHC at 25.6%, 4,4'-DDD at 22.7%, and 4,4'-DDE at 24.1%. The continuing calibration analyzed for sequence 8011111 displayed a %D greater than the control limit with a positive bias for toxaphene at 20.8%. The continuing calibration analyzed for sequence 7122812 displayed %Ds greater than the control limit with a positive bias for alpha-BHC at 24% and 21.8%, delta-BHC at 25.6%, 4,4'-DDD at 22.7%, and 4,4'-DDE at 24.1%. The associated field sample results were non-detects while the continuing calibrations displayed a positive bias and no data qualifying action was required.

Surrogates tetrachloro-m-xylene (44%, 45%) and decachlorobiphenyl (43%, 48%) displayed %Rs less than the lower control limits for sample 38SB10A. Surrogate tetrachloro-m-xylene (57%, 58%) displayed %Rs less than the lower control limits for sample DUP-4. Positive associated field sample results were flagged "L,s" and non-detects were flagged "UL,s".

The matrix spike duplicate analyzed for sample 37SB5A displayed a %R less than the lower control limit of 60% for endrin at 59%. The associated parent sample result was a non-detect and was flagged "UJ,m".

Endrin displayed a %D greater than the control limit of 40% between the two analytical columns for several samples. These results were flagged "J,g".

For the PCBs analyses, samples 38SB10A and DUP-5 were re-extracted 12 days after the holding time had expired. Positive results were flagged "J,h" and non-detects were flagged "UJ,h" for these samples. The original sample results should be used.

Surrogate decachlorobiphenyl displayed %Rs less than the lower control limits for samples DUP-4 (55%, 40%) and 38SB10A (44%, 42%). Positive associated field sample results were flagged "L,s" and non-detects were flagged "UL,s". This surrogate also displayed %Rs less than the lower control limits for samples 37SB8A (57%) and DUP-5 (59%). No data qualifying action is required based on one surrogate failure and no data flags were applied.

The field duplicate pair (38SB7A/DUP-5) displayed results outside the control limits for PCB-1254. These results were flagged "J,f" in these two samples.

For the explosives analyses by method 8330, the laboratory control sample analyzed for batch 714379 displayed a %R less than the lower control limit of 80% for 2-nitrotoluene at 79%. Using professional judgment, the associated field sample results that were non-detects were flagged "UJ,l". The laboratory control sample pair analyzed for batch 714136 displayed a relative percent difference greater than the control limit for 3-nitrotoluene at 34%. The associated field sample results were non-detects and no data qualifying action was necessary.

The matrix spike pair analyzed for sample 37SB5A displayed %Rs less than the lower control limit of 80% for 2,6-dinitrotoluene (74%), 2-amino-4,6-dinitrotoluene (70%, 70%), and 4-amino-2,6-dinitrotoluene (68%, 68%). The associated parent sample results were non-detects and were flagged "UJ,m".

The matrix spike pair analyzed for sample 38SB5A displayed %Rs and/or relative percent differences greater than the upper control limits for 2,6-dinitrotoluene (132%, 32%), 2,4-dinitrotoluene (195%, 49%), and 4-nitrotoluene (142%). The associated parent sample results were non-detects and no data qualifying action was required.

For the metals analyses, for method 6010, the method blanks displayed positive detections for calcium and cadmium. The associated field sample results less than five times the method blank concentrations were flagged "B,p". The equipment blanks displayed positive detections for calcium and iron. The associated field sample results

were greater than five times the equipment blank concentrations and no data qualifying action was taken.

For method 6020, the method blanks displayed positive detections for lead, thallium, vanadium, and zinc. The associated positive field sample results less than five times the method blank concentrations were flagged "B,p". The equipment blanks displayed positive detections for calcium, iron, and manganese. The associated field sample results were greater than five times the equipment blank concentrations and no data qualifying action was taken.

For method 6020, the matrix spike analyzed for sample 37SB5A displayed %Rs less than the lower control limit of 75% for arsenic (70%, 71%) and selenium (68%, 67%). Positive associated field sample results were flagged "L,m" and non-detects were flagged "UL,m".

For method 6010, the serial dilution analyzed for sample 38SB5A displayed a percent difference greater than the control limit of 10% for iron at 15%. For method 6020, the serial dilution analyzed for sample 37SB5A displayed percent differences greater than the control limit of 10% for copper at 15%, lead at 11%, and nickel at 14%. Positive associated field sample results were flagged "J,s".

For the mercury analyses, equipment blank, EQBK-4 displayed a positive detection for mercury at 0.052 ug/L. The associated field sample results were greater than five times the equipment blank concentration and no data qualifying action was necessary.

Correctable Anomalies: None.

Comments: On the basis of this evaluation, the laboratory appears to have followed the specified method. All data are usable, as qualified, for their intended purpose based on the data reviewed. It should be noted that detection limits were raised in several samples due to dilutions.

Signed: Rayan

SAMPLE ID SUMMARY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-44

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
37SB8A	0711396-01
37SB8B	0711396-02
37SB8C	0711396-03
DUP-4	0711396-04
37SB4A	0711396-05
37SB5A	0711396-06
37SB6A	0711396-07
38SB10A	0711396-08
38SB10A	0711396-08RE1
38SB10B	0711396-09
38SB10C	0711396-10
38SB9A	0711396-11
38SB9B	0711396-12
38SB9C	0711396-13
38SB8A	0711396-14
38SB8B	0711396-15
38SB8C	0711396-16
EQBK-3	0711396-17
38SB7A	0711396-18
38SB7B	0711396-19
38SB7C	0711396-20
DUP-5	0711396-21
38SB4A	0711431-01
DUP-6	0711431-02
38SB5A	0711431-03
38SB6A	0711431-04
QSB4A	0711431-05
EQBK-4	0711431-06

ANALYSIS DATA SHEET

37SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-01 File ID: A61_343-0

Sampled: 11/15/07 07:40 Prepared: 11/28/07 06:59 Analyzed: 12/24/07 22:13

Solids: 66.40 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.6	2.6	0.53	U
319-85-7	beta-BHC	1	5.0	5.0	1.0	U
58-89-9	gamma-BHC (Lindane)	1	5.0	5.0	0.97	U
319-86-8	delta-BHC	1	5.0	5.0	1.4	U
5103-71-9	alpha-Chlordane	1	5.0	5.0	1.0	U
5103-74-2	gamma-Chlordane	1	5.0	5.0	0.71	U
72-54-8	4,4'-DDD	1	5.0	5.0	1.7	U
72-55-9	4,4'-DDE	1	5.0	5.0	1.4	U
50-29-3	4,4'-DDT	1	5.0	5.0	1.6	U
309-00-2	Aldrin	1	2.6	2.6	0.82	U
60-57-1	Dieldrin	1	5.0	5.0	0.69	U
959-98-8	Endosulfan I	1	5.0	5.0	1.3	U
33213-65-9	Endosulfan II	1	5.0	5.0	1.3	U
1031-07-8	Endosulfan Sulfate	1	5.0	5.0	1.5	U
72-20-8	Endrin	1	5.0	5.0	0.81	
7421-93-4	Endrin Aldehyde	1	5.0	5.0	1.6	U
53494-70-5	Endrin Ketone	1	5.0	5.0	1.5	U
76-44-8	Heptachlor	1	10	10	1.8	U
1024-57-3	Heptachlor Epoxide	1	2.6	2.6	0.62	U
72-43-5	Methoxychlor	1	26	26	1.9	U
8001-35-2	Toxaphene	1	260	260	34	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	50.2	36.7	73	70 - 125	
Decachlorobiphenyl	50.2	40.5	81	55 - 130	

* Values outside of QC limits

03445

ANALYSIS DATA SHEET

37SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-02 File ID: A61_342-0

Sampled: 11/15/07 08:00 Prepared: 11/28/07 06:59 Analyzed: 12/24/07 21:37

Solids: 85.37 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.9	3.9	0.79	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.75	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.79	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.55	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	3.9	3.9	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.64	U
60-57-1	Dieldrin	1	3.9	3.9	0.54	U
959-98-8	Endosulfan I	1	3.9	3.9	1.0	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.63	U
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	7.8	7.8	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.48	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.0	36.4	93	70 - 125	
Decachlorobiphenyl	39.0	34.0	87	55 - 130	

* Values outside of QC limits

: 03454

ANALYSIS DATA SHEET

37SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-03 File ID: A61_341-0

Sampled: 11/15/07 08:00 Prepared: 11/28/07 06:59 Analyzed: 12/24/07 21:02

Solids: 85.05 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.9	3.9	0.79	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.75	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.80	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.55	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	3.9	3.9	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.64	U
60-57-1	Dieldrin	1	3.9	3.9	0.54	U
959-98-8	Endosulfan I	1	3.9	3.9	1.1	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.63	U
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	7.9	7.9	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.49	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.2	38.6	98	70 - 125	
Decachlorobiphenyl	39.2	40.7	104	55 - 130	

* Values outside of QC limits

: 03463

ANALYSIS DATA SHEET

DUP-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-04 File ID: A61_340-0

Sampled: 11/15/07 09:00 Prepared: 11/28/07 06:59 Analyzed: 12/24/07 20:26

Solids: 55.36 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	3.1	3.1	0.63	U UL,S
319-85-7	beta-BHC	1	6.0	6.0	1.2	U
58-89-9	gamma-BHC (Lindane)	1	6.0	6.0	1.2	U
319-86-8	delta-BHC	1	6.0	6.0	1.7	U
5103-71-9	alpha-Chlordane	1	6.0	6.0	1.2	U
5103-74-2	gamma-Chlordane	1	6.0	6.0	0.85	U
72-54-8	4,4'-DDD	1	6.0	6.0	2.0	U
72-55-9	4,4'-DDE	1	6.0	6.0	1.6	U
50-29-3	4,4'-DDT	1	6.0	6.0	1.9	U
309-00-2	Aldrin	1	3.1	3.1	0.98	U
60-57-1	Dieldrin	1	6.0	6.0	0.83	U
959-98-8	Endosulfan I	1	6.0	6.0	1.6	U
33213-65-9	Endosulfan II	1	6.0	6.0	1.5	U
1031-07-8	Endosulfan Sulfate	1	6.0	6.0	1.8	U UL,S
72-20-8	Endrin	1	4.8	6.0	0.97	J L,S
7421-93-4	Endrin Aldehyde	1	6.0	6.0	1.9	U UL,S
53494-70-5	Endrin Ketone	1	6.0	6.0	1.8	U
76-44-8	Heptachlor	1	12	12	2.2	U
1024-57-3	Heptachlor Epoxide	1	3.1	3.1	0.75	U
72-43-5	Methoxychlor	1	31	31	2.3	U
8001-35-2	Toxaphene	1	310	310	40	U UL,S

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	60.2	34.5	57	70 - 125	*
Decachlorobiphenyl	60.2	37.4	62	55 - 130	

* Values outside of QC limits

03472

ANALYSIS DATA SHEET

37SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-05 File ID: A61_339-0

Sampled: 11/15/07 08:50 Prepared: 11/28/07 06:59 Analyzed: 12/24/07 19:51

Solids: 88.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	1.9	1.9	0.40	U
319-85-7	beta-BHC	1	3.7	3.7	0.76	U
58-89-9	gamma-BHC (Lindane)	1	3.7	3.7	0.73	U
319-86-8	delta-BHC	1	3.7	3.7	1.1	U
5103-71-9	alpha-Chlordane	1	3.7	3.7	0.77	U
5103-74-2	gamma-Chlordane	1	3.7	3.7	0.53	U
72-54-8	4,4'-DDD	1	3.7	3.7	1.3	U
72-55-9	4,4'-DDE	1	3.7	3.7	1.0	U
50-29-3	4,4'-DDT	1	3.7	3.7	1.2	U
309-00-2	Aldrin	1	1.9	1.9	0.62	U
60-57-1	Dieldrin	1	3.7	3.7	0.52	U
959-98-8	Endosulfan I	1	3.7	3.7	1.0	U
33213-65-9	Endosulfan II	1	3.7	3.7	0.97	U
1031-07-8	Endosulfan Sulfate	1	3.7	3.7	1.1	U
72-20-8	Endrin	1	3.7	3.7	0.61	U
7421-93-4	Endrin Aldehyde	1	3.7	3.7	1.2	U
53494-70-5	Endrin Ketone	1	3.7	3.7	1.2	U
76-44-8	Heptachlor	1	7.6	7.6	1.4	U
1024-57-3	Heptachlor Epoxide	1	1.9	1.9	0.47	U
72-43-5	Methoxychlor	1	19	19	1.5	U
8001-35-2	Toxaphene	1	190	190	25	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	37.9	37.2	98	70 - 125	
Decachlorobiphenyl	37.9	35.5	94	55 - 130	

* Values outside of QC limits

03489

ANALYSIS DATA SHEET

37SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-06 File ID: A61_338-0

Sampled: 11/15/07 09:30 Prepared: 11/28/07 06:59 Analyzed: 12/24/07 19:15

Solids: 84.89 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714462 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.9	3.9	0.79	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.76	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.80	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.55	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	3.9	3.9	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.64	U
60-57-1	Dieldrin	1	3.9	3.9	0.54	U
959-98-8	Endosulfan I	1	3.9	3.9	1.1	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.63	U UJ,M
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	7.9	7.9	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.49	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.3	39.3	100	70 - 125	
Decachlorobiphenyl	39.3	37.7	96	55 - 130	

* Values outside of QC limits

03498

ANALYSIS DATA SHEET

37SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-07 File ID: A61_359-0

Sampled: 11/15/07 10:00 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 07:42

Solids: 83.20 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	4.0	4.0	0.81	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.77	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.81	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.56	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.3	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.65	U
60-57-1	Dieldrin	1	4.0	4.0	0.55	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.64	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.3	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.1	8.1	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.50	U
72-43-5	Methoxychlor	1	20	20	1.6	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.1	39.0	97	70 - 125	
Decachlorobiphenyl	40.1	40.9	102	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-08 File ID: A60_387-0

Sampled: 11/15/07 10:58 Prepared: 11/29/07 07:04 Analyzed: 12/12/07 05:45

Solids: 70.79 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7123115 Calibration: 7L11022 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.4	2.4	0.50	U UL,S
319-85-7	beta-BHC	1	4.7	4.7	0.95	U
58-89-9	gamma-BHC (Lindane)	1	4.7	4.7	0.91	U
319-86-8	delta-BHC	1	4.7	4.7	1.3	U
5103-71-9	alpha-Chlordane	1	4.7	4.7	0.96	U
5103-74-2	gamma-Chlordane	1	4.7	4.7	0.66	U
72-54-8	4,4'-DDD	1	4.7	4.7	1.6	U
72-55-9	4,4'-DDE	1	4.7	4.7	1.3	U
50-29-3	4,4'-DDT	1	4.7	4.7	1.5	U
309-00-2	Aldrin	1	2.4	2.4	0.77	U
60-57-1	Dieldrin	1	4.7	4.7	0.65	U
959-98-8	Endosulfan I	1	4.7	4.7	1.3	U
33213-65-9	Endosulfan II	1	4.7	4.7	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.7	4.7	1.4	U
72-20-8	Endrin	1	1.1	4.7	0.76	J L,S
7421-93-4	Endrin Aldehyde	1	4.7	4.7	1.5	U UL,S
53494-70-5	Endrin Ketone	1	4.7	4.7	1.4	U
76-44-8	Heptachlor	1	9.5	9.5	1.7	U
1024-57-3	Heptachlor Epoxide	1	2.4	2.4	0.58	U
72-43-5	Methoxychlor	1	24	24	1.8	U
8001-35-2	Toxaphene	1	240	240	32	U UL,S

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	47.1	20.6	44	70 - 125	*
Decachlorobiphenyl	47.1	20.1	43	55 - 130	*

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-08RE1 File ID: A63_285-0

Sampled: 11/15/07 10:58 Prepared: 12/11/07 07:04 Analyzed: 01/08/08 08:23

Solids: 70.79 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0715118 Sequence: 8011111 Calibration: 8A11004 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.4	2.4	0.50	U UJ, h
319-85-7	beta-BHC	1	4.7	4.7	0.95	U
58-89-9	gamma-BHC (Lindane)	1	4.7	4.7	0.91	U
319-86-8	delta-BHC	1	4.7	4.7	1.3	U
5103-71-9	alpha-Chlordane	1	4.7	4.7	0.96	U
5103-74-2	gamma-Chlordane	1	4.7	4.7	0.66	U
72-54-8	4,4'-DDD	1	4.7	4.7	1.6	U
72-55-9	4,4'-DDE	1	4.7	4.7	1.3	U
50-29-3	4,4'-DDT	1	4.7	4.7	1.5	U
309-00-2	Aldrin	1	2.4	2.4	0.77	U
60-57-1	Dieldrin	1	4.7	4.7	0.65	U
959-98-8	Endosulfan I	1	4.7	4.7	1.3	U
33213-65-9	Endosulfan II	1	4.7	4.7	1.2	U
1031-07-8	Endosulfan Sulfate	1	4.7	4.7	1.4	U
72-20-8	Endrin	1	4.7	4.7	0.76	U
7421-93-4	Endrin Aldehyde	1	4.7	4.7	1.5	U
53494-70-5	Endrin Ketone	1	4.7	4.7	1.4	U
76-44-8	Heptachlor	1	9.5	9.5	1.7	U
1024-57-3	Heptachlor Epoxide	1	2.4	2.4	0.58	U
72-43-5	Methoxychlor	1	24	24	1.8	U
8001-35-2	Toxaphene	1	240	240	32	U UJ,h

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	47.1	33.1	70	70 - 125	
Decachlorobiphenyl	47.1	30.5	65	55 - 130	

* Values outside of QC limits

DO NOT USE RA 1/29/08

ANALYSIS DATA SHEET

38SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-09 File ID: A60_388-0

Sampled: 11/15/07 10:58 Prepared: 11/29/07 07:04 Analyzed: 12/12/07 06:21

Solids: 82.05 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7123115 Calibration: 7L11022 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.43	U
319-85-7	beta-BHC	1	4.0	4.0	0.82	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.78	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.83	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.57	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.4	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.66	U
60-57-1	Dieldrin	1	4.0	4.0	0.56	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.65	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.3	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.2	8.2	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.50	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.6	33.5	82	70 - 125	
Decachlorobiphenyl	40.6	34.1	84	55 - 130	

* Values outside of QC limits

03534

ANALYSIS DATA SHEET

38SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-10 File ID: A60_389-0

Sampled: 11/15/07 11:10 Prepared: 11/29/07 07:04 Analyzed: 12/12/07 06:57

Solids: 83.90 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7123115 Calibration: 7L11022 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	3.9	3.9	0.80	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.77	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.81	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.56	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	3.9	3.9	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.65	U
60-57-1	Dieldrin	1	3.9	3.9	0.55	U
959-98-8	Endosulfan I	1	3.9	3.9	1.1	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.64	U
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	8.0	8.0	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.49	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.7	35.2	89	70 - 125	
Decachlorobiphenyl	39.7	35.6	90	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-11 File ID: A61_364-0

Sampled: 11/15/07 11:35 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 10:40

Solids: 80.08 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122812 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.44	U
319-85-7	beta-BHC	1	4.1	4.1	0.84	U
58-89-9	gamma-BHC (Lindane)	1	4.1	4.1	0.80	U
319-86-8	delta-BHC	1	4.1	4.1	1.2	U
5103-71-9	alpha-Chlordane	1	4.1	4.1	0.85	U
5103-74-2	gamma-Chlordane	1	4.1	4.1	0.59	U
72-54-8	4,4'-DDD	1	4.1	4.1	1.4	U
72-55-9	4,4'-DDE	1	4.1	4.1	1.1	U
50-29-3	4,4'-DDT	1	4.1	4.1	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.68	U
60-57-1	Dieldrin	1	4.1	4.1	0.58	U
959-98-8	Endosulfan I	1	4.1	4.1	1.1	U
33213-65-9	Endosulfan II	1	4.1	4.1	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.1	4.1	1.2	U
72-20-8	Endrin	1	4.1	4.1	0.67	U
7421-93-4	Endrin Aldehyde	1	4.1	4.1	1.3	U
53494-70-5	Endrin Ketone	1	4.1	4.1	1.3	U
76-44-8	Heptachlor	1	8.4	8.4	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.52	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	28	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	41.6	35.6	86	70 - 125	
Decachlorobiphenyl	41.6	34.5	83	55 - 130	

* Values outside of QC limits

03552

ANALYSIS DATA SHEET

38SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-12 File ID: A61_365-0

Sampled: 11/15/07 11:35 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 11:15

Solids: 82.14 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122812 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.43	U
319-85-7	beta-BHC	1	4.0	4.0	0.82	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.78	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.83	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.57	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.4	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.66	U
60-57-1	Dieldrin	1	4.0	4.0	0.56	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.65	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.3	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.2	8.2	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.50	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.6	40.5	100	70 - 125	
Decachlorobiphenyl	40.6	41.6	102	55 - 130	

* Values outside of QC limits

03561

ANALYSIS DATA SHEET

38SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-13 File ID: A61_366-0

Sampled: 11/15/07 11:40 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 11:51

Solids: 83.53 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122812 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	4.0	4.0	0.81	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.77	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.81	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.56	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.3	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.65	U
60-57-1	Dieldrin	1	4.0	4.0	0.55	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.64	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.2	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.0	8.0	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.50	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	39.9	40.3	101	70 - 125	
Decachlorobiphenyl	39.9	37.6	94	55 - 130	

* Values outside of QC limits

03570

ANALYSIS DATA SHEET

38SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-14 File ID: A61_367-0

Sampled: 11/15/07 13:18 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 12:26

Solids: 80.70 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122812 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.43	U
319-85-7	beta-BHC	1	4.1	4.1	0.83	U
58-89-9	gamma-BHC (Lindane)	1	4.1	4.1	0.80	U
319-86-8	delta-BHC	1	4.1	4.1	1.2	U
5103-71-9	alpha-Chlordane	1	4.1	4.1	0.84	U
5103-74-2	gamma-Chlordane	1	4.1	4.1	0.58	U
72-54-8	4,4'-DDD	1	4.1	4.1	1.4	U
72-55-9	4,4'-DDE	1	4.1	4.1	1.1	U
50-29-3	4,4'-DDT	1	4.1	4.1	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.67	U
60-57-1	Dieldrin	1	4.1	4.1	0.57	U
959-98-8	Endosulfan I	1	4.1	4.1	1.1	U
33213-65-9	Endosulfan II	1	4.1	4.1	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.1	4.1	1.2	U
72-20-8	Endrin	1	4.1	4.1	0.66	U
7421-93-4	Endrin Aldehyde	1	4.1	4.1	1.3	U
53494-70-5	Endrin Ketone	1	4.1	4.1	1.3	U
76-44-8	Heptachlor	1	8.3	8.3	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.51	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	28	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	41.3	33.0	80	70 - 125	
Decachlorobiphenyl	41.3	35.9	87	55 - 130	

* Values outside of QC limits

03579

ANALYSIS DATA SHEET

38SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-15 File ID: A61_368-0

Sampled: 11/15/07 13:18 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 13:02

Solids: 82.71 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122812 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.42	U
319-85-7	beta-BHC	1	4.0	4.0	0.81	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.78	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.82	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.57	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.4	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.2	U
309-00-2	Aldrin	1	2.1	2.1	0.66	U
60-57-1	Dieldrin	1	4.0	4.0	0.56	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.65	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.3	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.1	8.1	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.50	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.3	39.5	98	70 - 125	
Decachlorobiphenyl	40.3	41.2	102	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-16 File ID: A61_369-0

Sampled: 11/15/07 13:22 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 13:38

Solids: 83.11 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122812 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	4.0	4.0	0.81	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.77	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.82	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.57	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.3	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.65	U
60-57-1	Dieldrin	1	4.0	4.0	0.55	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.64	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.3	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.1	8.1	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.50	U
72-43-5	Methoxychlor	1	20	20	1.6	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.1	39.4	98	70 - 125	
Decachlorobiphenyl	40.1	37.9	94	55 - 130	

* Values outside of QC limits

03597

ANALYSIS DATA SHEET

EQBK-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Water Laboratory ID: 0711396-17 File ID: A59_455-0

Sampled: 11/15/07 12:50 Prepared: 11/19/07 07:11 Analyzed: 11/29/07 07:45

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0713952 Sequence: 7113009 Calibration: 7K30006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Tetrachloro-m-xylene		0.189	0.127	67	25 - 140	
Decachlorobiphenyl		0.189	0.157	83	30 - 135	

* Values outside of QC limits

03606

ANALYSIS DATA SHEET

38SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-18 File ID: A61_370-0

Sampled: 11/15/07 14:15 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 14:13

Solids: 74.65 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122812 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.3	2.3	0.47	U
319-85-7	beta-BHC	1	4.4	4.4	0.90	U
58-89-9	gamma-BHC (Lindane)	1	4.4	4.4	0.86	U
319-86-8	delta-BHC	1	4.4	4.4	1.3	U
5103-71-9	alpha-Chlordane	1	4.4	4.4	0.91	U
5103-74-2	gamma-Chlordane	1	4.4	4.4	0.63	U
72-54-8	4,4'-DDD	1	4.4	4.4	1.5	U
72-55-9	4,4'-DDE	1	4.4	4.4	1.2	U
50-29-3	4,4'-DDT	1	4.4	4.4	1.4	U
309-00-2	Aldrin	1	2.3	2.3	0.73	U
60-57-1	Dieldrin	1	4.4	4.4	0.62	U
959-98-8	Endosulfan I	1	4.4	4.4	1.2	U
33213-65-9	Endosulfan II	1	4.4	4.4	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.4	4.4	1.3	U
72-20-8	Endrin	1	2.4	4.4	0.72	J
7421-93-4	Endrin Aldehyde	1	4.4	4.4	1.4	U
53494-70-5	Endrin Ketone	1	4.4	4.4	1.4	U
76-44-8	Heptachlor	1	9.0	9.0	1.6	U
1024-57-3	Heptachlor Epoxide	1	2.3	2.3	0.55	U
72-43-5	Methoxychlor	1	23	23	1.7	U
8001-35-2	Toxaphene	1	230	230	30	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	44.7	37.7	84	70 - 125	
Decachlorobiphenyl	44.7	42.2	94	55 - 130	

* Values outside of QC limits

03615

ANALYSIS DATA SHEET

38SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-19 File ID: A61_371-0

Sampled: 11/15/07 14:15 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 14:49

Solids: 83.24 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122812 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.42	U
319-85-7	beta-BHC	1	4.0	4.0	0.81	U
58-89-9	gamma-BHC (Lindane)	1	4.0	4.0	0.77	U
319-86-8	delta-BHC	1	4.0	4.0	1.1	U
5103-71-9	alpha-Chlordane	1	4.0	4.0	0.81	U
5103-74-2	gamma-Chlordane	1	4.0	4.0	0.56	U
72-54-8	4,4'-DDD	1	4.0	4.0	1.3	U
72-55-9	4,4'-DDE	1	4.0	4.0	1.1	U
50-29-3	4,4'-DDT	1	4.0	4.0	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.65	U
60-57-1	Dieldrin	1	4.0	4.0	0.55	U
959-98-8	Endosulfan I	1	4.0	4.0	1.1	U
33213-65-9	Endosulfan II	1	4.0	4.0	1.0	U
1031-07-8	Endosulfan Sulfate	1	4.0	4.0	1.2	U
72-20-8	Endrin	1	4.0	4.0	0.64	U
7421-93-4	Endrin Aldehyde	1	4.0	4.0	1.2	U
53494-70-5	Endrin Ketone	1	4.0	4.0	1.2	U
76-44-8	Heptachlor	1	8.0	8.0	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.50	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	27	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	40.0	38.6	97	70 - 125	
Decachlorobiphenyl	40.0	42.0	105	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-20 File ID: A61_372-0

Sampled: 11/15/07 14:20 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 15:24

Solids: 85.43 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122812 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.9	3.9	0.79	U
58-89-9	gamma-BHC (Lindane)	1	3.9	3.9	0.75	U
319-86-8	delta-BHC	1	3.9	3.9	1.1	U
5103-71-9	alpha-Chlordane	1	3.9	3.9	0.79	U
5103-74-2	gamma-Chlordane	1	3.9	3.9	0.55	U
72-54-8	4,4'-DDD	1	3.9	3.9	1.3	U
72-55-9	4,4'-DDE	1	3.9	3.9	1.1	U
50-29-3	4,4'-DDT	1	3.9	3.9	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.64	U
60-57-1	Dieldrin	1	3.9	3.9	0.54	U
959-98-8	Endosulfan I	1	3.9	3.9	1.0	U
33213-65-9	Endosulfan II	1	3.9	3.9	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.9	3.9	1.2	U
72-20-8	Endrin	1	3.9	3.9	0.63	U
7421-93-4	Endrin Aldehyde	1	3.9	3.9	1.2	U
53494-70-5	Endrin Ketone	1	3.9	3.9	1.2	U
76-44-8	Heptachlor	1	7.8	7.8	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.48	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Tetrachloro-m-xylene		39.0	40.4	104	70 - 125	
Decachlorobiphenyl		39.0	37.3	96	55 - 130	

* Values outside of QC limits

03633

ANALYSIS DATA SHEET

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-21 File ID: A61_373-0

Sampled: 11/15/07 13:00 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 16:00

Solids: 64.80 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122812 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.6	2.6	0.54	U
319-85-7	beta-BHC	1	5.1	5.1	1.0	U
58-89-9	gamma-BHC (Lindane)	1	5.1	5.1	0.99	U
319-86-8	delta-BHC	1	5.1	5.1	1.4	U
5103-71-9	alpha-Chlordane	1	5.1	5.1	1.0	U
5103-74-2	gamma-Chlordane	1	5.1	5.1	0.73	U
72-54-8	4,4'-DDD	1	5.1	5.1	1.7	U
72-55-9	4,4'-DDE	1	5.1	5.1	1.4	U
50-29-3	4,4'-DDT	1	5.1	5.1	1.6	U
309-00-2	Aldrin	1	2.6	2.6	0.84	U
60-57-1	Dieldrin	1	5.1	5.1	0.71	U
959-98-8	Endosulfan I	1	4.6	5.1	1.4	J
33213-65-9	Endosulfan II	1	5.1	5.1	1.3	U
1031-07-8	Endosulfan Sulfate	1	5.1	5.1	1.5	U
72-20-8	Endrin	1	4.5	5.1	0.83	J J/8
7421-93-4	Endrin Aldehyde	1	5.1	5.1	1.6	U
53494-70-5	Endrin Ketone	1	5.1	5.1	1.6	U
76-44-8	Heptachlor	1	10	10	1.9	U
1024-57-3	Heptachlor Epoxide	1	2.6	2.6	0.64	U
72-43-5	Methoxychlor	1	26	26	2.0	U
8001-35-2	Toxaphene	1	260	260	35	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	51.4	37.8	73	70 - 125	
Decachlorobiphenyl	51.4	40.7	79	55 - 130	

* Values outside of QC limits

03642

ANALYSIS DATA SHEET

38SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711431-01 File ID: A61_358-0

Sampled: 11/16/07 08:10 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 07:06

Solids: 87.21 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	1.9	1.9	0.40	U
319-85-7	beta-BHC	1	3.8	3.8	0.77	U
58-89-9	gamma-BHC (Lindane)	1	3.8	3.8	0.74	U
319-86-8	delta-BHC	1	3.8	3.8	1.1	U
5103-71-9	alpha-Chlordane	1	3.8	3.8	0.78	U
5103-74-2	gamma-Chlordane	1	3.8	3.8	0.54	U
72-54-8	4,4'-DDD	1	3.8	3.8	1.3	U
72-55-9	4,4'-DDE	1	3.8	3.8	1.0	U
50-29-3	4,4'-DDT	1	3.8	3.8	1.2	U
309-00-2	Aldrin	1	1.9	1.9	0.62	U
60-57-1	Dieldrin	1	3.8	3.8	0.53	U
959-98-8	Endosulfan I	1	3.8	3.8	1.0	U
33213-65-9	Endosulfan II	1	3.8	3.8	0.98	U
1031-07-8	Endosulfan Sulfate	1	3.8	3.8	1.1	U
72-20-8	Endrin	1	3.8	3.8	0.61	U
7421-93-4	Endrin Aldehyde	1	3.8	3.8	1.2	U
53494-70-5	Endrin Ketone	1	3.8	3.8	1.2	U
76-44-8	Heptachlor	1	7.7	7.7	1.4	U
1024-57-3	Heptachlor Epoxide	1	1.9	1.9	0.47	U
72-43-5	Methoxychlor	1	19	19	1.5	U
8001-35-2	Toxaphene	1	190	190	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	38.2	39.6	104	70 - 125	
Decachlorobiphenyl	38.2	37.2	97	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711431-02 File ID: A61_357-0

Sampled: 11/16/07 09:00 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 06:31

Solids: 85.82 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.0	2.0	0.41	U
319-85-7	beta-BHC	1	3.8	3.8	0.78	U
58-89-9	gamma-BHC (Lindane)	1	3.8	3.8	0.75	U
319-86-8	delta-BHC	1	3.8	3.8	1.1	U
5103-71-9	alpha-Chlordane	1	3.8	3.8	0.79	U
5103-74-2	gamma-Chlordane	1	3.8	3.8	0.55	U
72-54-8	4,4'-DDD	1	3.8	3.8	1.3	U
72-55-9	4,4'-DDE	1	3.8	3.8	1.0	U
50-29-3	4,4'-DDT	1	3.8	3.8	1.2	U
309-00-2	Aldrin	1	2.0	2.0	0.63	U
60-57-1	Dieldrin	1	3.8	3.8	0.54	U
959-98-8	Endosulfan I	1	3.8	3.8	1.0	U
33213-65-9	Endosulfan II	1	3.8	3.8	1.0	U
1031-07-8	Endosulfan Sulfate	1	3.8	3.8	1.2	U
72-20-8	Endrin	1	3.8	3.8	0.62	U
7421-93-4	Endrin Aldehyde	1	3.8	3.8	1.2	U
53494-70-5	Endrin Ketone	1	3.8	3.8	1.2	U
76-44-8	Heptachlor	1	7.8	7.8	1.4	U
1024-57-3	Heptachlor Epoxide	1	2.0	2.0	0.48	U
72-43-5	Methoxychlor	1	20	20	1.5	U
8001-35-2	Toxaphene	1	200	200	26	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	38.8	42.0	108	70 - 125	
Decachlorobiphenyl	38.8	36.9	95	55 - 130	

* Values outside of QC limits

03660

ANALYSIS DATA SHEET

38SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711431-03 File ID: A61_356-0

Sampled: 11/16/07 08:35 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 05:55

Solids: 88.70 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	1.9	1.9	0.40	U
319-85-7	beta-BHC	1	3.7	3.7	0.76	U
58-89-9	gamma-BHC (Lindane)	1	3.7	3.7	0.72	U
319-86-8	delta-BHC	1	3.7	3.7	1.1	U
5103-71-9	alpha-Chlordane	1	3.7	3.7	0.76	U
5103-74-2	gamma-Chlordane	1	3.7	3.7	0.53	U
72-54-8	4,4'-DDD	1	3.7	3.7	1.3	U
72-55-9	4,4'-DDE	1	3.7	3.7	1.0	U
50-29-3	4,4'-DDT	1	3.7	3.7	1.2	U
309-00-2	Aldrin	1	1.9	1.9	0.61	U
60-57-1	Dieldrin	1	3.7	3.7	0.52	U
959-98-8	Endosulfan I	1	3.7	3.7	1.0	U
33213-65-9	Endosulfan II	1	3.7	3.7	0.96	U
1031-07-8	Endosulfan Sulfate	1	3.7	3.7	1.1	U
72-20-8	Endrin	1	3.7	3.7	0.60	U
7421-93-4	Endrin Aldehyde	1	3.7	3.7	1.2	U
53494-70-5	Endrin Ketone	1	3.7	3.7	1.1	U
76-44-8	Heptachlor	1	7.6	7.6	1.4	U
1024-57-3	Heptachlor Epoxide	1	1.9	1.9	0.47	U
72-43-5	Methoxychlor	1	19	19	1.5	U
8001-35-2	Toxaphene	1	190	190	25	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	37.6	37.7	100	70 - 125	
Decachlorobiphenyl	37.6	39.0	104	55 - 130	

* Values outside of QC limits

03669

ANALYSIS DATA SHEET

38SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711431-04 File ID: A61_355-0

Sampled: 11/16/07 09:45 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 05:20

Solids: 88.67 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	1.9	1.9	0.40	U
319-85-7	beta-BHC	1	3.7	3.7	0.76	U
58-89-9	gamma-BHC (Lindane)	1	3.7	3.7	0.72	U
319-86-8	delta-BHC	1	3.7	3.7	1.1	U
5103-71-9	alpha-Chlordane	1	3.7	3.7	0.76	U
5103-74-2	gamma-Chlordane	1	3.7	3.7	0.53	U
72-54-8	4,4'-DDD	1	3.7	3.7	1.3	U
72-55-9	4,4'-DDE	1	3.7	3.7	1.0	U
50-29-3	4,4'-DDT	1	3.7	3.7	1.2	U
309-00-2	Aldrin	1	1.9	1.9	0.61	U
60-57-1	Dieldrin	1	3.7	3.7	0.52	U
959-98-8	Endosulfan I	1	3.7	3.7	1.0	U
33213-65-9	Endosulfan II	1	3.7	3.7	0.96	U
1031-07-8	Endosulfan Sulfate	1	3.7	3.7	1.1	U
72-20-8	Endrin	1	1.2	3.7	0.60	J J, J
7421-93-4	Endrin Aldehyde	1	3.7	3.7	1.2	U
53494-70-5	Endrin Ketone	1	3.7	3.7	1.2	U
76-44-8	Heptachlor	1	7.6	7.6	1.4	U
1024-57-3	Heptachlor Epoxide	1	1.9	1.9	0.47	U
72-43-5	Methoxychlor	1	19	19	1.5	U
8001-35-2	Toxaphene	1	190	190	25	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	37.6	39.2	104	70 - 125	
Decachlorobiphenyl	37.6	39.6	105	55 - 130	

* Values outside of QC limits

ANALYSIS DATA SHEET

QSB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711431-05 File ID: A61_354-0

Sampled: 11/16/07 10:20 Prepared: 11/29/07 07:04 Analyzed: 12/25/07 04:44

Solids: 79.70 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714554 Sequence: 7122808 Calibration: 7L28006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
319-84-6	alpha-BHC	1	2.1	2.1	0.44	U
319-85-7	beta-BHC	1	4.1	4.1	0.84	U
58-89-9	gamma-BHC (Lindane)	1	4.1	4.1	0.81	U
319-86-8	delta-BHC	1	4.1	4.1	1.2	U
5103-71-9	alpha-Chlordane	1	4.1	4.1	0.85	U
5103-74-2	gamma-Chlordane	1	4.1	4.1	0.59	U
72-54-8	4,4'-DDD	1	4.1	4.1	1.4	U
72-55-9	4,4'-DDE	1	4.1	4.1	1.1	U
50-29-3	4,4'-DDT	1	4.1	4.1	1.3	U
309-00-2	Aldrin	1	2.1	2.1	0.68	U
60-57-1	Dieldrin	1	4.1	4.1	0.58	U
959-98-8	Endosulfan I	1	4.1	4.1	1.1	U
33213-65-9	Endosulfan II	1	4.1	4.1	1.1	U
1031-07-8	Endosulfan Sulfate	1	4.1	4.1	1.3	U
72-20-8	Endrin	1	3.3	4.1	0.67	J J,J
7421-93-4	Endrin Aldehyde	1	4.1	4.1	1.3	U
53494-70-5	Endrin Ketone	1	4.1	4.1	1.3	U
76-44-8	Heptachlor	1	8.4	8.4	1.5	U
1024-57-3	Heptachlor Epoxide	1	2.1	2.1	0.52	U
72-43-5	Methoxychlor	1	21	21	1.6	U
8001-35-2	Toxaphene	1	210	210	28	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	41.8	37.9	91	70 - 125	
Decachlorobiphenyl	41.8	34.9	83	55 - 130	

* Values outside of QC limits

03687

ANALYSIS DATA SHEET

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Water Laboratory ID: 0711431-06 File ID: A59_456-0

Sampled: 11/16/07 10:58 Prepared: 11/20/07 07:11 Analyzed: 11/29/07 08:20

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0713952 Sequence: 7113009 Calibration: 7K30006 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.145	77	25 - 140	
Decachlorobiphenyl	0.189	0.168	89	30 - 135	

* Values outside of QC limits

03696

SAMPLE ID SUMMARY

USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-44

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
37SB8A	0711396-01
37SB8B	0711396-02
37SB8C	0711396-03
DUP-4	0711396-04
37SB4A	0711396-05
37SB5A	0711396-06
37SB6A	0711396-07
38SB10A	0711396-08
38SB10A	0711396-08RE1
38SB10B	0711396-09
38SB10C	0711396-10
38SB9A	0711396-11
38SB9B	0711396-12
38SB9C	0711396-13
38SB8A	0711396-14
38SB8B	0711396-15
38SB8C	0711396-16
EQBK-3	0711396-17
38SB7A	0711396-18
38SB7B	0711396-19
38SB7C	0711396-20
DUP-5	0711396-21
DUP-5	0711396-21RE1
38SB4A	0711431-01
DUP-6	0711431-02
38SB5A	0711431-03
38SB6A	0711431-04
QSB4A	0711431-05
EQBK-4	0711431-06

ANALYSIS DATA SHEET

37SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-01 File ID: A189155-0

Sampled: 11/15/07 07:40 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 17:32

Solids: 66.40 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	50	50	6.3	U
11104-28-2	PCB-1221	1	50	50	11	U
11141-16-5	PCB-1232	1	50	50	13	U
53469-21-9	PCB-1242	1	100	100	25	U
12672-29-6	PCB-1248	1	50	50	8.0	U
11097-69-1	PCB-1254	1	590	50	6.6	
11096-82-5	PCB-1260	1	100	100	24	U
37324-23-5	PCB-1262	1	50	50	7.8	U
11100-14-4	PCB-1268	1	50	50	6.6	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		50.2	34.4	69	60 - 125	
Tetrachloro-m-xylene		50.2	35.4	71	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

37SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-02 File ID: A189156-0

Sampled: 11/15/07 08:00 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 17:49

Solids: 85.37 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	4.9	U
11104-28-2	PCB-1221	1	39	39	8.7	U
11141-16-5	PCB-1232	1	39	39	9.8	U
53469-21-9	PCB-1242	1	78	78	19	U
12672-29-6	PCB-1248	1	39	39	6.2	U
11097-69-1	PCB-1254	1	87	39	5.2	
11096-82-5	PCB-1260	1	78	78	19	U
37324-23-5	PCB-1262	1	39	39	6.1	U
11100-14-4	PCB-1268	1	39	39	5.2	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.0	33.6	86	60 - 125	
Tetrachloro-m-xylene		39.0	34.9	89	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

37SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-03 File ID: A189157-0

Sampled: 11/15/07 08:00 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 18:06

Solids: 85.05 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	4.9	U
11104-28-2	PCB-1221	1	39	39	8.7	U
11141-16-5	PCB-1232	1	39	39	9.9	U
53469-21-9	PCB-1242	1	79	79	19	U
12672-29-6	PCB-1248	1	39	39	6.2	U
11097-69-1	PCB-1254	1	39	39	5.2	U
11096-82-5	PCB-1260	1	79	79	19	U
37324-23-5	PCB-1262	1	39	39	6.1	U
11100-14-4	PCB-1268	1	39	39	5.2	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.2	38.1	97	60 - 125	
Tetrachloro-m-xylene		39.2	38.1	97	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

DUP-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-04 File ID: A189158-0

Sampled: 11/15/07 09:00 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 18:23

Solids: 55.36 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	60	60	7.6	U UL,S
11104-28-2	PCB-1221	1	60	60	13	U
11141-16-5	PCB-1232	1	60	60	15	U
53469-21-9	PCB-1242	1	120	120	29	U
12672-29-6	PCB-1248	1	60	60	9.6	U UL,S
11097-69-1	PCB-1254	1	580	60	7.9	L,S
11096-82-5	PCB-1260	1	120	120	29	U UL,S
37324-23-5	PCB-1262	1	60	60	9.4	U
11100-14-4	PCB-1268	1	60	60	7.9	U UL,S
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		60.2	33.0	55	60 - 125	*
Tetrachloro-m-xylene		60.2	34.9	58	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

37SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-05 File ID: A189159-0

Sampled: 11/15/07 08:50 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 18:41

Solids: 88.00 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	37	37	4.8	U
11104-28-2	PCB-1221	1	37	37	8.4	U
11141-16-5	PCB-1232	1	37	37	9.5	U
53469-21-9	PCB-1242	1	76	76	19	U
12672-29-6	PCB-1248	1	37	37	6.0	U
11097-69-1	PCB-1254	1	37	37	5.0	U
11096-82-5	PCB-1260	1	76	76	18	U
37324-23-5	PCB-1262	1	37	37	5.9	U
11100-14-4	PCB-1268	1	37	37	5.0	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		37.9	35.0	92	60 - 125	
Tetrachloro-m-xylene		37.9	35.7	94	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

37SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-06 File ID: A189160-0

Sampled: 11/15/07 09:30 Prepared: 11/28/07 07:01 Analyzed: 12/03/07 18:58

Solids: 84.89 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714463 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	4.9	U
11104-28-2	PCB-1221	1	39	39	8.7	U
11141-16-5	PCB-1232	1	39	39	9.9	U
53469-21-9	PCB-1242	1	79	79	19	U
12672-29-6	PCB-1248	1	39	39	6.2	U
11097-69-1	PCB-1254	1	17	39	5.2	J
11096-82-5	PCB-1260	1	79	79	19	U
37324-23-5	PCB-1262	1	39	39	6.1	U
11100-14-4	PCB-1268	1	39	39	5.2	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.3	38.1	97	60 - 125	
Tetrachloro-m-xylene		39.3	38.0	97	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

37SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-07 File ID: A190067-0

Sampled: 11/15/07 10:00 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 02:18

Solids: 83.20 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.0	U
11104-28-2	PCB-1221	1	40	40	8.9	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	81	81	20	U
12672-29-6	PCB-1248	1	40	40	6.4	U
11097-69-1	PCB-1254	1	40	40	5.3	U
11096-82-5	PCB-1260	1	81	81	19	U
37324-23-5	PCB-1262	1	40	40	6.3	U
11100-14-4	PCB-1268	1	40	40	5.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.1	33.7	84	60 - 125	
Tetrachloro-m-xylene		40.1	36.7	92	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-08 File ID: A190068-0

Sampled: 11/15/07 10:58 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 02:35

Solids: 70.79 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	47	47	5.9	U UL,S
11104-28-2	PCB-1221	1	47	47	10	U
11141-16-5	PCB-1232	1	47	47	12	U
53469-21-9	PCB-1242	1	95	95	23	U
12672-29-6	PCB-1248	1	47	47	7.5	U UL,S
11097-69-1	PCB-1254	1	130	47	6.2	L,S
11096-82-5	PCB-1260	1	95	95	22	U UL,S
37324-23-5	PCB-1262	1	47	47	7.3	U
11100-14-4	PCB-1268	1	47	47	6.2	U UL,S
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		47.1	20.7	44	60 - 125	*
Tetrachloro-m-xylene		47.1	22.8	48	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-08RE1 File ID: A191038-0

Sampled: 11/15/07 10:58 Prepared: 12/11/07 07:05 Analyzed: 12/14/07 00:00

Solids: 70.79 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0715089 Sequence: 7121434 Calibration: 7L14008 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	47	47	5.9	U UJ, h
11104-28-2	PCB-1221	1	47	47	10	U
11141-16-5	PCB-1232	1	47	47	12	U
53469-21-9	PCB-1242	1	95	95	23	U ↓
12672-29-6	PCB-1248	1	47	47	7.5	U UJ, h
11097-69-1	PCB-1254	1	170	47	6.2	J, h
11096-82-5	PCB-1260	1	95	95	22	U UJ,h
37324-23-5	PCB-1262	1	47	47	7.3	U
11100-14-4	PCB-1268	1	47	47	6.2	U UJ,h
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		47.1	35.4	75	60 - 125	
Tetrachloro-m-xylene		47.1	35.6	76	32 - 129	

* Values outside of QC limits

Do Not use RA 1123108

ANALYSIS DATA SHEET

38SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-09 File ID: A190069-0

Sampled: 11/15/07 10:58 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 02:52

Solids: 82.05 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.1	U
11104-28-2	PCB-1221	1	40	40	9.0	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	82	82	20	U
12672-29-6	PCB-1248	1	40	40	6.5	U
11097-69-1	PCB-1254	1	40	40	5.4	U
11096-82-5	PCB-1260	1	82	82	19	U
37324-23-5	PCB-1262	1	40	40	6.3	U
11100-14-4	PCB-1268	1	40	40	5.4	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.6	33.1	82	60 - 125	
Tetrachloro-m-xylene		40.6	36.3	89	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-10 File ID: A190070-0

Sampled: 11/15/07 11:10 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 03:09

Solids: 83.90 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	5.0	U
11104-28-2	PCB-1221	1	39	39	8.8	U
11141-16-5	PCB-1232	1	39	39	10	U
53469-21-9	PCB-1242	1	80	80	19	U
12672-29-6	PCB-1248	1	39	39	6.3	U
11097-69-1	PCB-1254	1	39	39	5.2	U
11096-82-5	PCB-1260	1	80	80	19	U
37324-23-5	PCB-1262	1	39	39	6.2	U
11100-14-4	PCB-1268	1	39	39	5.2	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.7	33.9	85	60 - 125	
Tetrachloro-m-xylene		39.7	36.4	92	32 - 129	

* Values outside of QC limits

02487

ANALYSIS DATA SHEET

38SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-11 File ID: A190071-0

Sampled: 11/15/07 11:35 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 03:27

Solids: 80.08 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	41	41	5.2	U
11104-28-2	PCB-1221	1	41	41	9.2	U
11141-16-5	PCB-1232	1	41	41	10	U
53469-21-9	PCB-1242	1	84	84	20	U
12672-29-6	PCB-1248	1	41	41	6.6	U
11097-69-1	PCB-1254	1	56	41	5.5	
11096-82-5	PCB-1260	1	84	84	20	U
37324-23-5	PCB-1262	1	41	41	6.5	U
.11100-14-4	PCB-1268	1	41	41	5.5	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		41.6	29.8	72	60 - 125	
Tetrachloro-m-xylene		41.6	34.2	82	32 - 129	

* Values outside of QC limits

02486

ANALYSIS DATA SHEET

38SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-12 File ID: A190073-0

Sampled: 11/15/07 11:35 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 04:01

Solids: 82.14 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.1	U
11104-28-2	PCB-1221	1	40	40	9.0	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	82	82	20	U
12672-29-6	PCB-1248	1	40	40	6.5	U
11097-69-1	PCB-1254	1	40	40	5.4	U
11096-82-5	PCB-1260	1	82	82	19	U
37324-23-5	PCB-1262	1	40	40	6.3	U
11100-14-4	PCB-1268	1	40	40	5.4	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.6	35.3	87	60 - 125	
Tetrachloro-m-xylene		40.6	35.5	87	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-13 File ID: A190074-0

Sampled: 11/15/07 11:40 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 04:18

Solids: 83.53 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.0	U
11104-28-2	PCB-1221	1	40	40	8.9	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	80	80	20	U
12672-29-6	PCB-1248	1	40	40	6.3	U
11097-69-1	PCB-1254	1	40	40	5.3	U
11096-82-5	PCB-1260	1	80	80	19	U
37324-23-5	PCB-1262	1	40	40	6.2	U
11100-14-4	PCB-1268	1	40	40	5.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.9	33.5	84	60 - 125	
Tetrachloro-m-xylene		39.9	36.2	91	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-14 File ID: A190075-0

Sampled: 11/15/07 13:18 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 04:36

Solids: 80.70 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	41	41	5.2	U
11104-28-2	PCB-1221	1	41	41	9.2	U
11141-16-5	PCB-1232	1	41	41	10	U
53469-21-9	PCB-1242	1	83	83	20	U
12672-29-6	PCB-1248	1	41	41	6.6	U
11097-69-1	PCB-1254	1	26	41	5.5	J
11096-82-5	PCB-1260	1	83	83	20	U
37324-23-5	PCB-1262	1	41	41	6.4	U
11100-14-4	PCB-1268	1	41	41	5.5	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		41.3	29.0	70	60 - 125	
Tetrachloro-m-xylene		41.3	30.4	73	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-15 File ID: A190076-0

Sampled: 11/15/07 13:18 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 04:53

Solids: 82.71 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.1	U
11104-28-2	PCB-1221	1	40	40	8.9	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	81	81	20	U
12672-29-6	PCB-1248	1	40	40	6.4	U
11097-69-1	PCB-1254	1	40	40	5.3	U
11096-82-5	PCB-1260	1	81	81	19	U
37324-23-5	PCB-1262	1	40	40	6.3	U
11100-14-4	PCB-1268	1	40	40	5.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.3	34.2	85	60 - 125	
Tetrachloro-m-xylene		40.3	35.7	89	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-16 File ID: A190077-0

Sampled: 11/15/07 13:22 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 05:10

Solids: 83.11 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.1	U
11104-28-2	PCB-1221	1	40	40	8.9	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	81	81	20	U
12672-29-6	PCB-1248	1	40	40	6.4	U
11097-69-1	PCB-1254	1	40	40	5.3	U
11096-82-5	PCB-1260	1	81	81	19	U
37324-23-5	PCB-1262	1	40	40	6.3	U
11100-14-4	PCB-1268	1	40	40	5.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.1	34.6	86	60 - 125	
Tetrachloro-m-xylene		40.1	35.9	90	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

EQBK-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Water Laboratory ID: 0711396-17 File ID: A189133-0

Sampled: 11/15/07 12:50 Prepared: 11/19/07 07:10 Analyzed: 12/03/07 11:13

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1060 mL / 2 mL

QC Batch: 0714046 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.189	0.186	98	40 - 135	
Tetrachloro-m-xylene		0.189	0.139	74	36 - 114	

* Values outside of QC limits

02558

ANALYSIS DATA SHEET

38SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-18 File ID: A190078-0

Sampled: 11/15/07 14:15 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 05:27

Solids: 74.65 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	44	44	5.6	U
11104-28-2	PCB-1221	1	44	44	9.9	U
11141-16-5	PCB-1232	1	44	44	11	U
53469-21-9	PCB-1242	1	90	90	22	U
12672-29-6	PCB-1248	1	44	44	7.1	U
11097-69-1	PCB-1254	1	260	44	5.9	J,F
11096-82-5	PCB-1260	1	90	90	21	U
37324-23-5	PCB-1262	1	44	44	7.0	U
11100-14-4	PCB-1268	1	44	44	5.9	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		44.7	34.0	76	60 - 125	
Tetrachloro-m-xylene		44.7	34.6	77	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-19 File ID: A190079-0

Sampled: 11/15/07 14:15 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 05:45

Solids: 83.24 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	40	40	5.0	U
11104-28-2	PCB-1221	1	40	40	8.9	U
11141-16-5	PCB-1232	1	40	40	10	U
53469-21-9	PCB-1242	1	80	80	20	U
12672-29-6	PCB-1248	1	40	40	6.4	U
11097-69-1	PCB-1254	1	40	40	5.3	U
11096-82-5	PCB-1260	1	80	80	19	U
37324-23-5	PCB-1262	1	40	40	6.2	U
11100-14-4	PCB-1268	1	40	40	5.3	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		40.0	33.3	83	60 - 125	
Tetrachloro-m-xylene		40.0	35.2	88	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-20 File ID: A190080-0

Sampled: 11/15/07 14:20 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 06:02

Solids: 85.43 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	39	39	4.9	U
11104-28-2	PCB-1221	1	39	39	8.7	U
11141-16-5	PCB-1232	1	39	39	9.8	U
53469-21-9	PCB-1242	1	78	78	19	U
12672-29-6	PCB-1248	1	39	39	6.2	U
11097-69-1	PCB-1254	1	39	39	5.2	U
11096-82-5	PCB-1260	1	78	78	19	U
37324-23-5	PCB-1262	1	39	39	6.1	U
11100-14-4	PCB-1268	1	39	39	5.2	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		39.0	34.8	89	60 - 125	
Tetrachloro-m-xylene		39.0	38.1	98	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-21 File ID: A190081-0

Sampled: 11/15/07 13:00 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 06:19

Solids: 64.80 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	51	51	6.5	U
11104-28-2	PCB-1221	1	51	51	11	U
11141-16-5	PCB-1232	1	51	51	13	U
53469-21-9	PCB-1242	1	100	100	25	U
12672-29-6	PCB-1248	1	51	51	8.2	U
11097-69-1	PCB-1254	1	510	51	6.8	J,F
11096-82-5	PCB-1260	1	100	100	25	U
37324-23-5	PCB-1262	1	51	51	8.0	U
11100-14-4	PCB-1268	1	51	51	6.8	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	51.4	32.0	62	60 - 125	
Tetrachloro-m-xylene	51.4	34.1	66	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711396-21RE1 File ID: A191039-0

Sampled: 11/15/07 13:00 Prepared: 12/11/07 07:05 Analyzed: 12/14/07 00:17

Solids: 64.80 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0715089 Sequence: 7121434 Calibration: 7L14008 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	51	51	6.5	U UJ, h
11104-28-2	PCB-1221	1	51	51	11	U
11141-16-5	PCB-1232	1	51	51	13	U
53469-21-9	PCB-1242	1	100	100	25	U
12672-29-6	PCB-1248	1	51	51	8.2	U UJ, h
11097-69-1	PCB-1254	1	44	51	6.8	J J, h
11096-82-5	PCB-1260	1	100	100	25	U UJ, h
37324-23-5	PCB-1262	1	51	51	8.0	U
11100-14-4	PCB-1268	1	51	51	6.8	U UJ, h

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	51.4	47.3	92	60 - 125	
Tetrachloro-m-xylene	51.4	45.7	89	32 - 129	

* Values outside of QC limits

Do not use RA 1/23/08

ANALYSIS DATA SHEET

38SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711431-01 File ID: A190082-0

Sampled: 11/16/07 08:10 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 06:36

Solids: 87.21 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	38	38	4.8	U
11104-28-2	PCB-1221	1	38	38	8.5	U
11141-16-5	PCB-1232	1	38	38	9.6	U
53469-21-9	PCB-1242	1	77	77	19	U
12672-29-6	PCB-1248	1	38	38	6.1	U
11097-69-1	PCB-1254	1	38	38	5.0	U
11096-82-5	PCB-1260	1	77	77	18	U
37324-23-5	PCB-1262	1	38	38	6.0	U
11100-14-4	PCB-1268	1	38	38	5.0	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		38.2	32.5	85	60 - 125	
Tetrachloro-m-xylene		38.2	34.6	90	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711431-02 File ID: A190084-0

Sampled: 11/16/07 09:00 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 07:11

Solids: 85.82 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	38	38	4.9	U
11104-28-2	PCB-1221	1	38	38	8.6	U
11141-16-5	PCB-1232	1	38	38	9.8	U
53469-21-9	PCB-1242	1	78	78	19	U
12672-29-6	PCB-1248	1	38	38	6.2	U
11097-69-1	PCB-1254	1	38	38	5.1	U
11096-82-5	PCB-1260	1	78	78	19	U
37324-23-5	PCB-1262	1	38	38	6.1	U
11100-14-4	PCB-1268	1	38	38	5.1	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		38.8	34.7	89	60 - 125	
Tetrachloro-m-xylene		38.8	36.4	94	32 - 129	

* Values outside of QC limits

02613

ANALYSIS DATA SHEET

38SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711431-03 File ID: A190085-0

Sampled: 11/16/07 08:35 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 07:28

Solids: 88.70 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	37	37	4.7	U
11104-28-2	PCB-1221	1	37	37	8.3	U
11141-16-5	PCB-1232	1	37	37	9.5	U
53469-21-9	PCB-1242	1	76	76	18	U
12672-29-6	PCB-1248	1	37	37	6.0	U
11097-69-1	PCB-1254	1	17	37	5.0	J
11096-82-5	PCB-1260	1	76	76	18	U
37324-23-5	PCB-1262	1	37	37	5.9	U
11100-14-4	PCB-1268	1	37	37	5.0	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	37.6	30.4	81	60 - 125	
Tetrachloro-m-xylene	37.6	34.0	91	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

38SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711431-04 File ID: A190086-0

Sampled: 11/16/07 09:45 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 07:45

Solids: 88.67 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	37	37	4.7	U
11104-28-2	PCB-1221	1	37	37	8.3	U
11141-16-5	PCB-1232	1	37	37	9.5	U
53469-21-9	PCB-1242	1	76	76	18	U
12672-29-6	PCB-1248	1	37	37	6.0	U
11097-69-1	PCB-1254	1	120	37	5.0	
11096-82-5	PCB-1260	1	76	76	18	U
37324-23-5	PCB-1262	1	37	37	5.9	U
11100-14-4	PCB-1268	1	37	37	5.0	U
System Monitoring Compound		**ADDED (ug/kg dry)**	**CONC (ug/kg dry)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		37.6	32.5	87	60 - 125	
Tetrachloro-m-xylene		37.6	35.8	95	32 - 129	

* Values outside of QC limits

02581

ANALYSIS DATA SHEET

QSB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Soil Laboratory ID: 0711431-05 File ID: A190087-0

Sampled: 11/16/07 10:20 Prepared: 11/29/07 07:05 Analyzed: 12/07/07 08:02

Solids: 79.70 Preparation: 3550B Sonication Extrac Initial/Final: 30 g / 10 mL

QC Batch: 0714555 Sequence: 7120751 Calibration: 7L07016 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/kg dry)	MRL	MDL	Q
12674-11-2	PCB-1016	1	41	41	5.3	U
11104-28-2	PCB-1221	1	41	41	9.3	U
11141-16-5	PCB-1232	1	41	41	11	U
53469-21-9	PCB-1242	1	84	84	20	U
12672-29-6	PCB-1248	1	41	41	6.7	U
11097-69-1	PCB-1254	1	400	41	5.5	
11096-82-5	PCB-1260	1	84	84	20	U
37324-23-5	PCB-1262	1	41	41	6.5	U
11100-14-4	PCB-1268	1	41	41	5.5	U

System Monitoring Compound	ADDED (ug/kg dry)	CONC (ug/kg dry)	% Rec.	QC Limits	Q
Decachlorobiphenyl	41.8	31.3	75	60 - 125	
Tetrachloro-m-xylene	41.8	33.0	79	32 - 129	

* Values outside of QC limits

ANALYSIS DATA SHEET

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Water Laboratory ID: 0711431-06 File ID: A189136-0

Sampled: 11/16/07 10:58 Prepared: 11/20/07 07:10 Analyzed: 12/03/07 12:04

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0714046 Sequence: 7120470 Calibration: 7L04020 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Decachlorobiphenyl	0.189	0.189	100	40 - 135	
Tetrachloro-m-xylene	0.189	0.160	85	36 - 114	

* Values outside of QC limits

SAMPLE ID SUMMARY

USEPA-8330

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44

Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
37SB8A	0711396-01
37SB8A	0711396-01RE1
37SB8B	0711396-02
37SB8C	0711396-03
DUP-4	0711396-04
37SB4A	0711396-05
37SB5A	0711396-06
37SB6A	0711396-07
38SB10A	0711396-08
38SB10B	0711396-09
38SB10C	0711396-10
38SB9A	0711396-11
38SB9B	0711396-12
38SB9C	0711396-13
38SB8A	0711396-14
38SB8B	0711396-15
38SB8C	0711396-16
EQBK-3	0711396-17
38SB7A	0711396-18
38SB7B	0711396-19
38SB7C	0711396-20
DUP-5	0711396-21
38SB4A	0711431-01
DUP-6	0711431-02
38SB5A	0711431-03
38SB6A	0711431-04
QSB4A	0711431-05
EQBK-4	0711431-06

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-01 File ID: data019-0

Sampled: 11/15/07 07:40 Prepared: 11/28/07 07:41 Analyzed: 12/16/07 01:59

Solids: 66.40 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121601 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	0.82	2.5	0.10	J
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.54	102	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-01RE1 File ID: E2a022-0

Sampled: 11/15/07 07:40 Prepared: 11/28/07 07:41 Analyzed: 12/18/07 07:06

Solids: 66.40 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121838 Calibration: 7H30002 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	0.71	2.5	0.10	J
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.15	86	57 - 139	

* Values outside of QC limits

Do Not use RA 1/22/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-02 File ID: data020-0

Sampled: 11/15/07 08:00 Prepared: 11/28/07 07:41 Analyzed: 12/16/07 02:48

Solids: 85.37 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121601 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.08	123	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-03 File ID: data021-0

Sampled: 11/15/07 08:00 Prepared: 11/28/07 07:41 Analyzed: 12/16/07 03:37

Solids: 85.05 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121601 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.57	103	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-04 File ID: data025-0

Sampled: 11/15/07 09:00 Prepared: 11/28/07 07:41 Analyzed: 12/16/07 06:53

Solids: 55.36 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.95	118	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-05 File ID: data005-0

Sampled: 11/15/07 08:50 Prepared: 11/28/07 07:41 Analyzed: 12/10/07 19:55

Solids: 88.00 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121402 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Méthyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.02	121	57 - 139	

* Values outside of QC limits

: 00191

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-06 File ID: data006-0

Sampled: 11/15/07 09:30 Prepared: 11/28/07 07:41 Analyzed: 12/10/07 20:44

Solids: 84.89 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714378 Sequence: 7121402 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U UJ, m
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U UJ, m
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U UJ, m
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.06	122	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-07 File ID: data011-0

Sampled: 11/15/07 10:00 Prepared: 11/28/07 07:42 Analyzed: 12/11/07 00:50

Solids: 83.20 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121402 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ,Q
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.19	128	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-08 File ID: data012-0

Sampled: 11/15/07 10:58 Prepared: 11/28/07 07:42 Analyzed: 12/11/07 01:39

Solids: 70.79 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121402 Calibration: 7L09001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ, Q
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	1.46	58	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-09 File ID: data026-0

Sampled: 11/15/07 10:58 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 07:43

Solids: 82.05 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ,R
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.97	119	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-10 File ID: data027-0

Sampled: 11/15/07 11:10 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 08:32

Solids: 83.90 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ, R
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.43	137	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-11 File ID: data028-0

Sampled: 11/15/07 11:35 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 09:21

Solids: 80.08 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ, Q
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.41	136	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-12 File ID: data029-0

Sampled: 11/15/07 11:35 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 10:10

Solids: 82.14 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ, R
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.39	136	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-13 File ID: data030-0

Sampled: 11/15/07 11:40 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 10:59

Solids: 83.53 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ, l
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.28	131	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-14 File ID: data010-0

Sampled: 11/15/07 13:18 Prepared: 11/28/07 07:42 Analyzed: 12/27/07 14:58

Solids: 80.70 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7122820 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ, R
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.46	98	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-15 File ID: data011-0

Sampled: 11/15/07 13:18 Prepared: 11/28/07 07:42 Analyzed: 12/27/07 15:40

Solids: 82.71 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7122820 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ, R
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.05	82	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-16 File ID: data031-0

Sampled: 11/15/07 13:22 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 11:48

Solids: 83.11 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ,d
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.12	125	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

EQBK-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711396-17 File ID: data032-0

Sampled: 11/15/07 12:50 Prepared: 11/20/07 18:37 Analyzed: 12/13/07 07:57

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0714136 Sequence: 7121403 Calibration: 7L14001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.08	64	29 - 138	

* Values outside of QC limits

00217

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-18 File ID: data032-0

Sampled: 11/15/07 14:15 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 12:38

Solids: 74.65 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ, Q
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.29	132	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-19 File ID: data012-0

Sampled: 11/15/07 14:15 Prepared: 11/28/07 07:42 Analyzed: 12/27/07 16:22

Solids: 83.24 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7122820 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ,Q
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.69	107	57 - 139	

* Values outside of QC limits

80223

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-20 File ID: data034-0

Sampled: 11/15/07 14:20 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 14:16

Solids: 85.43 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.23	129	57 - 139	

* Values outside of QC limits

0225

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-21 File ID: data037-0

Sampled: 11/15/07 13:00 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 16:43

Solids: 64.80 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ, L
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.08	123	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711431-01 File ID: data036-0

Sampled: 11/16/07 08:10 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 15:54

Solids: 87.21 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ,P
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.48	139	57 - 139	

* Values outside of QC limits

00232

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711431-02 File ID: data038-0

Sampled: 11/16/07 09:00 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 17:32

Solids: 85.82 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ, R
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.23	129	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711431-03 File ID: data039-0

Sampled: 11/16/07 08:35 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 18:22

Solids: 88.70 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ,A
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	3.00	120	57 - 139	

* Values outside of QC limits

00238

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711431-04 File ID: data040-0

Sampled: 11/16/07 09:45 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 19:11

Solids: 88.67 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U UJ
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.51	100	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

QSB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711431-05 File ID: data041-0

Sampled: 11/16/07 10:20 Prepared: 11/28/07 07:42 Analyzed: 12/16/07 20:00

Solids: 79.70 Preparation: 8330 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714379 Sequence: 7121704 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	2.5	2.5	0.074	U
99-65-0	1,3-Dinitrobenzene	1	2.5	2.5	0.076	U
118-96-7	2,4,6-Trinitrotoluene	1	2.5	2.5	0.15	U
121-14-2	2,4-Dinitrotoluene	1	2.5	2.5	0.10	U
606-20-2	2,6-Dinitrotoluene	1	2.5	2.5	0.20	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	2.5	2.5	0.22	U
88-72-2	2-Nitrotoluene	1	2.5	2.5	0.17	U VJ, R
99-08-1	3-Nitrotoluene	1	2.5	2.5	0.21	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	2.5	2.5	0.30	U
99-99-0	4-Nitrotoluene	1	2.5	2.5	0.20	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	2.5	2.5	0.048	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	2.5	2.5	0.065	U
98-95-3	Nitrobenzene	1	2.5	2.5	0.030	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	2.5	2.5	0.066	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
4-Nitroaniline	2.50	2.79	112	57 - 139	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711431-06 File ID: data012-0

Sampled: 11/16/07 10:58 Prepared: 11/20/07 18:37 Analyzed: 12/15/07 20:15

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0714136 Sequence: 7121601 Calibration: 7L16001 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.83	87	29 - 138	

* Values outside of QC limits

00247

SAMPLE ID SUMMARY

USEPA-8332

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-44

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
37SB8A	0711396-01
37SB8B	0711396-02
37SB8C	0711396-03
DUP-4	0711396-04
37SB4A	0711396-05
37SB5A	0711396-06
37SB6A	0711396-07
38SB10A	0711396-08
38SB10B	0711396-09
38SB10C	0711396-10
38SB9A	0711396-11
38SB9B	0711396-12
38SB9C	0711396-13
38SB8A	0711396-14
38SB8B	0711396-15
38SB8C	0711396-16
EQBK-3	0711396-17
38SB7A	0711396-18
38SB7B	0711396-19
38SB7C	0711396-20
DUP-5	0711396-21
38SB4A	0711431-01
DUP-6	0711431-02
38SB5A	0711431-03
38SB6A	0711431-04
QSB4A	0711431-05
EQBK-4	0711431-06

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-01 File ID: data020-0

Sampled: 11/15/07 07:40 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 18:19

Solids: 66.40 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.14	86	50 - 150	

* Values outside of QC limits

0851

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-02 File ID: data021-0

Sampled: 11/15/07 08:00 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 18:36

Solids: 85.37 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.77	112	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-03 File ID: data022-0

Sampled: 11/15/07 08:00 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 18:53

Solids: 85.05 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.83	114	50 - 150	

* Values outside of QC limits

0595

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

DUP-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-04 File ID: data023-0

Sampled: 11/15/07 09:00 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 19:10

Solids: 55.36 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.26	91	50 - 150	

* Values outside of QC limits

00597

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-05 File ID: data025-0

Sampled: 11/15/07 08:50 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 19:45

Solids: 88.00 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.80	113	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-06 File ID: data026-0

Sampled: 11/15/07 09:30 Prepared: 11/28/07 07:12 Analyzed: 12/03/07 20:02

Solids: 84.89 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714468 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.84	115	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-07 File ID: data031-0

Sampled: 11/15/07 10:00 Prepared: 11/28/07 07:13 Analyzed: 12/03/07 21:29

Solids: 83.20 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.86	116	50 - 150	

* Values outside of QC limits

00503

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB10A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-08 File ID: data032-0

Sampled: 11/15/07 10:58 Prepared: 11/28/07 07:13 Analyzed: 12/03/07 21:46

Solids: 70.79 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.71	109	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB10B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-09 File ID: data033-0

Sampled: 11/15/07 10:58 Prepared: 11/28/07 07:13 Analyzed: 12/03/07 22:03

Solids: 82.05 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.82	114	50 - 150	

* Values outside of QC limits

00507

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB10C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-10 File ID: data034-0

Sampled: 11/15/07 11:10 Prepared: 11/28/07 07:13 Analyzed: 12/03/07 22:20

Solids: 83.90 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.85	115	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB9A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-11 File ID: data036-0

Sampled: 11/15/07 11:35 Prepared: 11/28/07 07:13 Analyzed: 12/03/07 22:55

Solids: 80.08 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.78	112	50 - 150	

* Values outside of QC limits

00611

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB9B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-12 File ID: data037-0

Sampled: 11/15/07 11:35 Prepared: 11/28/07 07:13 Analyzed: 12/03/07 23:12

Solids: 82.14 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.83	114	50 - 150	

* Values outside of QC limits

: 00513

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB9C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-13 File ID: data038-0

Sampled: 11/15/07 11:40 Prepared: 11/28/07 07:13 Analyzed: 12/03/07 23:29

Solids: 83.53 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.87	116	50 - 150	

* Values outside of QC limits

: 09515

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB8A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-14 File ID: data039-0

Sampled: 11/15/07 13:18 Prepared: 11/28/07 07:13 Analyzed: 12/03/07 23:47

Solids: 80.70 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.83	114	50 - 150	

* Values outside of QC limits

00617

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB8B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-15 File ID: data040-0

Sampled: 11/15/07 13:18 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 00:04

Solids: 82.71 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.85	115	50 - 150	

* Values outside of QC limits

00519

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB8C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-16 File ID: data041-0

Sampled: 11/15/07 13:22 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 00:21

Solids: 83.11 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.84	115	50 - 150	

* Values outside of QC limits

: 08621

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

EQBK-3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711396-17 File ID: data015-0

Sampled: 11/15/07 12:50 Prepared: 11/20/07 18:38 Analyzed: 11/26/07 15:23

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0714137 Sequence: 7120530 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.51	109	50 - 150	

* Values outside of QC limits

: 06623

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB7A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-18 File ID: data042-0

Sampled: 11/15/07 14:15 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 00:39

Solids: 74.65 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.70	109	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB7B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-19 File ID: data043-0

Sampled: 11/15/07 14:15 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 00:56

Solids: 83.24 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.84	115	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB7C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-20 File ID: data044-0

Sampled: 11/15/07 14:20 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 01:13

Solids: 85.43 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.83	114	50 - 150	

* Values outside of QC limits

: 09631

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

DUP-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711396-21 File ID: data045-0

Sampled: 11/15/07 13:00 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 01:30

Solids: 64.80 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.33	94	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711431-01 File ID: data047-0

Sampled: 11/16/07 08:10 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 02:05

Solids: 87.21 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.83	115	50 - 150	

* Values outside of QC limits

00535

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

DUP-6

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711431-02 File ID: data048-0

Sampled: 11/16/07 09:00 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 02:22

Solids: 85.82 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.84	115	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB5A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711431-03 File ID: data049-0

Sampled: 11/16/07 08:35 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 02:39

Solids: 88.70 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.77	112	50 - 150	

* Values outside of QC limits

: 00539

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38SB6A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711431-04 File ID: data050-0

Sampled: 11/16/07 09:45 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 02:57

Solids: 88.67 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.80	113	50 - 150	

* Values outside of QC limits

: 0054 1

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

QSB4A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Soil Laboratory ID: 0711431-05 File ID: data051-0

Sampled: 11/16/07 10:20 Prepared: 11/28/07 07:13 Analyzed: 12/04/07 03:14

Solids: 79.70 Preparation: 8332 Extraction Initial/Final: 2 g / 20 mL

QC Batch: 0714469 Sequence: 7120808 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (mg/kg dry	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.39	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.23	U

System Monitoring Compound	ADDED (mg/kg dry	CONC (mg/kg dry	% REC.	QC Limits	Q
1-Nitronaphthalene	2.48	2.80	113	50 - 150	

* Values outside of QC limits

: 00643

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

EQBK-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Matrix: Water Laboratory ID: 0711431-06 File ID: data016-0

Sampled: 11/16/07 10:58 Prepared: 11/20/07 18:38 Analyzed: 11/26/07 15:40

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0714137 Sequence: 7120530 Calibration: 7L05006 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.55	110	50 - 150	

* Values outside of QC limits

SAMPLE ID SUMMARY

USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-44

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
37SB8A	0711396-01
37SB8B	0711396-02
37SB8C	0711396-03
DUP-4	0711396-04
37SB4A	0711396-05
37SB5A	0711396-06
37SB6A	0711396-07
38SB10A	0711396-08
38SB10B	0711396-09
38SB10C	0711396-10
38SB9A	0711396-11
38SB9B	0711396-12
38SB9C	0711396-13
38SB8A	0711396-14
38SB8B	0711396-15
38SB8C	0711396-16
EQBK-3	0711396-17
38SB7A	0711396-18
38SB7B	0711396-19
38SB7C	0711396-20
DUP-5	0711396-21
38SB4A	0711431-01
DUP-6	0711431-02
38SB5A	0711431-03
38SB6A	0711431-04
EQBK-4	0711431-06

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 07:40
Solids: 66.40
Laboratory ID: 0711396-01

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	17000	mg/kg dry wt.	1	10	2.1		12/03/07 12:17
7440-39-3	Barium, Total	80	mg/kg dry wt.	1	1.0	0.17		12/03/07 12:17
7440-41-7	Beryllium, Total	0.90	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 12:19
7440-43-9	Cadmium, Total	2.2	mg/kg dry wt.	1	2.0	0.11		12/03/07 12:19
7440-70-2	Calcium, Total	73000	mg/kg dry wt.	1	50	4.2		12/03/07 12:17
7440-47-3	Chromium, Total	170	mg/kg dry wt.	1	5.0	0.72		12/03/07 12:19
7440-48-4	Cobalt, Total	5.1	mg/kg dry wt.	1	2.0	0.37		12/03/07 12:19
7439-89-6	Iron, Total	25000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 12:17
7439-95-4	Magnesium, Total	2900	mg/kg dry wt.	1	50	5.0		12/03/07 12:17
7439-96-5	Manganese, Total	130	mg/kg dry wt.	1	1.0	0.16		12/03/07 12:17
7440-09-7	Potassium, Total	1100	mg/kg dry wt.	1	50	5.3		12/03/07 12:17
7440-23-5	Sodium, Total	91	mg/kg dry wt.	1	100	13	J	12/03/07 12:17
7440-66-6	Zinc, Total	99	mg/kg dry wt.	1	5.0	1.0		12/03/07 12:19

: 00801

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:00
Solids: 85.37
Laboratory ID: 0711396-02

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	19000	mg/kg dry wt.	1	10	2.1		12/03/07 12:23
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17		12/03/07 12:23
7440-41-7	Beryllium, Total	0.65	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 12:25
7440-43-9	Cadmium, Total	1.4	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 12:25
7440-70-2	Calcium, Total	7500	mg/kg dry wt.	1	50	4.2		12/03/07 12:23
7440-47-3	Chromium, Total	30	mg/kg dry wt.	1	5.0	0.72		12/03/07 12:25
7440-48-4	Cobalt, Total	10	mg/kg dry wt.	1	2.0	0.37		12/03/07 12:25
7439-89-6	Iron, Total	28000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 12:23
7439-95-4	Magnesium, Total	4600	mg/kg dry wt.	1	50	5.0		12/03/07 12:23
7439-96-5	Manganese, Total	340	mg/kg dry wt.	1	1.0	0.16		12/03/07 12:23
7440-09-7	Potassium, Total	2600	mg/kg dry wt.	1	50	5.3		12/03/07 12:23
7440-23-5	Sodium, Total	61	mg/kg dry wt.	1	100	13	J	12/03/07 12:23
7440-66-6	Zinc, Total	69	mg/kg dry wt.	1	5.0	1.0		12/03/07 12:25

: 009902

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:00
Solids: 85.05
Laboratory ID: 0711396-03

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	19000	mg/kg dry wt.	1	10	2.1		12/03/07 12:29
7440-39-3	Barium, Total	120	mg/kg dry wt.	1	1.0	0.17		12/03/07 12:29
7440-41-7	Beryllium, Total	0.56	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 12:31
7440-43-9	Cadmium, Total	1.9	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 12:31
7440-70-2	Calcium, Total	1900	mg/kg dry wt.	1	50	4.2		12/03/07 12:30
7440-47-3	Chromium, Total	25	mg/kg dry wt.	1	5.0	0.72		12/03/07 12:31
7440-48-4	Cobalt, Total	11	mg/kg dry wt.	1	2.0	0.37		12/03/07 12:31
7439-89-6	Iron, Total	29000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 12:30
7439-95-4	Magnesium, Total	4600	mg/kg dry wt.	1	50	5.0		12/03/07 12:30
7439-96-5	Manganese, Total	350	mg/kg dry wt.	1	1.0	0.16		12/03/07 12:30
7440-09-7	Potassium, Total	2400	mg/kg dry wt.	1	50	5.3		12/03/07 12:30
7440-23-5	Sodium, Total	65	mg/kg dry wt.	1	100	13	J	12/03/07 12:29
7440-66-6	Zinc, Total	61	mg/kg dry wt.	1	5.0	1.0		12/03/07 12:31

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 09:00
Solids: 55.36
Laboratory ID: 0711396-04

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	16000	mg/kg dry wt.	1	10	2.1		12/03/07 12:36
7440-39-3	Barium, Total	69	mg/kg dry wt.	1	1.0	0.17		12/03/07 12:36
7440-41-7	Beryllium, Total	1.2	mg/kg dry wt.	1	1.0	0.021		12/03/07 12:37
7440-43-9	Cadmium, Total	2.3	mg/kg dry wt.	1	2.0	0.11		12/03/07 12:37
7440-70-2	Calcium, Total	79000	mg/kg dry wt.	1	50	4.2		12/03/07 12:36
7440-47-3	Chromium, Total	190	mg/kg dry wt.	1	5.0	0.72		12/03/07 12:37
7440-48-4	Cobalt, Total	4.6	mg/kg dry wt.	1	2.0	0.37		12/03/07 12:37
7439-89-6	Iron, Total	22000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 12:36
7439-95-4	Magnesium, Total	2700	mg/kg dry wt.	1	50	5.0		12/03/07 12:36
7439-96-5	Manganese, Total	130	mg/kg dry wt.	1	1.0	0.16		12/03/07 12:36
7440-09-7	Potassium, Total	940	mg/kg dry wt.	1	50	5.3		12/03/07 12:36
7440-23-5	Sodium, Total	93	mg/kg dry wt.	1	100	13	J	12/03/07 12:36
7440-66-6	Zinc, Total	85	mg/kg dry wt.	1	5.0	1.0		12/03/07 12:37

00804

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:50
Solids: 88.00
Laboratory ID: 0711396-05

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4998 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	9400	mg/kg dry wt.	1	10	2.1		12/03/07 12:41
7440-39-3	Barium, Total	100	mg/kg dry wt.	1	1.0	0.17		12/03/07 12:41
7440-41-7	Beryllium, Total	0.46	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 12:43
7440-43-9	Cadmium, Total	1.0	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 12:43
7440-70-2	Calcium, Total	1300	mg/kg dry wt.	1	50	4.2		12/03/07 12:41
7440-47-3	Chromium, Total	16	mg/kg dry wt.	1	5.0	0.72		12/03/07 12:43
7440-48-4	Cobalt, Total	6.4	mg/kg dry wt.	1	2.0	0.37		12/03/07 12:43
7439-89-6	Iron, Total	15000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 12:41
7439-95-4	Magnesium, Total	2500	mg/kg dry wt.	1	50	5.0		12/03/07 12:41
7439-96-5	Manganese, Total	400	mg/kg dry wt.	1	1.0	0.16		12/03/07 12:41
7440-09-7	Potassium, Total	1400	mg/kg dry wt.	1	50	5.3		12/03/07 12:41
7440-23-5	Sodium, Total	47	mg/kg dry wt.	1	100	13	J	12/03/07 12:41
7440-66-6	Zinc, Total	60	mg/kg dry wt.	1	5.0	1.0		12/03/07 12:43

00805

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 09:30
Solids: 84.89
Laboratory ID: 0711396-06

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	20000	mg/kg dry wt.	100	1000	210		12/03/07 17:28
7440-39-3	Barium, Total	86	mg/kg dry wt.	1	1.0	0.17		12/03/07 12:47
7440-41-7	Beryllium, Total	0.47	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 12:49
7440-43-9	Cadmium, Total	1.9	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 12:49
7440-70-2	Calcium, Total	1300	mg/kg dry wt.	1	50	4.2		12/03/07 12:48
7440-47-3	Chromium, Total	34	mg/kg dry wt.	1	5.0	0.72		12/03/07 12:49
7440-48-4	Cobalt, Total	9.6	mg/kg dry wt.	1	2.0	0.37		12/03/07 12:49
7439-89-6	Iron, Total	29000	mg/kg dry wt.	500	5000	240	J, s	12/03/07 17:09
7439-95-4	Magnesium, Total	2800	mg/kg dry wt.	1	50	5.0		12/03/07 12:48
7439-96-5	Manganese, Total	470	mg/kg dry wt.	10	10	1.6		12/03/07 17:47
7440-09-7	Potassium, Total	1700	mg/kg dry wt.	1	50	5.3		12/03/07 12:48
7440-23-5	Sodium, Total	39	mg/kg dry wt.	1	100	13	J	12/03/07 12:47
7440-66-6	Zinc, Total	49	mg/kg dry wt.	1	5.0	1.0		12/03/07 12:49

00806

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:00
Solids: 83.20
Laboratory ID: 0711396-07

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4999 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	21000	mg/kg dry wt.	1	10	2.1		12/03/07 13:37
7440-39-3	Barium, Total	47	mg/kg dry wt.	1	1.0	0.17		12/03/07 13:37
7440-41-7	Beryllium, Total	0.64	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 13:38
7440-43-9	Cadmium, Total	2.2	mg/kg dry wt.	1	2.0	0.11		12/03/07 13:39
7440-70-2	Calcium, Total	250	mg/kg dry wt.	1	50	4.2		12/03/07 13:37
7440-47-3	Chromium, Total	24	mg/kg dry wt.	1	5.0	0.72		12/03/07 13:39
7440-48-4	Cobalt, Total	3.7	mg/kg dry wt.	1	2.0	0.37		12/03/07 13:39
7439-89-6	Iron, Total	28000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 13:37
7439-95-4	Magnesium, Total	880	mg/kg dry wt.	1	50	5.0		12/03/07 13:37
7439-96-5	Manganese, Total	160	mg/kg dry wt.	1	1.0	0.16		12/03/07 13:37
7440-09-7	Potassium, Total	1100	mg/kg dry wt.	1	50	5.3		12/03/07 13:37
7440-23-5	Sodium, Total	28	mg/kg dry wt.	1	100	13	J	12/03/07 13:37
7440-66-6	Zinc, Total	31	mg/kg dry wt.	1	5.0	1.0		12/03/07 13:39

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:58
Solids: 70.79
Laboratory ID: 0711396-08

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	24000	mg/kg dry wt.	1	10	2.1		12/03/07 13:43
7440-39-3	Barium, Total	120	mg/kg dry wt.	1	1.0	0.17		12/03/07 13:43
7440-41-7	Beryllium, Total	0.68	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 13:44
7440-43-9	Cadmium, Total	1.6	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 13:45
7440-70-2	Calcium, Total	7400	mg/kg dry wt.	1	50	4.2		12/03/07 13:43
7440-47-3	Chromium, Total	74	mg/kg dry wt.	1	5.0	0.72		12/03/07 13:45
7440-48-4	Cobalt, Total	9.6	mg/kg dry wt.	1	2.0	0.37		12/03/07 13:45
7439-89-6	Iron, Total	29000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 13:43
7439-95-4	Magnesium, Total	5300	mg/kg dry wt.	1	50	5.0		12/03/07 13:43
7439-96-5	Manganese, Total	400	mg/kg dry wt.	1	1.0	0.16		12/03/07 13:43
7440-09-7	Potassium, Total	2100	mg/kg dry wt.	1	50	5.3		12/03/07 13:43
7440-23-5	Sodium, Total	62	mg/kg dry wt.	1	100	13	J	12/03/07 13:43
7440-66-6	Zinc, Total	83	mg/kg dry wt.	1	5.0	1.0		12/03/07 13:45

: 00805

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:58
Solids: 82.05
Laboratory ID: 0711396-09

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	19000	mg/kg dry wt.	1	10	2.1		12/03/07 13:49
7440-39-3	Barium, Total	140	mg/kg dry wt.	1	1.0	0.17		12/03/07 13:49
7440-41-7	Beryllium, Total	0.48	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 13:50
7440-43-9	Cadmium, Total	1.8	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 13:51
7440-70-2	Calcium, Total	2400	mg/kg dry wt.	1	50	4.2		12/03/07 13:49
7440-47-3	Chromium, Total	26	mg/kg dry wt.	1	5.0	0.72		12/03/07 13:51
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		12/03/07 13:51
7439-89-6	Iron, Total	30000	mg/kg dry wt.	1	10	0.48	J5	12/03/07 13:49
7439-95-4	Magnesium, Total	5100	mg/kg dry wt.	1	50	5.0		12/03/07 13:49
7439-96-5	Manganese, Total	490	mg/kg dry wt.	1	1.0	0.16		12/03/07 13:49
7440-09-7	Potassium, Total	2000	mg/kg dry wt.	1	50	5.3		12/03/07 13:49
7440-23-5	Sodium, Total	55	mg/kg dry wt.	1	100	13	J	12/03/07 13:49
7440-66-6	Zinc, Total	65	mg/kg dry wt.	1	5.0	1.0		12/03/07 13:51

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:10
Solids: 83.90
Laboratory ID: 0711396-10

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	15000	mg/kg dry wt.	1	10	2.1		12/03/07 13:55
7440-39-3	Barium, Total	96	mg/kg dry wt.	1	1.0	0.17		12/03/07 13:55
7440-41-7	Beryllium, Total	0.42	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 13:56
7440-43-9	Cadmium, Total	1.6	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 13:57
7440-70-2	Calcium, Total	1900	mg/kg dry wt.	1	50	4.2		12/03/07 13:55
7440-47-3	Chromium, Total	23	mg/kg dry wt.	1	5.0	0.72		12/03/07 13:57
7440-48-4	Cobalt, Total	8.9	mg/kg dry wt.	1	2.0	0.37		12/03/07 13:57
7439-89-6	Iron, Total	25000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 13:55
7439-95-4	Magnesium, Total	4100	mg/kg dry wt.	1	50	5.0		12/03/07 13:55
7439-96-5	Manganese, Total	440	mg/kg dry wt.	1	1.0	0.16		12/03/07 13:55
7440-09-7	Potassium, Total	1500	mg/kg dry wt.	1	50	5.3		12/03/07 13:55
7440-23-5	Sodium, Total	59	mg/kg dry wt.	1	100	13	J	12/03/07 13:55
7440-66-6	Zinc, Total	49	mg/kg dry wt.	1	5.0	1.0		12/03/07 13:57

0088

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:35
Solids: 80.08
Laboratory ID: 0711396-11

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	21000	mg/kg dry wt.	1	10	2.1		12/03/07 14:01
7440-39-3	Barium, Total	160	mg/kg dry wt.	1	1.0	0.17		12/03/07 14:01
7440-41-7	Beryllium, Total	0.68	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 14:02
7440-43-9	Cadmium, Total	1.8	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 14:03
7440-70-2	Calcium, Total	2700	mg/kg dry wt.	1	50	4.2		12/03/07 14:01
7440-47-3	Chromium, Total	35	mg/kg dry wt.	1	5.0	0.72		12/03/07 14:03
7440-48-4	Cobalt, Total	12	mg/kg dry wt.	1	2.0	0.37		12/03/07 14:03
7439-89-6	Iron, Total	28000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 14:01
7439-95-4	Magnesium, Total	5100	mg/kg dry wt.	1	50	5.0		12/03/07 14:01
7439-96-5	Manganese, Total	530	mg/kg dry wt.	1	1.0	0.16		12/03/07 14:01
7440-09-7	Potassium, Total	2200	mg/kg dry wt.	1	50	5.3		12/03/07 14:01
7440-23-5	Sodium, Total	65	mg/kg dry wt.	1	100	13	J	12/03/07 14:01
7440-66-6	Zinc, Total	73	mg/kg dry wt.	1	5.0	1.0		12/03/07 14:03

0811

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:35
Solids: 82.14
Laboratory ID: 0711396-12

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	23000	mg/kg dry wt.	1	10	2.1		12/03/07 14:07
7440-39-3	Barium, Total	180	mg/kg dry wt.	1	1.0	0.17		12/03/07 14:07
7440-41-7	Beryllium, Total	0.60	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 14:08
7440-43-9	Cadmium, Total	2.0	mg/kg dry wt.	1	2.0	0.11		12/03/07 14:09
7440-70-2	Calcium, Total	2400	mg/kg dry wt.	1	50	4.2		12/03/07 14:07
7440-47-3	Chromium, Total	29	mg/kg dry wt.	1	5.0	0.72		12/03/07 14:09
7440-48-4	Cobalt, Total	13	mg/kg dry wt.	1	2.0	0.37		12/03/07 14:09
7439-89-6	Iron, Total	31000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 14:07
7439-95-4	Magnesium, Total	5500	mg/kg dry wt.	1	50	5.0		12/03/07 14:07
7439-96-5	Manganese, Total	550	mg/kg dry wt.	1	1.0	0.16		12/03/07 14:07
7440-09-7	Potassium, Total	2200	mg/kg dry wt.	1	50	5.3		12/03/07 14:07
7440-23-5	Sodium, Total	73	mg/kg dry wt.	1	100	13	J	12/03/07 14:07
7440-66-6	Zinc, Total	71	mg/kg dry wt.	1	5.0	1.0		12/03/07 14:09

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:40
Solids: 83.53
Laboratory ID: 0711396-13

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	16000	mg/kg dry wt.	1	10	2.1		12/03/07 14:13
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17		12/03/07 14:13
7440-41-7	Beryllium, Total	0.32	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 14:14
7440-43-9	Cadmium, Total	1.6	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 14:15
7440-70-2	Calcium, Total	2000	mg/kg dry wt.	1	50	4.2		12/03/07 14:13
7440-47-3	Chromium, Total	20	mg/kg dry wt.	1	5.0	0.72		12/03/07 14:15
7440-48-4	Cobalt, Total	10	mg/kg dry wt.	1	2.0	0.37		12/03/07 14:15
7439-89-6	Iron, Total	24000	mg/kg dry wt.	1	10	0.48	JS	12/03/07 14:13
7439-95-4	Magnesium, Total	4300	mg/kg dry wt.	1	50	5.0		12/03/07 14:13
7439-96-5	Manganese, Total	510	mg/kg dry wt.	1	1.0	0.16		12/03/07 14:13
7440-09-7	Potassium, Total	1900	mg/kg dry wt.	1	50	5.3		12/03/07 14:13
7440-23-5	Sodium, Total	62	mg/kg dry wt.	1	100	13	J	12/03/07 14:13
7440-66-6	Zinc, Total	52	mg/kg dry wt.	1	5.0	1.0		12/03/07 14:15

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:18
Solids: 80.70
Laboratory ID: 0711396-14

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	22000	mg/kg dry wt.	1	10	2.1		12/03/07 14:19
7440-39-3	Barium, Total	150	mg/kg dry wt.	1	1.0	0.17		12/03/07 14:19
7440-41-7	Beryllium, Total	0.64	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 14:20
7440-43-9	Cadmium, Total	1.8	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 14:21
7440-70-2	Calcium, Total	2600	mg/kg dry wt.	1	50	4.2		12/03/07 14:19
7440-47-3	Chromium, Total	34	mg/kg dry wt.	1	5.0	0.72		12/03/07 14:21
7440-48-4	Cobalt, Total	11	mg/kg dry wt.	1	2.0	0.37		12/03/07 14:21
7439-89-6	Iron, Total	28000	mg/kg dry wt.	1	10	0.48	J1S	12/03/07 14:19
7439-95-4	Magnesium, Total	5100	mg/kg dry wt.	1	50	5.0		12/03/07 14:19
7439-96-5	Manganese, Total	540	mg/kg dry wt.	1	1.0	0.16		12/03/07 14:19
7440-09-7	Potassium, Total	2400	mg/kg dry wt.	1	50	5.3		12/03/07 14:19
7440-23-5	Sodium, Total	68	mg/kg dry wt.	1	100	13	J	12/03/07 14:19
7440-66-6	Zinc, Total	73	mg/kg dry wt.	1	5.0	1.0		12/03/07 14:21

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:18
Solids: 82.71
Laboratory ID: 0711396-15

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5002 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	21000	mg/kg dry wt.	1	10	2.1		12/03/07 15:54
7440-39-3	Barium, Total	160	mg/kg dry wt.	1	1.0	0.17		12/03/07 15:54
7440-41-7	Beryllium, Total	0.44	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 15:55
7440-43-9	Cadmium, Total	1.7	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 15:56
7440-70-2	Calcium, Total	2300	mg/kg dry wt.	1	50	4.2		12/03/07 15:54
7440-47-3	Chromium, Total	27	mg/kg dry wt.	1	5.0	0.72		12/03/07 15:56
7440-48-4	Cobalt, Total	11	mg/kg dry wt.	1	2.0	0.37		12/03/07 15:56
7439-89-6	Iron, Total	29000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 15:54
7439-95-4	Magnesium, Total	5000	mg/kg dry wt.	1	50	5.0		12/03/07 15:54
7439-96-5	Manganese, Total	490	mg/kg dry wt.	1	1.0	0.16		12/03/07 15:54
7440-09-7	Potassium, Total	2100	mg/kg dry wt.	1	50	5.3		12/03/07 15:54
7440-23-5	Sodium, Total	75	mg/kg dry wt.	1	100	13	J	12/03/07 15:54
7440-66-6	Zinc, Total	66	mg/kg dry wt.	1	5.0	1.0		12/03/07 15:56

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:22
Solids: 83.11
Laboratory ID: 0711396-16

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4998 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	17000	mg/kg dry wt.	1	10	2.1		12/03/07 14:44
7440-39-3	Barium, Total	120	mg/kg dry wt.	1	1.0	0.17		12/03/07 14:44
7440-41-7	Beryllium, Total	0.49	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 14:45
7440-43-9	Cadmium, Total	1.7	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 14:46
7440-70-2	Calcium, Total	2200	mg/kg dry wt.	1	50	4.2		12/03/07 14:44
7440-47-3	Chromium, Total	23	mg/kg dry wt.	1	5.0	0.72		12/03/07 14:46
7440-48-4	Cobalt, Total	9.9	mg/kg dry wt.	1	2.0	0.37		12/03/07 14:46
7439-89-6	Iron, Total	25000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 14:44
7439-95-4	Magnesium, Total	4400	mg/kg dry wt.	1	50	5.0		12/03/07 14:44
7439-96-5	Manganese, Total	440	mg/kg dry wt.	1	1.0	0.16		12/03/07 14:44
7440-09-7	Potassium, Total	1800	mg/kg dry wt.	1	50	5.3		12/03/07 14:44
7440-23-5	Sodium, Total	63	mg/kg dry wt.	1	100	13	J	12/03/07 14:44
7440-66-6	Zinc, Total	53	mg/kg dry wt.	1	5.0	1.0		12/03/07 14:46

: 08815

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

EQBK-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/15/07 12:50
Solids: 0.00
Laboratory ID: 0711396-17

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3010A Digestion
Prepared: 11/29/07 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0714542

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	11/30/07 08:36
7440-70-2	Calcium, Total	48	ug/L	1	500	40	J	11/30/07 08:36
7439-89-6	Iron, Total	11	ug/L	1	20	5.7	J	11/30/07 08:36
7439-95-4	Magnesium, Total	500	ug/L	1	500	38	U	11/30/07 08:36
7440-09-7	Potassium, Total	200	ug/L	1	200	54	U	11/30/07 08:36
7440-23-5	Sodium, Total	500	ug/L	1	500	84	U	11/30/07 08:36

0617

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:15
Solids: 74.65
Laboratory ID: 0711396-18

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	21000	mg/kg dry wt.	1	10	2.1		12/03/07 14:50
7440-39-3	Barium, Total	120	mg/kg dry wt.	1	1.0	0.17		12/03/07 14:50
7440-41-7	Beryllium, Total	0.50	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 14:52
7440-43-9	Cadmium, Total	1.4	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 14:52
7440-70-2	Calcium, Total	11000	mg/kg dry wt.	1	50	4.2		12/03/07 14:50
7440-47-3	Chromium, Total	57	mg/kg dry wt.	1	5.0	0.72		12/03/07 14:52
7440-48-4	Cobalt, Total	10	mg/kg dry wt.	1	2.0	0.37		12/03/07 14:52
7439-89-6	Iron, Total	26000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 14:50
7439-95-4	Magnesium, Total	4700	mg/kg dry wt.	1	50	5.0		12/03/07 14:50
7439-96-5	Manganese, Total	450	mg/kg dry wt.	1	1.0	0.16		12/03/07 14:50
7440-09-7	Potassium, Total	2400	mg/kg dry wt.	1	50	5.3		12/03/07 14:50
7440-23-5	Sodium, Total	65	mg/kg dry wt.	1	100	13	J	12/03/07 14:50
7440-66-6	Zinc, Total	72	mg/kg dry wt.	1	5.0	1.0		12/03/07 14:52

00818

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:15
Solids: 83.24
Laboratory ID: 0711396-19

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	20000	mg/kg dry wt.	1	10	2.1		12/03/07 14:56
7440-39-3	Barium, Total	130	mg/kg dry wt.	1	1.0	0.17		12/03/07 14:56
7440-41-7	Beryllium, Total	0.70	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 14:58
7440-43-9	Cadmium, Total	1.7	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 14:58
7440-70-2	Calcium, Total	2200	mg/kg dry wt.	1	50	4.2		12/03/07 14:56
7440-47-3	Chromium, Total	26	mg/kg dry wt.	1	5.0	0.72		12/03/07 14:58
7440-48-4	Cobalt, Total	11	mg/kg dry wt.	1	2.0	0.37		12/03/07 14:58
7439-89-6	Iron, Total	28000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 14:56
7439-95-4	Magnesium, Total	4600	mg/kg dry wt.	1	50	5.0		12/03/07 14:56
7439-96-5	Manganese, Total	490	mg/kg dry wt.	1	1.0	0.16		12/03/07 14:56
7440-09-7	Potassium, Total	2400	mg/kg dry wt.	1	50	5.3		12/03/07 14:56
7440-23-5	Sodium, Total	62	mg/kg dry wt.	1	100	13	J	12/03/07 14:56
7440-66-6	Zinc, Total	65	mg/kg dry wt.	1	5.0	1.0		12/03/07 14:58

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:20
Solids: 85.43
Laboratory ID: 0711396-20

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4999 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	17000	mg/kg dry wt.	1	10	2.1		12/03/07 15:32
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17		12/03/07 15:32
7440-41-7	Beryllium, Total	0.31	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 15:34
7440-43-9	Cadmium, Total	1.4	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 15:34
7440-70-2	Calcium, Total	2300	mg/kg dry wt.	1	50	4.2		12/03/07 15:32
7440-47-3	Chromium, Total	20	mg/kg dry wt.	1	5.0	0.72		12/03/07 15:34
7440-48-4	Cobalt, Total	9.1	mg/kg dry wt.	1	2.0	0.37		12/03/07 15:34
7439-89-6	Iron, Total	25000	mg/kg dry wt.	1	10	0.48	J1S	12/03/07 15:32
7439-95-4	Magnesium, Total	4200	mg/kg dry wt.	1	50	5.0		12/03/07 15:32
7439-96-5	Manganese, Total	400	mg/kg dry wt.	1	1.0	0.16		12/03/07 15:32
7440-09-7	Potassium, Total	2000	mg/kg dry wt.	1	50	5.3		12/03/07 15:32
7440-23-5	Sodium, Total	63	mg/kg dry wt.	1	100	13	J	12/03/07 15:32
7440-66-6	Zinc, Total	50	mg/kg dry wt.	1	5.0	1.0		12/03/07 15:34

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:00
Solids: 64.80
Laboratory ID: 0711396-21

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5004 g / 50 mL
QC Batch: 0714534

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	21000	mg/kg dry wt.	1	10	2.1		12/03/07 15:15
7440-39-3	Barium, Total	120	mg/kg dry wt.	1	1.0	0.17		12/03/07 15:15
7440-41-7	Beryllium, Total	0.43	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 15:16
7440-43-9	Cadmium, Total	1.2	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 15:17
7440-70-2	Calcium, Total	9600	mg/kg dry wt.	1	50	4.2		12/03/07 15:15
7440-47-3	Chromium, Total	52	mg/kg dry wt.	1	5.0	0.72		12/03/07 15:17
7440-48-4	Cobalt, Total	9.9	mg/kg dry wt.	1	2.0	0.37		12/03/07 15:17
7439-89-6	Iron, Total	27000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 15:15
7439-95-4	Magnesium, Total	4700	mg/kg dry wt.	1	50	5.0		12/03/07 15:15
7439-96-5	Manganese, Total	450	mg/kg dry wt.	1	1.0	0.16		12/03/07 15:15
7440-09-7	Potassium, Total	2400	mg/kg dry wt.	1	50	5.3		12/03/07 15:15
7440-23-5	Sodium, Total	64	mg/kg dry wt.	1	100	13	J	12/03/07 15:15
7440-66-6	Zinc, Total	76	mg/kg dry wt.	1	5.0	1.0		12/03/07 15:17

00821

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 08:10
Solids: 87.21
Laboratory ID: 0711431-01

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 10:30
Initial/Final: 0.4998 g / 50 mL
QC Batch: 0714578

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	8500	mg/kg dry wt.	1	10	2.1		12/03/07 10:56
7440-39-3	Barium, Total	94	mg/kg dry wt.	1	1.0	0.17		12/03/07 10:56
7440-41-7	Beryllium, Total	0.61	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 10:58
7440-43-9	Cadmium, Total	1.2	mg/kg dry wt.	1	2.0	0.11	J BP	12/03/07 10:58
7440-70-2	Calcium, Total	1100	mg/kg dry wt.	1	50	4.2		12/03/07 10:56
7440-47-3	Chromium, Total	16	mg/kg dry wt.	1	5.0	0.72		12/03/07 10:58
7440-48-4	Cobalt, Total	6.8	mg/kg dry wt.	1	2.0	0.37		12/03/07 10:58
7439-89-6	Iron, Total	15000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 10:56
7439-95-4	Magnesium, Total	2500	mg/kg dry wt.	1	50	5.0		12/03/07 10:56
7439-96-5	Manganese, Total	360	mg/kg dry wt.	1	1.0	0.16		12/03/07 10:56
7440-09-7	Potassium, Total	1100	mg/kg dry wt.	1	50	5.3		12/03/07 10:56
7440-23-5	Sodium, Total	29	mg/kg dry wt.	1	100	13	J	12/03/07 10:56
7440-66-6	Zinc, Total	49	mg/kg dry wt.	1	5.0	1.0		12/03/07 10:58

0082

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 09:00
Solids: 85.82
Laboratory ID: 0711431-02

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 10:30
Initial/Final: 0.4995 g / 50 mL
QC Batch: 0714578

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	7500	mg/kg dry wt.	1	10	2.1		12/03/07 11:02
7440-39-3	Barium, Total	80	mg/kg dry wt.	1	1.0	0.17		12/03/07 11:02
7440-41-7	Beryllium, Total	0.57	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 11:04
7440-43-9	Cadmium, Total	1.1	mg/kg dry wt.	1	2.0	0.11	J B,P	12/03/07 11:04
7440-70-2	Calcium, Total	990	mg/kg dry wt.	1	50	4.2		12/03/07 11:02
7440-47-3	Chromium, Total	14	mg/kg dry wt.	1	5.0	0.72		12/03/07 11:04
7440-48-4	Cobalt, Total	6.1	mg/kg dry wt.	1	2.0	0.37		12/03/07 11:04
7439-89-6	Iron, Total	13000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 11:02
7439-95-4	Magnesium, Total	2200	mg/kg dry wt.	1	50	5.0		12/03/07 11:02
7439-96-5	Manganese, Total	310	mg/kg dry wt.	1	1.0	0.16		12/03/07 11:02
7440-09-7	Potassium, Total	1000	mg/kg dry wt.	1	50	5.3		12/03/07 11:02
7440-23-5	Sodium, Total	25	mg/kg dry wt.	1	100	13	J	12/03/07 11:02
7440-66-6	Zinc, Total	42	mg/kg dry wt.	1	5.0	1.0		12/03/07 11:04

00623

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 08:35
Solids: 88.70
Laboratory ID: 0711431-03

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 10:30
Initial/Final: 0.5001 g / 50 mL
QC Batch: 0714578

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	10000	mg/kg dry wt.	50	500	100		12/03/07 16:18
7440-39-3	Barium, Total	120	mg/kg dry wt.	1	1.0	0.17		12/03/07 11:08
7440-41-7	Beryllium, Total	0.80	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 11:10
7440-43-9	Cadmium, Total	1.4	mg/kg dry wt.	1	2.0	0.11	J	12/03/07 11:10
7440-70-2	Calcium, Total	1600	mg/kg dry wt.	1	50	4.2		12/03/07 11:08
7440-47-3	Chromium, Total	17	mg/kg dry wt.	1	5.0	0.72		12/03/07 11:10
7440-48-4	Cobalt, Total	8.2	mg/kg dry wt.	1	2.0	0.37		12/03/07 11:10
7439-89-6	Iron, Total	18000	mg/kg dry wt.	250	2500	120	JS	12/03/07 16:37
7439-95-4	Magnesium, Total	2600	mg/kg dry wt.	1	50	5.0		12/03/07 11:08
7439-96-5	Manganese, Total	600	mg/kg dry wt.	10	10	1.6		12/03/07 16:00
7440-09-7	Potassium, Total	1300	mg/kg dry wt.	1	50	5.3		12/03/07 11:08
7440-23-5	Sodium, Total	35	mg/kg dry wt.	1	100	13	J	12/03/07 11:08
7440-66-6	Zinc, Total	120	mg/kg dry wt.	1	5.0	1.0		12/03/07 11:10

00824

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 09:45
Solids: 88.67
Laboratory ID: 0711431-04

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 10:30
Initial/Final: 0.5005 g / 50 mL
QC Batch: 0714578

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	8700	mg/kg dry wt.	1	10	2.1		12/03/07 11:38
7440-39-3	Barium, Total	110	mg/kg dry wt.	1	1.0	0.17		12/03/07 11:38
7440-41-7	Beryllium, Total	0.72	mg/kg dry wt.	1	1.0	0.021	J	12/03/07 11:39
7440-43-9	Cadmium, Total	1.2	mg/kg dry wt.	1	2.0	0.11	J B,P	12/03/07 11:40
7440-70-2	Calcium, Total	1900	mg/kg dry wt.	1	50	4.2		12/03/07 11:38
7440-47-3	Chromium, Total	16	mg/kg dry wt.	1	5.0	0.72		12/03/07 11:40
7440-48-4	Cobalt, Total	7.1	mg/kg dry wt.	1	2.0	0.37		12/03/07 11:40
7439-89-6	Iron, Total	16000	mg/kg dry wt.	1	10	0.48	J,S	12/03/07 11:38
7439-95-4	Magnesium, Total	2600	mg/kg dry wt.	1	50	5.0		12/03/07 11:38
7439-96-5	Manganese, Total	470	mg/kg dry wt.	1	1.0	0.16		12/03/07 11:38
7440-09-7	Potassium, Total	1300	mg/kg dry wt.	1	50	5.3		12/03/07 11:38
7440-23-5	Sodium, Total	34	mg/kg dry wt.	1	100	13	J	12/03/07 11:38
7440-66-6	Zinc, Total	97	mg/kg dry wt.	1	5.0	1.0		12/03/07 11:40

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

EQBK-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/16/07 10:58
Solids: 0.00
Laboratory ID: 0711431-06

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3010A Digestion
Prepared: 12/04/07 07:00
Initial/Final: 25 mL / 25 mL
QC Batch: 0714749

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	12/05/07 10:29
7440-70-2	Calcium, Total	120	ug/L	1	500	40	J	12/05/07 10:29
7439-89-6	Iron, Total	28	ug/L	1	20	5.7		12/05/07 10:29
7439-95-4	Magnesium, Total	500	ug/L	1	500	38	U	12/05/07 10:29
7440-09-7	Potassium, Total	200	ug/L	1	200	54	U	12/05/07 10:29
7440-23-5	Sodium, Total	500	ug/L	1	500	84	U	12/05/07 10:29

00825

SAMPLE ID SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-44

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
37SB8A	0711396-01
37SB8B	0711396-02
37SB8C	0711396-03
DUP-4	0711396-04
37SB4A	0711396-05
37SB5A	0711396-06
37SB6A	0711396-07
38SB10A	0711396-08
38SB10B	0711396-09
38SB10C	0711396-10
38SB9A	0711396-11
38SB9B	0711396-12
38SB9C	0711396-13
38SB8A	0711396-14
38SB8B	0711396-15
38SB8C	0711396-16
EQBK-3	0711396-17
38SB7A	0711396-18
38SB7B	0711396-19
38SB7C	0711396-20
DUP-5	0711396-21
38SB4A	0711431-01
DUP-6	0711431-02
38SB5A	0711431-03
38SB6A	0711431-04
EQBK-4	0711431-06

: 01211

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 07:40
Solids: 66.40
Laboratory ID: 0711396-01

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	6.1	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 12:55
7440-50-8	Copper, Total	120	mg/kg dry wt.	5	1.0	0.22	J,s	12/01/07 15:17
7439-92-1	Lead, Total	290	mg/kg dry wt.	10	2.0	0.22	J,s	12/01/07 15:14
7440-02-0	Nickel, Total	56	mg/kg dry wt.	5	0.50	0.18	J,s	12/01/07 15:17
7782-49-2	Selenium, Total	0.12	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 12:55
7440-22-4	Silver, Total	0.15	mg/kg dry wt.	1	0.10	0.013		12/01/07 12:55
7440-28-0	Thallium, Total	0.095	mg/kg dry wt.	1	0.10	0.0049	J B,P	12/01/07 12:55
7440-62-2	Vanadium, Total	21	mg/kg dry wt.	1	0.10	0.034		12/01/07 12:55

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 07:40
Solids: 66.40
Laboratory ID: 0711396-01

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.99	mg/kg dry wt.	1	0.20	0.042		12/03/07 14:18

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:00
Solids: 85.37
Laboratory ID: 0711396-02

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	2.1	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 12:58
7440-50-8	Copper, Total	20	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 12:58
7439-92-1	Lead, Total	28	mg/kg dry wt.	1	0.20	0.022	J,S	12/01/07 12:58
7440-02-0	Nickel, Total	18	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 12:58
7782-49-2	Selenium, Total	0.11	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 12:58
7440-22-4	Silver, Total	0.047	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 12:58
7440-28-0	Thallium, Total	0.22	mg/kg dry wt.	1	0.10	0.0049		12/01/07 12:58
7440-62-2	Vanadium, Total	41	mg/kg dry wt.	1	0.10	0.034		12/01/07 12:58

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:00
Solids: 85.37
Laboratory ID: 0711396-02

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.20	mg/kg dry wt.	1	0.20	0.042		12/03/07 14:20

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:00
Solids: 85.05
Laboratory ID: 0711396-03

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4996 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.9	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 13:01
7440-50-8	Copper, Total	14	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 13:01
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022	J,S	12/01/07 13:01
7440-02-0	Nickel, Total	15	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 13:01
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U UL,m	12/01/07 13:01
7440-22-4	Silver, Total	0.043	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 13:01
7440-28-0	Thallium, Total	0.22	mg/kg dry wt.	1	0.10	0.0049		12/01/07 13:01
7440-62-2	Vanadium, Total	39	mg/kg dry wt.	1	0.10	0.034		12/01/07 13:01

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:00
Solids: 85.05
Laboratory ID: 0711396-03

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.15	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 14:22

01216

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 09:00
Solids: 55.36
Laboratory ID: 0711396-04

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	7.5	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 13:03
7440-50-8	Copper, Total	150	mg/kg dry wt.	10	2.0	0.44	J,S	12/01/07 15:20
7439-92-1	Lead, Total	340	mg/kg dry wt.	10	2.0	0.22	J,S	12/01/07 15:20
7440-02-0	Nickel, Total	50	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 13:03
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U UL,m	12/01/07 13:03
7440-22-4	Silver, Total	0.19	mg/kg dry wt.	1	0.10	0.013		12/01/07 13:03
7440-28-0	Thallium, Total	0.076	mg/kg dry wt.	1	0.10	0.0049	J B,P	12/01/07 13:03
7440-62-2	Vanadium, Total	20	mg/kg dry wt.	1	0.10	0.034		12/01/07 13:03

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 09:00
Solids: 55.36
Laboratory ID: 0711396-04

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	1.1	mg/kg dry wt.	1	0.20	0.042		12/03/07 14:23

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:50
Solids: 88.00
Laboratory ID: 0711396-05

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.1	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 13:06
7440-50-8	Copper, Total	7.6	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 13:06
7439-92-1	Lead, Total	12	mg/kg dry wt.	1	0.20	0.022	J,S	12/01/07 13:06
7440-02-0	Nickel, Total	8.9	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 13:06
7782-49-2	Selenium, Total	0.14	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 13:06
7440-22-4	Silver, Total	0.034	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 13:06
7440-28-0	Thallium, Total	0.12	mg/kg dry wt.	1	0.10	0.0049		12/01/07 13:06
7440-62-2	Vanadium, Total	18	mg/kg dry wt.	1	0.10	0.034		12/01/07 13:06

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:50
Solids: 88.00
Laboratory ID: 0711396-05

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.086	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 14:25

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 09:30
Solids: 84.89
Laboratory ID: 0711396-06

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	2.5	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 13:16
7440-50-8	Copper, Total	15	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 13:16
7439-92-1	Lead, Total	18	mg/kg dry wt.	1	0.20	0.022	J,S	12/01/07 13:16
7440-02-0	Nickel, Total	12	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 13:16
7782-49-2	Selenium, Total	0.17	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 13:16
7440-22-4	Silver, Total	0.041	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 13:16
7440-28-0	Thallium, Total	0.20	mg/kg dry wt.	1	0.10	0.0049		12/01/07 13:16
7440-62-2	Vanadium, Total	49	mg/kg dry wt.	2	0.20	0.069		12/01/07 15:23

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 09:30
Solids: 84.89
Laboratory ID: 0711396-06

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.23	mg/kg dry wt.	1	0.20	0.042		12/03/07 14:27

01222

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:00
Solids: 83.20
Laboratory ID: 0711396-07

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.8	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 13:33
7440-50-8	Copper, Total	11	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 13:33
7439-92-1	Lead, Total	10	mg/kg dry wt.	1	0.20	0.022	J,s	12/01/07 13:33
7440-02-0	Nickel, Total	7.2	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 13:33
7782-49-2	Selenium, Total	0.18	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 13:33
7440-22-4	Silver, Total	0.028	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 13:33
7440-28-0	Thallium, Total	0.14	mg/kg dry wt.	1	0.10	0.0049		12/01/07 13:33
7440-62-2	Vanadium, Total	49	mg/kg dry wt.	1	0.10	0.034		12/01/07 13:33

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:00
Solids: 83.20
Laboratory ID: 0711396-07

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.22	mg/kg dry wt.	1	0.20	0.042		12/03/07 14:40

INORGANIC ANALYSIS DATA SHEET

USEPA-6020A

38SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:58
Solids: 70.79
Laboratory ID: 0711396-08

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	5.1	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 13:36
7440-50-8	Copper, Total	80	mg/kg dry wt.	2	0.40	0.088	J,S	12/01/07 15:44
7439-92-1	Lead, Total	52	mg/kg dry wt.	2	0.40	0.045	J,S	12/01/07 15:44
7440-02-0	Nickel, Total	32	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 13:36
7782-49-2	Selenium, Total	0.14	mg/kg dry wt.	1	0.30	0.089	J,L,m	12/01/07 13:36
7440-22-4	Silver, Total	0.098	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 13:36
7440-28-0	Thallium, Total	0.17	mg/kg dry wt.	1	0.10	0.0049		12/01/07 13:36
7440-62-2	Vanadium, Total	36	mg/kg dry wt.	1	0.10	0.034		12/01/07 13:36

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:58
Solids: 70.79
Laboratory ID: 0711396-08

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.39	mg/kg dry wt.	1	0.20	0.042		12/03/07 14:42

01226

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:58
Solids: 82.05
Laboratory ID: 0711396-09

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4995 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.6	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 13:39
7440-50-8	Copper, Total	13	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 13:39
7439-92-1	Lead, Total	13	mg/kg dry wt.	1	0.20	0.022	J,s	12/01/07 13:39
7440-02-0	Nickel, Total	14	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 13:39
7782-49-2	Selenium, Total	0.18	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 13:39
7440-22-4	Silver, Total	0.041	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 13:39
7440-28-0	Thallium, Total	0.22	mg/kg dry wt.	1	0.10	0.0049		12/01/07 13:39
7440-62-2	Vanadium, Total	41	mg/kg dry wt.	1	0.10	0.034		12/01/07 13:39

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:58
Solids: 82.05
Laboratory ID: 0711396-09

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.13	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 14:43

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:10
Solids: 83.90
Laboratory ID: 0711396-10

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4995 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.5	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 13:42
7440-50-8	Copper, Total	11	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 13:42
7439-92-1	Lead, Total	9.5	mg/kg dry wt.	1	0.20	0.022	J,s	12/01/07 13:42
7440-02-0	Nickel, Total	12	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 13:42
7782-49-2	Selenium, Total	0.11	mg/kg dry wt.	1	0.30	0.089	J,m	12/01/07 13:42
7440-22-4	Silver, Total	0.038	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 13:42
7440-28-0	Thallium, Total	0.16	mg/kg dry wt.	1	0.10	0.0049		12/01/07 13:42
7440-62-2	Vanadium, Total	33	mg/kg dry wt.	1	0.10	0.034		12/01/07 13:42

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:10
Solids: 83.90
Laboratory ID: 0711396-10

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.11	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 14:45

012230

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:35
Solids: 80.08
Laboratory ID: 0711396-11

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.7	mg/kg dry wt.	1	0.20	0.071	J,m	12/01/07 13:44
7440-50-8	Copper, Total	19	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 13:44
7439-92-1	Lead, Total	18	mg/kg dry wt.	1	0.20	0.022	J,s	12/01/07 13:44
7440-02-0	Nickel, Total	18	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 13:44
7782-49-2	Selenium, Total	0.14	mg/kg dry wt.	1	0.30	0.089	J,m	12/01/07 13:44
7440-22-4	Silver, Total	0.049	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 13:44
7440-28-0	Thallium, Total	0.23	mg/kg dry wt.	1	0.10	0.0049		12/01/07 13:44
7440-62-2	Vanadium, Total	42	mg/kg dry wt.	1	0.10	0.034		12/01/07 13:44

: 01233

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:35
Solids: 80.08
Laboratory ID: 0711396-11

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.13	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 14:47

01282

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:35
Solids: 82.14
Laboratory ID: 0711396-12

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.7	mg/kg dry wt.	1	0.20	0.071	J,m	12/01/07 13:54
7440-50-8	Copper, Total	14	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 13:54
7439-92-1	Lead, Total	14	mg/kg dry wt.	1	0.20	0.022	J,s	12/01/07 13:54
7440-02-0	Nickel, Total	17	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 13:54
7782-49-2	Selenium, Total	0.14	mg/kg dry wt.	1	0.30	0.089	J,m	12/01/07 13:54
7440-22-4	Silver, Total	0.052	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 13:54
7440-28-0	Thallium, Total	0.24	mg/kg dry wt.	1	0.10	0.0049		12/01/07 13:54
7440-62-2	Vanadium, Total	45	mg/kg dry wt.	1	0.10	0.034		12/01/07 13:54

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:35
Solids: 82.14
Laboratory ID: 0711396-12

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.12	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 14:48

01234

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:40
Solids: 83.53
Laboratory ID: 0711396-13

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4997 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.4	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 13:57
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 13:57
7439-92-1	Lead, Total	9.2	mg/kg dry wt.	1	0.20	0.022	J,s	12/01/07 13:57
7440-02-0	Nickel, Total	12	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 13:57
7782-49-2	Selenium, Total	0.30	mg/kg dry wt.	1	0.30	0.089	U UL,m	12/01/07 13:57
7440-22-4	Silver, Total	0.039	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 13:57
7440-28-0	Thallium, Total	0.18	mg/kg dry wt.	1	0.10	0.0049		12/01/07 13:57
7440-62-2	Vanadium, Total	34	mg/kg dry wt.	1	0.10	0.034		12/01/07 13:57

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:40
Solids: 83.53
Laboratory ID: 0711396-13

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.10	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 14:50

: 01236

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:18
Solids: 80.70
Laboratory ID: 0711396-14

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.7	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 14:00
7440-50-8	Copper, Total	18	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 14:00
7439-92-1	Lead, Total	17	mg/kg dry wt.	1	0.20	0.022	J,s	12/01/07 14:00
7440-02-0	Nickel, Total	18	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 14:00
7782-49-2	Selenium, Total	0.16	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 14:00
7440-22-4	Silver, Total	0.051	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 14:00
7440-28-0	Thallium, Total	0.24	mg/kg dry wt.	1	0.10	0.0049		12/01/07 14:00
7440-62-2	Vanadium, Total	43	mg/kg dry wt.	1	0.10	0.034		12/01/07 14:00

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:18
Solids: 80.70
Laboratory ID: 0711396-14

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.12	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 14:52

012238

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:18
Solids: 82.71
Laboratory ID: 0711396-15

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5002 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.7	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 14:03
7440-50-8	Copper, Total	14	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 14:03
7439-92-1	Lead, Total	13	mg/kg dry wt.	1	0.20	0.022	J,s	12/01/07 14:03
7440-02-0	Nickel, Total	16	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 14:03
7782-49-2	Selenium, Total	0.11	mg/kg dry wt.	1	0.30	0.089	J,L,m	12/01/07 14:03
7440-22-4	Silver, Total	0.052	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 14:03
7440-28-0	Thallium, Total	0.24	mg/kg dry wt.	1	0.10	0.0049		12/01/07 14:03
7440-62-2	Vanadium, Total	44	mg/kg dry wt.	1	0.10	0.034		12/01/07 14:03

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:18
Solids: 82.71
Laboratory ID: 0711396-15

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.11	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 14:58

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:22
Solids: 83.11
Laboratory ID: 0711396-16

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.5	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 14:06
7440-50-8	Copper, Total	12	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 14:06
7439-92-1	Lead, Total	10	mg/kg dry wt.	1	0.20	0.022	J,S	12/01/07 14:06
7440-02-0	Nickel, Total	14	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 14:06
7782-49-2	Selenium, Total	0.12	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 14:06
7440-22-4	Silver, Total	0.042	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 14:06
7440-28-0	Thallium, Total	0.19	mg/kg dry wt.	1	0.10	0.0049		12/01/07 14:06
7440-62-2	Vanadium, Total	38	mg/kg dry wt.	1	0.10	0.034		12/01/07 14:06

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:22
Solids: 83.11
Laboratory ID: 0711396-16

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.11	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 15:00

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/15/07 12:50
Solids: 0.00
Laboratory ID: 0711396-17

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3020A Digestion
Prepared: 11/29/07 07:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0714543

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	12/01/07 01:02
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	11/30/07 14:00
7440-39-3	Barium, Total	0.60	ug/L	1	2.0	0.52	J	11/30/07 14:00
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	11/30/07 14:00
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	11/30/07 14:00
7440-47-3	Chromium, Total	2.0	ug/L	1	2.0	0.31	U	12/01/07 01:02
7440-48-4	Cobalt, Total	1.0	ug/L	1	1.0	0.096	U	11/30/07 14:00
7440-50-8	Copper, Total	0.51	ug/L	1	1.0	0.33	J	11/30/07 14:00
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	12/01/07 01:02
7439-96-5	Manganese, Total	1.6	ug/L	1	3.0	0.43	J	11/30/07 14:00
7440-02-0	Nickel, Total	0.41	ug/L	1	2.0	0.28	J	11/30/07 14:00
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	11/30/07 14:00
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	11/30/07 14:00
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	12/03/07 13:48
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	11/30/07 14:00
7440-66-6	Zinc, Total	9.6	ug/L	1	10	0.84	J B,P	11/30/07 14:00

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:15
Solids: 74.65
Laboratory ID: 0711396-18

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5003 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	2.8	mg/kg dry wt.	1	0.20	0.071	L,M	12/01/07 14:09
7440-50-8	Copper, Total	35	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 14:09
7439-92-1	Lead, Total	33	mg/kg dry wt.	1	0.20	0.022	J,S	12/01/07 14:09
7440-02-0	Nickel, Total	25	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 14:09
7782-49-2	Selenium, Total	0.12	mg/kg dry wt.	1	0.30	0.089	J L,M	12/01/07 14:09
7440-22-4	Silver, Total	0.10	mg/kg dry wt.	1	0.10	0.013		12/01/07 14:09
7440-28-0	Thallium, Total	0.18	mg/kg dry wt.	1	0.10	0.0049		12/01/07 14:09
7440-62-2	Vanadium, Total	38	mg/kg dry wt.	1	0.10	0.034		12/01/07 14:09

: 01345

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:15
Solids: 74.65
Laboratory ID: 0711396-18

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.43	mg/kg dry wt.	1	0.20	0.042		12/03/07 15:01

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:15
Solids: 83.24
Laboratory ID: 0711396-19

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.5	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 14:12
7440-50-8	Copper, Total	13	mg/kg dry wt.	1	0.20	0.044	J,S	12/01/07 14:12
7439-92-1	Lead, Total	11	mg/kg dry wt.	1	0.20	0.022	J,S	12/01/07 14:12
7440-02-0	Nickel, Total	16	mg/kg dry wt.	1	0.10	0.036	J,S	12/01/07 14:12
7782-49-2	Selenium, Total	0.14	mg/kg dry wt.	1	0.30	0.089	J, L,m	12/01/07 14:12
7440-22-4	Silver, Total	0.047	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 14:12
7440-28-0	Thallium, Total	0.21	mg/kg dry wt.	1	0.10	0.0049		12/01/07 14:12
7440-62-2	Vanadium, Total	43	mg/kg dry wt.	1	0.10	0.034		12/01/07 14:12

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:15
Solids: 83.24
Laboratory ID: 0711396-19

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.4996 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.10	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 15:03

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:20
Solids: 85.43
Laboratory ID: 0711396-20

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.7	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 14:15
7440-50-8	Copper, Total	13	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 14:15
7439-92-1	Lead, Total	9.5	mg/kg dry wt.	1	0.20	0.022	J,s	12/01/07 14:15
7440-02-0	Nickel, Total	14	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 14:15
7782-49-2	Selenium, Total	0.12	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 14:15
7440-22-4	Silver, Total	0.045	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 14:15
7440-28-0	Thallium, Total	0.19	mg/kg dry wt.	1	0.10	0.0049		12/01/07 14:15
7440-62-2	Vanadium, Total	37	mg/kg dry wt.	1	0.10	0.034		12/01/07 14:15

01250

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:20
Solids: 85.43
Laboratory ID: 0711396-20

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.4997 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.11	mg/kg dry wt.	1	0.20	0.042	J	12/03/07 15:04

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:00
Solids: 64.80
Laboratory ID: 0711396-21

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4995 g / 250 mL
QC Batch: 0714535

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	3.1	mg/kg dry wt.	1	0.20	0.071	L,m	12/01/07 14:18
7440-50-8	Copper, Total	38	mg/kg dry wt.	1	0.20	0.044	J,s	12/01/07 14:18
7439-92-1	Lead, Total	29	mg/kg dry wt.	1	0.20	0.022	J,s	12/01/07 14:18
7440-02-0	Nickel, Total	25	mg/kg dry wt.	1	0.10	0.036	J,s	12/01/07 14:18
7782-49-2	Selenium, Total	0.10	mg/kg dry wt.	1	0.30	0.089	J L,m	12/01/07 14:18
7440-22-4	Silver, Total	0.092	mg/kg dry wt.	1	0.10	0.013	J	12/01/07 14:18
7440-28-0	Thallium, Total	0.20	mg/kg dry wt.	1	0.10	0.0049		12/01/07 14:18
7440-62-2	Vanadium, Total	39	mg/kg dry wt.	1	0.10	0.034		12/01/07 14:18

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:00
Solids: 64.80
Laboratory ID: 0711396-21

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/29/07 15:00
Initial/Final: 0.4999 g / 250 mL
QC Batch: 0714511

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.22	mg/kg dry wt.	1	0.20	0.042		12/03/07 15:06

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 08:10
Solids: 87.21
Laboratory ID: 0711431-01

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4998 g / 250 mL
QC Batch: 0714427

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	0.63	mg/kg dry wt.	1	0.20	0.071	L,m	12/04/07 12:17
7440-50-8	Copper, Total	7.3	mg/kg dry wt.	1	0.20	0.044	J,S	12/04/07 12:17
7440-02-0	Nickel, Total	9.4	mg/kg dry wt.	1	0.10	0.036	J,S	12/04/07 12:17
7782-49-2	Selenium, Total	0.16	mg/kg dry wt.	1	0.30	0.089	J L,m	12/04/07 12:17
7440-22-4	Silver, Total	0.037	mg/kg dry wt.	1	0.10	0.013	J	12/04/07 12:17
7440-28-0	Thallium, Total	0.11	mg/kg dry wt.	1	0.10	0.0049		12/04/07 12:17
7440-62-2	Vanadium, Total	15	mg/kg dry wt.	1	0.10	0.034		12/04/07 12:17

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 08:10
Solids: 87.21
Laboratory ID: 0711431-01

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 12/05/07 07:00
Initial/Final: 0.5004 g / 250 mL
QC Batch: 0714857

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-92-1	Lead, Total	8.0	mg/kg dry wt.	1	0.20	0.022	J,S	12/05/07 17:16

012255

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 08:10
Solids: 87.21
Laboratory ID: 0711431-01

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 11:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714411

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.050	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 22:57

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 09:00
Solids: 85.82
Laboratory ID: 0711431-02

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.4995 g / 250 mL
QC Batch: 0714427

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	0.64	mg/kg dry wt.	1	0.20	0.071	L,m	12/04/07 12:20
7440-50-8	Copper, Total	7.3	mg/kg dry wt.	1	0.20	0.044	J,S	12/04/07 12:20
7440-02-0	Nickel, Total	9.2	mg/kg dry wt.	1	0.10	0.036	J,S	12/04/07 12:20
7782-49-2	Selenium, Total	0.13	mg/kg dry wt.	1	0.30	0.089	J L,m	12/04/07 12:20
7440-22-4	Silver, Total	0.033	mg/kg dry wt.	1	0.10	0.013	J	12/04/07 12:20
7440-28-0	Thallium, Total	0.11	mg/kg dry wt.	1	0.10	0.0049		12/04/07 12:20
7440-62-2	Vanadium, Total	15	mg/kg dry wt.	1	0.10	0.034		12/04/07 12:20

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 09:00
Solids: 85.82
Laboratory ID: 0711431-02

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 12/05/07 07:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714857

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-92-1	Lead, Total	6.4	mg/kg dry wt.	1	0.20	0.022	J,S	12/05/07 17:18

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 09:00
Solids: 85.82
Laboratory ID: 0711431-02

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 11:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714411

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.20	mg/kg dry wt.	1	0.20	0.042	U	11/28/07 23:04

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 08:35
Solids: 88.70
Laboratory ID: 0711431-03

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5001 g / 250 mL
QC Batch: 0714427

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	0.95	mg/kg dry wt.	1	0.20	0.071	L,m	12/04/07 12:22
7440-50-8	Copper, Total	8.6	mg/kg dry wt.	1	0.20	0.044	J,s	12/04/07 12:22
7439-92-1	Lead, Total	30	mg/kg dry wt.	1	0.20	0.022	J,s	12/04/07 12:22
7440-02-0	Nickel, Total	11	mg/kg dry wt.	1	0.10	0.036	J,s	12/04/07 12:22
7782-49-2	Selenium, Total	0.16	mg/kg dry wt.	1	0.30	0.089	J L,m	12/04/07 12:22
7440-22-4	Silver, Total	0.042	mg/kg dry wt.	1	0.10	0.013	J	12/04/07 12:22
7440-28-0	Thallium, Total	0.20	mg/kg dry wt.	1	0.10	0.0049		12/04/07 12:22
7440-62-2	Vanadium, Total	18	mg/kg dry wt.	1	0.10	0.034		12/04/07 12:22

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 08:35
Solids: 88.70
Laboratory ID: 0711431-03

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 11:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714411

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.064	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 23:06

: 91259

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 09:45
Solids: 88.67
Laboratory ID: 0711431-04

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/28/07 07:00
Initial/Final: 0.5005 g / 250 mL
QC Batch: 0714427

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-38-2	Arsenic, Total	1.1	mg/kg dry wt.	1	0.20	0.071	L,m	12/04/07 12:37
7440-50-8	Copper, Total	9.5	mg/kg dry wt.	1	0.20	0.044	J,s	12/04/07 12:37
7439-92-1	Lead, Total	25	mg/kg dry wt.	1	0.20	0.022	J,s	12/04/07 12:37
7440-02-0	Nickel, Total	10	mg/kg dry wt.	1	0.10	0.036	J,s	12/04/07 12:37
7782-49-2	Selenium, Total	0.23	mg/kg dry wt.	1	0.30	0.089	J L,m	12/04/07 12:37
7440-22-4	Silver, Total	0.044	mg/kg dry wt.	1	0.10	0.013	J	12/04/07 12:37
7440-28-0	Thallium, Total	0.14	mg/kg dry wt.	1	0.10	0.0049		12/04/07 12:37
7440-62-2	Vanadium, Total	16	mg/kg dry wt.	1	0.10	0.034		12/04/07 12:37

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 09:45
Solids: 88.67
Laboratory ID: 0711431-04

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3050B Digestion
Prepared: 11/27/07 11:00
Initial/Final: 0.5 g / 250 mL
QC Batch: 0714411

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.12	mg/kg dry wt.	1	0.20	0.042	J	11/28/07 23:15

012651

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/16/07 10:58
Solids: 0.00
Laboratory ID: 0711431-06

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 3020A Digestion
Prepared: 12/04/07 07:05
Initial/Final: 25 mL / 125 mL
QC Batch: 0714750

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	12/04/07 20:28
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	12/04/07 20:28
7440-39-3	Barium, Total	2.0	ug/L	1	2.0	0.52	U	12/04/07 20:28
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	12/04/07 20:28
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	12/04/07 20:28
7440-47-3	Chromium, Total	2.0	ug/L	1	2.0	0.31	U	12/04/07 20:28
7440-48-4	Cobalt, Total	1.0	ug/L	1	1.0	0.096	U	12/04/07 20:28
7440-50-8	Copper, Total	1.0	ug/L	1	1.0	0.33	U	12/04/07 20:28
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	12/04/07 20:28
7439-96-5	Manganese, Total	1.7	ug/L	1	3.0	0.43	J	12/04/07 20:28
7440-02-0	Nickel, Total	2.0	ug/L	1	2.0	0.28	U	12/04/07 20:28
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	12/04/07 20:28
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	12/04/07 20:28
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	12/04/07 20:28
7440-62-2	Vanadium, Total	1.3	ug/L	1	5.0	0.83	J B,P	12/04/07 21:41
7440-66-6	Zinc, Total	3.8	ug/L	1	10	0.84	J	12/04/07 20:28

012263

SAMPLE ID SUMMARY

USEPA-7471A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-44

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
37SB8A	0711396-01
37SB8B	0711396-02
37SB8C	0711396-03
DUP-4	0711396-04
37SB4A	0711396-05
37SB5A	0711396-06
37SB6A	0711396-07
38SB10A	0711396-08
38SB10B	0711396-09
38SB10C	0711396-10
38SB9A	0711396-11
38SB9B	0711396-12
38SB9C	0711396-13
38SB8A	0711396-14
38SB8B	0711396-15
38SB8C	0711396-16
38SB7A	0711396-18
38SB7B	0711396-19
38SB7C	0711396-20
DUP-5	0711396-21
38SB4A	0711431-01
DUP-6	0711431-02
38SB5A	0711431-03
38SB6A	0711431-04

: 02197

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 07:40
Solids: 66.40
Laboratory ID: 0711396-01

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3004 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.94	mg/kg dry wt.	2	0.10	0.015		11/30/07 18:08

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:00
Solids: 85.37
Laboratory ID: 0711396-02

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.081	mg/kg dry wt.	1	0.050	0.0075		11/30/07 09:54

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:00
Solids: 85.05
Laboratory ID: 0711396-03

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.021	mg/kg dry wt.	1	0.050	0.0075	J	11/30/07 09:59

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 09:00
Solids: 55.36
Laboratory ID: 0711396-04

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3004 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	1.3	mg/kg dry wt.	2	0.10	0.015		11/30/07 18:14

022681

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 08:50
Solids: 88.00
Laboratory ID: 0711396-05

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.046	mg/kg dry wt.	1	0.050	0.0075	J	11/30/07 10:09

022262

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 09:30
Solids: 84.89
Laboratory ID: 0711396-06

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.072	mg/kg dry wt.	1	0.050	0.0075		11/30/07 10:24

022203

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

37SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:00
Solids: 83.20
Laboratory ID: 0711396-07

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.066	mg/kg dry wt.	1	0.050	0.0075		11/30/07 10:39

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB10A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:58
Solids: 70.79
Laboratory ID: 0711396-08

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.27	mg/kg dry wt.	1	0.050	0.0075		11/30/07 10:44

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB10B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 10:58
Solids: 82.05
Laboratory ID: 0711396-09

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3005 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.028	mg/kg dry wt.	1	0.050	0.0075	J	11/30/07 10:49

022265

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB10C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:10
Solids: 83.90
Laboratory ID: 0711396-10

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.024	mg/kg dry wt.	1	0.050	0.0075	J	11/30/07 10:54

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB9A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:35
Solids: 80.08
Laboratory ID: 0711396-11

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.069	mg/kg dry wt.	1	0.050	0.0075		11/30/07 11:00

: a2268

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB9B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:35
Solids: 82.14
Laboratory ID: 0711396-12

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.035	mg/kg dry wt.	1	0.050	0.0075	J	11/30/07 11:05

: 02269

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB9C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 11:40
Solids: 83.53
Laboratory ID: 0711396-13

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.019	mg/kg dry wt.	1	0.050	0.0075	J	11/30/07 11:10

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB8A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:18
Solids: 80.70
Laboratory ID: 0711396-14

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3002 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.056	mg/kg dry wt.	1	0.050	0.0075		11/30/07 11:24

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB8B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:18
Solids: 82.71
Laboratory ID: 0711396-15

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.2996 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.031	mg/kg dry wt.	1	0.050	0.0075	J	11/30/07 11:29

02212

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB8C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:22
Solids: 83.11
Laboratory ID: 0711396-16

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.022	mg/kg dry wt.	1	0.050	0.0075	J	11/30/07 11:35

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB7A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:15
Solids: 74.65
Laboratory ID: 0711396-18

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.2998 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.14	mg/kg dry wt.	1	0.050	0.0075		11/30/07 11:40

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB7B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:15
Solids: 83.24
Laboratory ID: 0711396-19

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3003 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.031	mg/kg dry wt.	1	0.050	0.0075	J	11/30/07 11:45

02215

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB7C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 14:20
Solids: 85.43
Laboratory ID: 0711396-20

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.3004 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.027	mg/kg dry wt.	1	0.050	0.0075	J	11/30/07 11:50

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/15/07 13:00
Solids: 64.80
Laboratory ID: 0711396-21

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/29/07 17:00
Initial/Final: 0.2999 g / 50 mL
QC Batch: 0714584

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.14	mg/kg dry wt.	1	0.050	0.0075		11/30/07 11:55

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB4A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 08:10
Solids: 87.21
Laboratory ID: 0711431-01

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/26/07 16:00
Initial/Final: 0.3001 g / 50 mL
QC Batch: 0714342

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.013	mg/kg dry wt.	1	0.050	0.0075	J	11/27/07 14:48

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

DUP-6

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 09:00
Solids: 85.82
Laboratory ID: 0711431-02

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/26/07 16:00
Initial/Final: 0.2998 g / 50 mL
QC Batch: 0714342

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.019	mg/kg dry wt.	1	0.050	0.0075	J	11/27/07 14:54

02215

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 08:35
Solids: 88.70
Laboratory ID: 0711431-03

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/26/07 16:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0714342

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.031	mg/kg dry wt.	1	0.050	0.0075	J	11/27/07 14:59

INORGANIC ANALYSIS DATA SHEET
USEPA-7471A

38SB6A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
Sampled: 11/16/07 09:45
Solids: 88.67
Laboratory ID: 0711431-04

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7471A Mercury Digestio
Prepared: 11/26/07 16:00
Initial/Final: 0.3 g / 50 mL
QC Batch: 0714342

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.070	mg/kg dry wt.	1	0.050	0.0075		11/27/07 15:30

02221

SAMPLE ID SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-44

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Client Sample Id:	Lab Sample Id:
EQBK-3	0711396-17
EQBK-4	0711431-06

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

EQBK-3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/15/07 12:50
Solids: 0.00
Laboratory ID: 0711396-17

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7470A Digestion - Total
Prepared: 12/03/07 17:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0714730

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	12/04/07 07:37

02166

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

EQBK-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water
Sampled: 11/16/07 10:58
Solids: 0.00
Laboratory ID: 0711431-06

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 7470A Digestion - Total
Prepared: 12/03/07 17:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0714730

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.052	ug/L	1	0.20	0.046	J	12/04/07 07:42

02167

DATA VALIDATION WORKSHEET

Reviewer: RA
Date: 1/25/08
DV Level: II (III) IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
X project QAPP

Pesticides/~~PCBs~~

Project Name: RAAP 10
Project Number: 21354887
Laboratory: TriMatrix
SDG No.: 36440-44
Test Name: Pest -
Method No.: 8081

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.	✓		
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes: 36SB10A re-extracted 12 days past ht since original had low surrogates - det NDs, UJ/h -

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (one per 20 samples or batch and matrix)?	✓		
3.2	Do any blanks have positive results? If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank].		✓	
3.3	Do any field equipment blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration

		Yes	No	NA
4.1	Are at least five standards included in the calibration curve for 1016, 1260, toxaphene, and technical chlordane; and at least one point for the other arochlors reported? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the control limits?		✓	
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes: Second source sequence 7113009 7120% alpha-BHC 121% pos bias ND's, No action
CC sequence 7122808 alpha-BHC 24% 21.8%, delta-BHC 25.6%, 4,4-DDD 22.7%, 4,4-DDE 24.1% 70C pos bias, all ND's, NO action
cc sequence 8011111 toxaphene > QC 20.8% pos bias all ND's, No action
CC sequence 7122812 alpha-BHC 24% 21.8%, delta-BHC 25.6%, 4,4-DDD 22.7%, 4,4-DDE 24.1% 70C pos bias all ND's, NO action.

5.0 GC/ECD Instrument Performance Check

		Yes	No	NA
5.1	Has a Performance Evaluation Mixture (PEM) been analyzed at the beginning, every 12 hours, and at the end of every sequence.	✓		
5.2	Is the 4,4'-DDT breakdown </= to 20%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non detect DDT results, DDD/DDE - R(+).	✓		
5.3	Is the endrin breakdown </= to 20%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	✓		
5.4	Is the combined breakdowns less than or equal to 30%? If No, for positive DDT/endrin results, DDT/endrin-L(+), DDD/DD/endrin aldehyde/endrin ketone - NJ(+). For non-detect DDT/endrin results, DDD/DDE/endrin aldehyde/endrin ketone - R(+).	✓		

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	✓		
6.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks? Advisory limit: 60-150%.		✓	
6.3	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?	✓		
6.4	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		✓	

# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
1 out	high/low	No action	No action
2 out	2 high same column	K	No action
	2 low same column	L, UL	No action
	mixed same column	J, UJ	No action
	2 high diff columns	J	Not applicable
	2 low diff columns	J, UJ	Not applicable
	mixed diff columns	Professional judgement	Not applicable
3 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	2 high, 1 low	K (2 high)	J (1 low 2nd column)
	2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
	other mixed	J, UJ	Not applicable
4 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	Mixed	J, UJ	Not applicable
If any recovery is >0% and <10% then L(+)/R(-).			
If any recovery is 0% then R(+/-).			

Notes: 375B104 tetrachloro-m-xylene 44%, 45%, decachlorobiphenyl 43%, 45%. see attached
DUP-4 tetrachloro-m-xylene 52%, 58%. ~~[illegible]~~
L, UL, J

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes: MSD for 375B5A <60%. Endrin 59%. Parent + ND → UJ, M

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			

Notes:

9.0 Field Duplicate

		Yes	No	NA
9.2	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: 375B8A and DUP-4 RL 355B4A and DUP-6
Endrin 5 4.8 6.0 kV UD ND
395B8A and DUP-5 RL
Endrin 2.4 4.5 5.1 ok
Endosulfan I ND 4.6 5.1 ok

10.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns <40%? If No, J(+).		✓	
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		

Notes: Endrin >40% for several samples. See attached J/q

11.0 Data Completeness

		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
11.1.1	Number of samples: Pest PCB			
11.1.2	Number of target compounds in each analysis: PEST PCB			
11.1.3	Number of results rejected and not reported: Pest PCB			
11.1.4	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = Pest 100% PCB			

Notes:

HOLDING TIME SUMMARY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-44

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 004

Method: Organochlorine Pesticides by EPA Method 8081A

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
37SB8A	11/15/07	11/16/07		11/28/07	13	14	12/24/07	27	40	
37SB8B	11/15/07	11/16/07		11/28/07	13	14	12/24/07	27	40	
37SB8C	11/15/07	11/16/07		11/28/07	13	14	12/24/07	27	40	
DUP-4	11/15/07	11/16/07		11/28/07	13	14	12/24/07	27	40	
37SB4A	11/15/07	11/16/07		11/28/07	13	14	12/24/07	27	40	
37SB5A	11/15/07	11/16/07		11/28/07	13	14	12/24/07	27	40	
37SB6A	11/15/07	11/16/07		11/29/07	14	14	12/25/07	26	40	
38SB10A	11/15/07	11/16/07		11/29/07	14	14	12/12/07	13	40	
38SB10A	11/15/07	11/16/07		12/11/07	26	14	01/08/08	28	40	*
38SB10B	11/15/07	11/16/07		11/29/07	14	14	12/12/07	13	40	
38SB10C	11/15/07	11/16/07		11/29/07	14	14	12/12/07	13	40	
38SB9A	11/15/07	11/16/07		11/29/07	14	14	12/25/07	26	40	
38SB9B	11/15/07	11/16/07		11/29/07	14	14	12/25/07	26	40	
38SB9C	11/15/07	11/16/07		11/29/07	14	14	12/25/07	26	40	
38SB8A	11/15/07	11/16/07		11/29/07	14	14	12/25/07	26	40	
38SB8B	11/15/07	11/16/07		11/29/07	14	14	12/25/07	26	40	
38SB8C	11/15/07	11/16/07		11/29/07	14	14	12/25/07	26	40	
EQBK-3	11/15/07	11/16/07		11/19/07	4	7	11/29/07	10	40	
38SB7A	11/15/07	11/16/07		11/29/07	14	14	12/25/07	26	40	
38SB7B	11/15/07	11/16/07		11/29/07	14	14	12/25/07	26	40	
38SB7C	11/15/07	11/16/07		11/29/07	14	14	12/25/07	26	40	

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7K30006
Laboratory ID: 7113009-SCV2
Sequence: 7113009
Standard ID: 7080436

Analyte	Expected (ug/mL)	Found (ug/mL)	% Rec.	QC Limit
alpha-BHC	0.0400	0.0473	118	80-120
alpha-BHC [2C]	0.0400	0.0484	121 *	80-120
beta-BHC	0.0400	0.0443	111	80-120
beta-BHC [2C]	0.0400	0.0428	107	80-120
gamma-BHC (Lindane)	0.0400	0.0460	115	80-120
gamma-BHC (Lindane) [2C]	0.0400	0.0467	117	80-120
delta-BHC	0.0400	0.0461	115	80-120
delta-BHC [2C]	0.0400	0.0449	112	80-120
alpha-Chlordane	0.0400	0.0434	109	80-120
alpha-Chlordane [2C]	0.0400	0.0424	106	80-120
gamma-Chlordane	0.0400	0.0445	111	80-120
gamma-Chlordane [2C]	0.0400	0.0433	108	80-120
4,4'-DDD	0.0400	0.0434	109	80-120
4,4'-DDD [2C]	0.0400	0.0412	103	80-120
4,4'-DDE	0.0400	0.0444	111	80-120
4,4'-DDE [2C]	0.0400	0.0423	106	80-120
4,4'-DDT	0.0400	0.0421	105	80-120
4,4'-DDT [2C]	0.0400	0.0414	104	80-120
Aldrin	0.0400	0.0459	115	80-120
Aldrin [2C]	0.0400	0.0450	113	80-120
Dieldrin	0.0400	0.0441	110	80-120
Dieldrin [2C]	0.0400	0.0430	108	80-120
Endosulfan I	0.0400	0.0443	111	80-120
Endosulfan I [2C]	0.0400	0.0434	109	80-120
Endosulfan II	0.0400	0.0426	107	80-120
Endosulfan II [2C]	0.0400	0.0410	103	80-120
Endosulfan Sulfate	0.0400	0.0415	104	80-120

: 04137

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 199
Lab File ID: A61_121-0
Sequence: 7121830
Lab Sample ID: 7121830-CCV3

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7L17005
Calibration Date: 12/15/07 12:02
Injection Date: 12/18/07
Injection Time: 03:28

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC	A	0.0400	0.0503	7550781	9502530		25.8	20 *
beta-BHC	A	0.0400	0.0457	2803578	3200870		14.2	20
gamma-BHC (Lindane)	A	0.0400	0.0483	6737820	8144760		20.9	20 *
delta-BHC	A	0.0400	0.0485	5868680	7120060		21.3	20 *
alpha-Chlordane	A	0.0400	0.0456	5192204	5918340		14.0	20
gamma-Chlordane	A	0.0400	0.0458	5411350	6194870		14.5	20
4,4'-DDD	A	0.0400	0.0465	3429186	3983840		16.2	20
4,4'-DDE	A	0.0400	0.0470	4737821	5565480		17.5	20
4,4'-DDT	A	0.0400	0.0446	3851409	4294180		11.5	20
Aldrin	A	0.0400	0.0474	6352499	7526880		18.5	20
Dieldrin	A	0.0400	0.0452	4972222	5614420		12.9	20
Endosulfan I	A	0.0400	0.0453	4874078	5516430		13.2	20
Endosulfan II	A	0.0400	0.0441	3803388	4190290		10.2	20
Endosulfan Sulfate	A	0.0400	0.0434	3369525	3653960		8.4	20
Endrin	A	0.0400	0.0461	4255450	4900740		15.2	20
Endrin Aldehyde	A	0.0400	0.0431	2947047	3176440		7.8	20
Endrin Ketone	A	0.0400	0.0426	3801852	4051070		6.6	20
Heptachlor	A	0.0400	0.0470	7026359	8266440		17.6	20
Heptachlor Epoxide	A	0.0400	0.0455	5513840	6275380		13.8	20
Methoxychlor	A	0.0400	0.0440	1989893	2187050		9.9	20

cancel pos. bias

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk
* Values outside of QC limits

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument ID: 199
Calibration: 7L17005
Lab File ID: B61_121-0
Calibration Date: 12/15/07 12:02
Sequence: 7121830
Injection Date: 12/18/07
Lab Sample ID: 7121830-CCV3
Injection Time: 03:28

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC [2C]	A	0.0400	0.0483	7891120	9524440	905	20.7	20 *
beta-BHC [2C]	A	0.0400	0.0435	3022346	3285590		8.7	20
gamma-BHC (Lindane) [2C]	A	0.0400	0.0463	7105153	8221530		15.7	20
delta-BHC [2C]	A	0.0400	0.0461	6107308	7041320		15.3	20
alpha-Chlordane [2C]	A	0.0400	0.0434	5220747	5669900		8.6	20
gamma-Chlordane [2C]	A	0.0400	0.0445	5471476	6080910		11.1	20
4,4'-DDD [2C]	A	0.0400	0.0455	3460591	3940070		13.9	20
4,4'-DDE [2C]	A	0.0400	0.0458	4799882	5490260		14.4	20
4,4'-DDT [2C]	A	0.0400	0.0448	3702919	4143190		11.9	20
Aldrin [2C]	A	0.0400	0.0456	6569919	7490890		14.0	20
Dieldrin [2C]	A	0.0400	0.0437	4963061	5417690		9.2	20
Endosulfan I [2C]	A	0.0400	0.0437	4887793	5344380		9.3	20
Endosulfan II [2C]	A	0.0400	0.0435	3739929	4067130		8.7	20
Endosulfan Sulfate [2C]	A	0.0400	0.0438	3400097	3726500		9.6	20
Endrin [2C]	A	0.0400	0.0450	3946214	4444030		12.6	20
Endrin Aldehyde [2C]	A	0.0400	0.0432	2885528	3113560		7.9	20
Endrin Ketone [2C]	A	0.0400	0.0439	3651417	4005280		9.7	20
Heptachlor [2C]	A	0.0400	0.0459	6670354	7649860		14.7	20
Heptachlor Epoxide [2C]	A	0.0400	0.0439	5712204	6265270		9.7	20
Methoxychlor [2C]	A	0.0400	0.0439	1866150	2048400		9.8	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk
* Values outside of QC limits

: 041291

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 199
Lab File ID: A61_360-0
Sequence: 7122808
Lab Sample ID: 7122808-CCV3

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7L28006
Calibration Date: 12/24/07 09:46
Injection Date: 12/25/07
Injection Time: 08:17

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC	A	0.0400	0.0496	7708385	9558620		24.0	20 *
beta-BHC	A	0.0400	0.0467	2713407	3169370	all	16.8	20
gamma-BHC (Lindane)	A	0.0400	0.0473	6845908	8103340		18.4	20
delta-BHC	A	0.0400	0.0503	5514248	6928010	POS	25.6	20 *
alpha-Chlordane	A	0.0400	0.0433	5428480	5872960		8.2	20
gamma-Chlordane	A	0.0400	0.0436	5654722	6160090		8.9	20
4,4'-DDD	A	0.0400	0.0491	3040041	3730480		22.7	20 *
4,4'-DDE	A	0.0400	0.0496	4239070	5259640		24.1	20 *
4,4'-DDT	A	0.0400	0.0446	3622752	4040260		11.5	20
Aldrin	A	0.0400	0.0454	6625954	7515440		13.4	20
Dieldrin	A	0.0400	0.0433	5177123	5609470		8.4	20
Endosulfan I	A	0.0400	0.0424	5149017	5452170		5.9	20
Endosulfan II	A	0.0400	0.0424	3958959	4192980		5.9	20
Endosulfan Sulfate	A	0.0400	0.0417	3451922	3595660		4.2	20
Endrin	A	0.0400	0.0434	4502195	4880060		8.4	20
Endrin Aldehyde	A	0.0400	0.0425	3005698	3193070		6.2	20
Endrin Ketone	A	0.0400	0.0415	3900643	4051630		3.9	20
Heptachlor	A	0.0400	0.0468	7181262	8402880		17.0	20
Heptachlor Epoxide	A	0.0400	0.0444	5718522	6348480		11.0	20
Methoxychlor	A	0.0400	0.0451	1783596	2011670		12.8	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument ID: 199
Calibration: 7L28006
Lab File ID: B61_360-0
Calibration Date: 12/24/07 09:46
Sequence: 7122808
Injection Date: 12/25/07
Lab Sample ID: 7122808-CCV3
Injection Time: 08:17

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC [2C]	A	0.0400	0.0487	7801813	9500700	P09	21.8	20 *
beta-BHC [2C]	A	0.0400	0.0445	2903154	3230760		11.3	20
gamma-BHC (Lindane) [2C]	A	0.0400	0.0469	7013466	8219020		17.2	20
delta-BHC [2C]	A	0.0400	0.0480	5728712	6877310		20.0	20
alpha-Chlordane [2C]	A	0.0400	0.0422	5404814	5697450		5.4	20
gamma-Chlordane [2C]	A	0.0400	0.0425	5652975	6007580		6.3	20
4,4'-DDD [2C]	A	0.0400	0.0463	3363853	3896410		15.8	20
4,4'-DDE [2C]	A	0.0400	0.0456	4549057	5182670		13.9	20
4,4'-DDT [2C]	A	0.0400	0.0436	3555790	3878000		9.1	20
Aldrin [2C]	A	0.0400	0.0449	6657364	7471340		12.2	20
Dieldrin [2C]	A	0.0400	0.0428	5218586	5588880		7.1	20
Endosulfan I [2C]	A	0.0400	0.0424	5041551	5345190		6.0	20
Endosulfan II [2C]	A	0.0400	0.0418	4027009	4205310		4.4	20
Endosulfan Sulfate [2C]	A	0.0400	0.0410	3635761	3723940		2.4	20
Endrin [2C]	A	0.0400	0.0432	4228653	4567530		8.0	20
Endrin Aldehyde [2C]	A	0.0400	0.0411	3066503	3151890		2.8	20
Endrin Ketone [2C]	A	0.0400	0.0411	3943356	4053840		2.8	20
Heptachlor [2C]	A	0.0400	0.0465	6439060	7478870		16.1	20
Heptachlor Epoxide [2C]	A	0.0400	0.0434	5824965	6322230		8.5	20
Methoxychlor [2C]	A	0.0400	0.0433	1789353	1935770		8.2	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 199
Lab File ID: A63_287-0
Sequence: 8011111
Lab Sample ID: 8011111-CCV4

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 8A11004
Calibration Date: 01/07/08 09:38
Injection Date: 01/08/08
Injection Time: 09:35

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Toxaphene	Q	0.500	0.604	105298.1	123096		20.8	20 *

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk
* Values outside of QC limits

Pos.

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument ID: 199
Calibration: 7L28006
Lab File ID: A61_360-0
Calibration Date: 12/24/07 09:46
Sequence: 7122812
Injection Date: 12/25/07
Lab Sample ID: 7122812-ICV1
Injection Time: 08:17

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC	A	0.0400	0.0496	7708385	9558620		24.0	20 *
beta-BHC	A	0.0400	0.0467	2713407	3169370		16.8	20
gamma-BHC (Lindane)	A	0.0400	0.0473	6845908	8103340		18.4	20
delta-BHC	A	0.0400	0.0503	5514248	6928010		25.6	20 *
alpha-Chlordane	A	0.0400	0.0433	5428480	5872960		8.2	20
gamma-Chlordane	A	0.0400	0.0436	5654722	6160090		8.9	20
4,4'-DDD	A	0.0400	0.0491	3040041	3730480		22.7	20 *
4,4'-DDE	A	0.0400	0.0496	4239070	5259640		24.1	20 *
4,4'-DDT	A	0.0400	0.0446	3622752	4040260		11.5	20
Aldrin	A	0.0400	0.0454	6625954	7515440		13.4	20
Dieldrin	A	0.0400	0.0433	5177123	5609470		8.4	20
Endosulfan I	A	0.0400	0.0424	5149017	5452170		5.9	20
Endosulfan II	A	0.0400	0.0424	3958959	4192980		5.9	20
Endosulfan Sulfate	A	0.0400	0.0417	3451922	3595660		4.2	20
Endrin	A	0.0400	0.0434	4502195	4880060		8.4	20
Endrin Aldehyde	A	0.0400	0.0425	3005698	3193070		6.2	20
Endrin Ketone	A	0.0400	0.0415	3900643	4051630		3.9	20
Heptachlor	A	0.0400	0.0468	7181262	8402880		17.0	20
Heptachlor Epoxide	A	0.0400	0.0444	5718522	6348480		11.0	20
Methoxychlor	A	0.0400	0.0451	1783596	2011670		12.8	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

: 04354

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 199
Lab File ID: B61_360-0
Sequence: 7122812
Lab Sample ID: 7122812-ICV1

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Calibration: 7L28006
Calibration Date: 12/24/07 09:46
Injection Date: 12/25/07
Injection Time: 08:17

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
alpha-BHC [2C]	A	0.0400	0.0487	7801813	9500700		21.8	20 *
beta-BHC [2C]	A	0.0400	0.0445	2903154	3230760		11.3	20
gamma-BHC (Lindane) [2C]	A	0.0400	0.0469	7013466	8219020		17.2	20
delta-BHC [2C]	A	0.0400	0.0480	5728712	6877310		20.0	20
alpha-Chlordane [2C]	A	0.0400	0.0422	5404814	5697450		5.4	20
gamma-Chlordane [2C]	A	0.0400	0.0425	5652975	6007580		6.3	20
4,4'-DDD [2C]	A	0.0400	0.0463	3363853	3896410		15.8	20
4,4'-DDE [2C]	A	0.0400	0.0456	4549057	5182670		13.9	20
4,4'-DDT [2C]	A	0.0400	0.0436	3555790	3878000		9.1	20
Aldrin [2C]	A	0.0400	0.0449	6657364	7471340		12.2	20
Dieldrin [2C]	A	0.0400	0.0428	5218586	5588880		7.1	20
Endosulfan I [2C]	A	0.0400	0.0424	5041551	5345190		6.0	20
Endosulfan II [2C]	A	0.0400	0.0418	4027009	4205310		4.4	20
Endosulfan Sulfate [2C]	A	0.0400	0.0410	3635761	3723940		2.4	20
Endrin [2C]	A	0.0400	0.0432	4228653	4567530		8.0	20
Endrin Aldehyde [2C]	A	0.0400	0.0411	3066503	3151890		2.8	20
Endrin Ketone [2C]	A	0.0400	0.0411	3943356	4053840		2.8	20
Heptachlor [2C]	A	0.0400	0.0465	6439060	7478870		16.1	20
Heptachlor Epoxide [2C]	A	0.0400	0.0434	5824965	6322230		8.5	20
Methoxychlor [2C]	A	0.0400	0.0433	1789353	1935770		8.2	20

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk
* Values outside of QC limits

: 04357

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 7123115
Matrix: Soil

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument: 199
Calibration: 7L11022

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
Initial Cal Check (7123115-ICV1)		**Lab File ID: A60_384-0**		**Analyzed: 12/12/07 03:59**			
Tetrachloro-m-xylene	7.59	7.63	-0.04	+/-1.0	103	80 - 120	
Tetrachloro-m-xylene [2C]	8.92	8.96	-0.04	+/-1.0	104	80 - 120	
Decachlorobiphenyl	21.70	21.76	-0.06	+/-1.0	105	80 - 120	
Decachlorobiphenyl [2C]	25.16	25.25	-0.09	+/-1.0	103	80 - 120	
Initial Cal Check (7123115-ICV2)		**Lab File ID: A60_385-0**		**Analyzed: 12/12/07 04:34**			
Tetrachloro-m-xylene	7.58	7.63	-0.05	+/-1.0	102	80 - 120	
Tetrachloro-m-xylene [2C]	8.91	8.96	-0.05	+/-1.0	101	80 - 120	
Decachlorobiphenyl	21.70	21.76	-0.06	+/-1.0	106	80 - 120	
Decachlorobiphenyl [2C]	25.16	25.25	-0.09	+/-1.0	104	80 - 120	
38SB10A (0711396-08)		**Lab File ID: A60_387-0**		**Analyzed: 12/12/07 05:45**			
Tetrachloro-m-xylene	7.59	7.63	-0.04	+/-1.0	44	70 - 125	*
Tetrachloro-m-xylene [2C]	8.92	8.96	-0.04	+/-1.0	45	70 - 125	*
Decachlorobiphenyl	21.70	21.76	-0.06	+/-1.0	43	55 - 130	*
Decachlorobiphenyl [2C]	25.16	25.25	-0.09	+/-1.0	48	55 - 130	*
38SB10B (0711396-09)		**Lab File ID: A60_388-0**		**Analyzed: 12/12/07 06:21**			
Tetrachloro-m-xylene	7.59	7.63	-0.04	+/-1.0	82	70 - 125	
Tetrachloro-m-xylene [2C]	8.92	8.96	-0.04	+/-1.0	84	70 - 125	
Decachlorobiphenyl	21.70	21.76	-0.06	+/-1.0	84	55 - 130	
Decachlorobiphenyl [2C]	25.16	25.25	-0.09	+/-1.0	82	55 - 130	
38SB10C (0711396-10)		**Lab File ID: A60_389-0**		**Analyzed: 12/12/07 06:57**			
Tetrachloro-m-xylene	7.58	7.63	-0.05	+/-1.0	89	70 - 125	
Tetrachloro-m-xylene [2C]	8.92	8.96	-0.04	+/-1.0	91	70 - 125	
Decachlorobiphenyl	21.70	21.76	-0.06	+/-1.0	90	55 - 130	
Decachlorobiphenyl [2C]	25.16	25.25	-0.09	+/-1.0	89	55 - 130	
Calibration Check (7123115-CCV1)		**Lab File ID: A60_396-0**		**Analyzed: 12/12/07 11:06**			
Tetrachloro-m-xylene	7.60	7.63	-0.03	+/-1.0	102	80 - 120	
Tetrachloro-m-xylene [2C]	8.93	8.96	-0.03	+/-1.0	102	80 - 120	
Decachlorobiphenyl	21.71	21.76	-0.05	+/-1.0	106	80 - 120	
Decachlorobiphenyl [2C]	25.18	25.25	-0.07	+/-1.0	106	80 - 120	

03378

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 7122808
Matrix: Soil

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument: 199
Calibration: 7L28006

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
Secondary Cal Check (7122808-SCV2)		**Lab File ID: A61_335-0**		**Analyzed: 12/24/07 17:28**			
Tetrachloro-m-xylene	7.58	7.58	0.00	+/-1.0	124	80 - 120	*
Tetrachloro-m-xylene [2C]	8.90	8.90	0.00	+/-1.0	128	80 - 120	*
Decachlorobiphenyl	21.67	21.66	0.01	+/-1.0	119	80 - 120	
Decachlorobiphenyl [2C]	25.10	25.09	0.01	+/-1.0	119	80 - 120	
Initial Cal Check (7122808-ICV1)		**Lab File ID: A61_336-0**		**Analyzed: 12/24/07 18:04**			
Tetrachloro-m-xylene	7.58	7.58	0.00	+/-1.0	107	80 - 120	
Tetrachloro-m-xylene [2C]	8.90	8.90	0.00	+/-1.0	105	80 - 120	
Decachlorobiphenyl	21.67	21.66	0.01	+/-1.0	110	80 - 120	
Decachlorobiphenyl [2C]	25.10	25.09	0.01	+/-1.0	108	80 - 120	
37SB5A (0711396-06)		**Lab File ID: A61_338-0**		**Analyzed: 12/24/07 19:15**			
Tetrachloro-m-xylene	7.58	7.58	0.00	+/-1.0	100	70 - 125	
Tetrachloro-m-xylene [2C]	8.90	8.90	0.00	+/-1.0	101	70 - 125	
Decachlorobiphenyl	21.67	21.66	0.01	+/-1.0	96	55 - 130	
Decachlorobiphenyl [2C]	25.10	25.09	0.01	+/-1.0	96	55 - 130	
37SB4A (0711396-05)		**Lab File ID: A61_339-0**		**Analyzed: 12/24/07 19:51**			
Tetrachloro-m-xylene	7.58	7.58	0.00	+/-1.0	98	70 - 125	
Tetrachloro-m-xylene [2C]	8.90	8.90	0.00	+/-1.0	99	70 - 125	
Decachlorobiphenyl	21.67	21.66	0.01	+/-1.0	94	55 - 130	
Decachlorobiphenyl [2C]	25.10	25.09	0.01	+/-1.0	92	55 - 130	
DUP-4 (0711396-04)		**Lab File ID: A61_340-0**		**Analyzed: 12/24/07 20:26**			
Tetrachloro-m-xylene	7.58	7.58	0.00	+/-1.0	57	70 - 125	*
Tetrachloro-m-xylene [2C]	8.90	8.90	0.00	+/-1.0	58	70 - 125	*
Decachlorobiphenyl	21.67	21.66	0.01	+/-1.0	62	55 - 130	
Decachlorobiphenyl [2C]	25.10	25.09	0.01	+/-1.0	73	55 - 130	
37SB8C (0711396-03)		**Lab File ID: A61_341-0**		**Analyzed: 12/24/07 21:02**			
Tetrachloro-m-xylene	7.58	7.58	0.00	+/-1.0	98	70 - 125	
Tetrachloro-m-xylene [2C]	8.90	8.90	0.00	+/-1.0	100	70 - 125	
Decachlorobiphenyl	21.67	21.66	0.01	+/-1.0	104	55 - 130	
Decachlorobiphenyl [2C]	25.10	25.09	0.01	+/-1.0	105	55 - 130	

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8081A

37SB5A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-44

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 3550B Sonication Extraction

Initial/Final: 30 g / 10 mL

Laboratory ID: 0714462-MSD1

QC Batch: 0714462

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
alpha-BHC	15.7	13.5	86	6	30	60 - 125	ug/kg dry
alpha-BHC [2C]	15.7	13.5	86	6	30	60 - 125	ug/kg dry
beta-BHC	15.7	13.2	84	6	30	60 - 125	ug/kg dry
beta-BHC [2C]	15.7	12.8	81	6	30	60 - 125	ug/kg dry
gamma-BHC (Lindane)	15.7	13.2	84	6	30	60 - 125	ug/kg dry
gamma-BHC (Lindane) [2C]	15.7	13.4	85	6	30	60 - 125	ug/kg dry
delta-BHC	15.7	14.1	90	7	30	55 - 130	ug/kg dry
delta-BHC [2C]	15.7	13.5	86	8	30	55 - 130	ug/kg dry
alpha-Chlordane	15.7	12.4	79	6	30	65 - 120	ug/kg dry
alpha-Chlordane [2C]	15.7	12.2	78	7	30	65 - 120	ug/kg dry
gamma-Chlordane	15.7	12.9	82	7	30	65 - 125	ug/kg dry
gamma-Chlordane [2C]	15.7	12.4	79	7	30	65 - 125	ug/kg dry
4,4'-DDD	15.7	14.1	90	6	30	30 - 135	ug/kg dry
4,4'-DDD [2C]	15.7	13.3	85	7	30	30 - 135	ug/kg dry
4,4'-DDE	15.7	11.1	71	7	30	70 - 125	ug/kg dry
4,4'-DDE [2C]	15.7	12.5	80	7	30	70 - 125	ug/kg dry
4,4'-DDT	15.7	13.3	85	6	30	45 - 140	ug/kg dry
4,4'-DDT [2C]	15.7	13.3	85	6	30	45 - 140	ug/kg dry
Aldrin	15.7	12.5	80	6	30	45 - 140	ug/kg dry
Aldrin [2C]	15.7	12.3	78	6	30	45 - 140	ug/kg dry
Dieldrin	15.7	13.5	86	8	30	65 - 125	ug/kg dry
Dieldrin [2C]	15.7	13.3	85	8	30	65 - 125	ug/kg dry
Endosulfan I	15.7	13.1	83	6	30	15 - 135	ug/kg dry
Endosulfan I [2C]	15.7	11.0	70	7	30	15 - 135	ug/kg dry
Endosulfan II	15.7	11.1	71	12	30	35 - 140	ug/kg dry
Endosulfan II [2C]	15.7	11.0	70	12	30	35 - 140	ug/kg dry
Endosulfan Sulfate	15.7	11.5	73	12	30	60 - 135	ug/kg dry
Endosulfan Sulfate [2C]	15.7	11.2	71	15	30	60 - 135	ug/kg dry
Endrin	15.7	9.62	61	20	30	60 - 135	ug/kg dry
Endrin [2C]	15.7	9.27	59 *	21	30	60 - 135	ug/kg dry
Endrin Aldehyde	15.7	10.0	64	13	30	35 - 145	ug/kg dry
Endrin Aldehyde [2C]	15.7	10.5	67	15	30	35 - 145	ug/kg dry
Endrin Ketone	15.7	12.6	81	11	30	65 - 135	ug/kg dry
Endrin Ketone [2C]	15.7	12.6	80	12	30	65 - 135	ug/kg dry

03403

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: DUP-5 LAB SAMPLE # 0711396-21

	COLUMN 1	COLUMN 2
Inst.ID:	199	199
Column:	RTX CLP Pest	RTX CLP Pest2
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (mg/kg)	RPD
Endrin	1	15.55	15.55	15.61	0.00179	47.0%
	2	17.86	17.85	17.92	0.00289	

: 04532

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 38SB6A LAB SAMPLE # 0711431-04

	COLUMN 1	COLUMN 2
Inst.ID:	199	199
Column:	RTX CLP Pest	RTX CLP Pest2
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (mg/kg)	RPD
Endrin	1	15.56	15.55	15.61	0.00057	62.7%
	2	17.87	17.85	17.92	0.00109	

04533

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: QSB4A LAB SAMPLE # 0711431-05

	COLUMN 1	COLUMN 2
Inst.ID:	199	199
Column:	RTX CLP Pest	RTX CLP Pest2
ID(mm):	0.53	0.53

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (mg/kg)	RPD
Endrin	1	15.56	15.55	15.61	0.00159	51.1%
	2	17.86	17.85	17.92	0.00268	

: 04534

Quality Control Results – Chlorinated Pesticides

Note: second column (confirmation) data is identified as "compound[2C]".

Calibration

Initial instrument calibrations, second source verification (SCV), and continuing calibration verifications (CCV) for both the primary and confirmation columns were method-compliant for all target analytes (including Toxaphene) with the following exceptions:

1) The confirmation column recovery (121%) of alpha-BHC in the SCV associated with analytical sequence 713009 was outside the 80-120% criterion.

2) The primary column recovery for three of the four BHC isomers in CCV3 associated with analytical sequence 7121830 were outside (i.e., increasing response) the 80-120% criterion.

3) The confirmation column recovery for alpha-BHC in CCV3 associated with analytical sequence 7121830 was outside (i.e., increasing response) the 80-120% criterion.

4) The primary column recovery for four compounds in CCV3 associated with analytical sequence 7122808 were outside (i.e., increasing response) the 80-120% criterion.

5) The confirmation column recovery for alpha-BHC in CCV3 associated with analytical sequence 7122808 was outside (i.e., increasing response) the 80-120% criterion.

6) The primary and confirmation column recoveries for Toxaphene in CCV4 associated with analytical sequence 8011111 were outside (i.e., increasing response) the 80-120% criterion.

7) The primary column recovery for four compounds in ICV1 associated with analytical sequence 7122812 were outside (i.e., increasing response) the 80-120% criterion.

8) The primary column recovery for alpha-BHC in ICV1 associated with analytical sequence 7122812 was outside (i.e., increasing response) the 80-120% criterion.

Note: There were many more CCVs analyzed and reported than those listed above.

Method Blanks

No target analytes were detected.

Surrogates

All surrogate recoveries were in control for both the primary column and confirmation column runs with the exception of all recoveries for sample 38SB10A, both recoveries for one surrogate (TCMX) in sample DUP-4, and one recovery in the re-extracted sample 38SB10A; see Narrative Attachment 2 and Surrogate Standard and RT Summaries for details.

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Individual sample results relate only to the sample tested.

Quality Control Results – Chlorinated Pesticides – (continued)

Laboratory Control Samples

Multiple Laboratory Control Samples (LCS) were fortified with all target analytes. LCS's for the one multi-component analyte (i.e., Toxaphene) were separately extracted/analyzed. All recoveries were in control for both the primary column and confirmation column runs.

Matrix Spikes

Samples 37SB5A and 38SB5A were fortified with all single component target analytes, including Toxaphene. For both samples, all recoveries for both the primary column and confirmation column runs were in control with the exception of one recovery for Endrin in sample 37SB5A. All RPDs were in control. See Narrative Attachment 2 and matrix spike summary forms for details.

Sample Results

Please see Section G. Sample 38SB10A required re-extraction and reanalysis due to low surrogate recovery with re-extraction past the fourteen day extraction holding time but within twice that time. Both sets of results for this sample have been reported. For the remaining sample, DUP-4, also re-extracted, only results from the initial extraction have been reported.

Confirmation analysis was required for seven samples.

For the four samples taken from plastic containers for extraction, there is no evidence that any phthalate contamination, if present, impacted the results reported.

Corrective Action

Corrective action involving the re-extraction and analysis of two samples due to one or more low surrogate recoveries was deemed necessary.

Preventative measures to further reduce the potential for the misplacement of a received sample container are being evaluated.

Statements of Data Qualification

See Narrative Attachment 2.

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STATEMENT OF DATA QUALIFICATIONS

Organochlorine Pesticides by EPA Method 8081A

Qualification: The MS or MSD recovery, but not both, was outside the control limit. The RPD is within the control limit. The unspiked sample result is considered estimated.

Analysis: USEPA-8081A

Sample/Analyte:		
0711396-06	37SB5A	Endrin [2C]

Qualification: The RPD between the detected values from the primary and confirmation analyses exceeded 40%. The higher concentration result has been reported.

Analysis: USEPA-8081A

Sample/Analyte:		
0711396-04	DUP-4	Endrin [2C]
0711396-21	DUP-5	Endosulfan I
0711396-21	DUP-5	Endrin [2C]
0711431-04	38SB6A	Endrin [2C]
0711431-05	QSB4A	Endrin [2C]

Qualification: Sample integrity for the parameter was suspect upon receipt; all results, including non-detects, are considered estimated. Sample was received in a plastic container.

Analysis: USEPA-8081A

Sample/Analyte:
0711396-21 DUP-5
0711431-01 38SB4A
0711431-02 DUP-6
0711431-03 38SB5A

Qualification: One or more surrogate recoveries for the sample were less than the lower control limit but greater than or equal to 10%. All results are considered estimated.

Analysis: USEPA-8081A

Sample/Analyte:
0711396-04 DUP-4
0711396-08 38SB10A

Qualification: This sample was re-extracted due to low surrogate recovery in the initial extract. The re-extracted sample also had low surrogate recovery, confirming matrix interference. The original sample extract result was reported.

Analysis: USEPA-8081A

Sample/Analyte: 0711396-04 DUP-4

Qualification: This sample was re-extracted due to low surrogate recovery in the initial extract. The re-extracted sample had acceptable surrogate recovery, but was extracted outside of the EPA holding time. The initial and re-extraction sample extract result was report

Analysis: USEPA-8081A

Sample/Analyte: 0711396-08RE1 38SB10A

DATA VALIDATION WORKSHEET

Reviewer: RA
Date: 1/23/10 8
DV Level: II III IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
X project QAPP

~~Pesticides~~/PCBs

Project Name: RAAP 10
Project Number: 213548 7
Laboratory: Tri Matrix
SDG No.: 36440-49
Test Name: DCB
Method No.: 8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.	✓		
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes: 36SB10A re-extracted 12-days past hold. original had one low surr.) J, UJ, A
DUP-5 " " " use original results.

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (one per 20 samples or batch and matrix)?	✓		
3.2	Do any blanks have positive results? If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank].		✓	
3.3	Do any field equipment blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration

		Yes	No	NA
4.1	Are at least five standards included in the calibration curve for 1016, 1260, toxaphene, and technical chlordane; and at least one point for the other arochlors reported? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the control limits?	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 GC/ECD Instrument Performance Check

		Yes	No	NA
5.1	Has a Performance Evaluation Mixture (PEM) been analyzed at the beginning, every 12 hours, and at the end of every sequence.			/
5.2	Is the 4,4'-DDT breakdown </= to 20%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non detect DDT results, DDD/DDE - R(+).			/
5.3	Is the endrin breakdown </= to 20%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).			/
5.4	Is the combined breakdowns less than or equal to 30%? If No, for positive DDT/endrin results, DDT/endrin-L(+), DDD/DD/endrin aldehyde/endrin ketone - NJ(+). For non-detect DDT/endrin results, DDD/DDE/endrin aldehyde/endrin ketone - R(+).			/

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	✓		
6.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks? Advisory limit: 60-150%.		✓	
6.3	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?	✓		
6.4	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)		✓	

# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
1 out	high/low	No action	No action
2 out	2 high same column	K	No action
	2 low same column	L, UL	No action
	mixed same column	J, UJ	No action
	2 high diff columns	J	Not applicable
	2 low diff columns	J, UJ	Not applicable
	mixed diff columns	Professional judgement	Not applicable
3 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	2 high, 1 low	K (2 high)	J (1 low 2nd column)
	2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
	other mixed	J, UJ	Not applicable
4 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	Mixed	J, UJ	Not applicable

If any recovery is >0% and <10% then L(+)/R(-).
If any recovery is 0% then R(+/-).

Notes: Decachlorobiphenyl <QC DUP-4 55%, 38SB10A 44%, see attached LCMS

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			

Notes:

9.0 Field Duplicate

		Yes	No	NA
9.2	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.		✓	

Notes: 375B8A , DUP-4 %RPD 385B4A DUP-6
PCB-1254 590 580 2.0 %RPD Both NDs ✓
385B7A DUP-5
PCB-1254 260 510 (65%) J+

10.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns <40%? If No, J(+).	✓		
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		

Notes:

11.0 Data Completeness

		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
11.1.1	Number of samples: Pest_____ PCB_____			
11.1.2	Number of target compounds in each analysis: PEST_____ PCB_____			
11.1.3	Number of results rejected and not reported: Pest_____ PCB_____			
11.1.4	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = Pest_____ PCB 100%			

Notes:

HOLDING TIME SUMMARY
USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-44

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Method: Polychlorinated Biphenyls (PCBs) by EPA Method 8082

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
37SB8A	11/15/07	11/16/07		11/28/07	13	14	12/03/07	5	40	
37SB8B	11/15/07	11/16/07		11/28/07	13	14	12/03/07	5	40	
37SB8C	11/15/07	11/16/07		11/28/07	13	14	12/03/07	5	40	
DUP-4	11/15/07	11/16/07		11/28/07	13	14	12/03/07	5	40	
37SB4A	11/15/07	11/16/07		11/28/07	13	14	12/03/07	5	40	
37SB5A	11/15/07	11/16/07		11/28/07	13	14	12/03/07	5	40	
37SB6A	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
38SB10A	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
38SB10A	11/15/07	11/16/07		12/11/07	26	14	12/14/07	3	40	*
38SB10B	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
38SB10C	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
38SB9A	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
38SB9B	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
38SB9C	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
38SB8A	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
38SB8B	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
38SB8C	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
EQBK-3	11/15/07	11/16/07		11/19/07	4	7	12/03/07	14	40	
38SB7A	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
38SB7B	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
38SB7C	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	

: 02378

HOLDING TIME SUMMARY
USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-44

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Method: Polychlorinated Biphenyls (PCBs) by EPA Method 8082

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
DUP-5	11/15/07	11/16/07		11/29/07	14	14	12/07/07	8	40	
DUP-5	11/15/07	11/16/07		12/11/07	26	14	12/14/07	3	40	*
38SB4A	11/16/07	11/17/07		11/29/07	13	14	12/07/07	8	40	
DUP-6	11/16/07	11/17/07		11/29/07	13	14	12/07/07	8	40	
38SB5A	11/16/07	11/17/07		11/29/07	13	14	12/07/07	8	40	
38SB6A	11/16/07	11/17/07		11/29/07	13	14	12/07/07	8	40	
QSB4A	11/16/07	11/17/07		11/29/07	13	14	12/07/07	8	40	
EQBK-4	11/16/07	11/17/07		11/20/07	4	7	12/03/07	13	40	

02379

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 7120470
Matrix: Water

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument: 144
Calibration: 7L04020

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
Calibration Check (7120470-CCV3)		**Lab File ID: A189154-0**		**Analyzed: 12/03/07 17:14**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	104	80 - 120	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	106	80 - 120	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	102	80 - 120	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	98	80 - 120	
37SB8A (0711396-01)		**Lab File ID: A189155-0**		**Analyzed: 12/03/07 17:32**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	69	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	57	60 - 125	*
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	71	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	69	32 - 129	
37SB8B (0711396-02)		**Lab File ID: A189156-0**		**Analyzed: 12/03/07 17:49**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	86	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	77	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	89	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	90	32 - 129	
37SB8C (0711396-03)		**Lab File ID: A189157-0**		**Analyzed: 12/03/07 18:06**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	97	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	93	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	97	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	112	32 - 129	
DUP-4 (0711396-04)		**Lab File ID: A189158-0**		**Analyzed: 12/03/07 18:23**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	55	60 - 125	*
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	40	60 - 125	*
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	58	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	56	32 - 129	
37SB4A (0711396-05)		**Lab File ID: A189159-0**		**Analyzed: 12/03/07 18:41**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	92	60 - 125	
Decachlorobiphenyl [2C]	12.62	12.61	0.01	+/-1.0	74	60 - 125	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	94	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	98	32 - 129	

02345

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Sequence: 7120751
Instrument: 144
Matrix: Soil
Calibration: 7L07016

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
38SB10A (0711396-08)		**Lab File ID: A190068-0**		**Analyzed: 12/07/07 02:35**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	44	60 - 125	*
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	42	60 - 125	*
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	48	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	46	32 - 129	
38SB10B (0711396-09)		**Lab File ID: A190069-0**		**Analyzed: 12/07/07 02:52**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	82	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	83	60 - 125	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	89	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	90	32 - 129	
38SB10C (0711396-10)		**Lab File ID: A190070-0**		**Analyzed: 12/07/07 03:09**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	85	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	87	60 - 125	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	92	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	84	32 - 129	
38SB9A (0711396-11)		**Lab File ID: A190071-0**		**Analyzed: 12/07/07 03:27**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	72	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	74	60 - 125	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	82	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	79	32 - 129	
Calibration Check (7120751-CCV3)		**Lab File ID: A190072-0**		**Analyzed: 12/07/07 03:44**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	92	80 - 120	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	100	80 - 120	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	94	80 - 120	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	93	80 - 120	
38SB9B (0711396-12)		**Lab File ID: A190073-0**		**Analyzed: 12/07/07 04:01**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	87	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	90	60 - 125	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	87	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	90	32 - 129	

0251

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 7120751
Matrix: Soil

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Instrument: 144
Calibration: 7L07016

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
38SB7C (0711396-20)		**Lab File ID: A190080-0**		**Analyzed: 12/07/07 06:02**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	89	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	95	60 - 125	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	98	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	104	32 - 129	
DUP-5 (0711396-21)		**Lab File ID: A190081-0**		**Analyzed: 12/07/07 06:19**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	62	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	59	60 - 125	*
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	66	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	65	32 - 129	
38SB4A (0711431-01)		**Lab File ID: A190082-0**		**Analyzed: 12/07/07 06:36**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	85	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	86	60 - 125	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	90	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	93	32 - 129	
Calibration Check (7120751-CCV4)		**Lab File ID: A190083-0**		**Analyzed: 12/07/07 06:54**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	92	80 - 120	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	99	80 - 120	
Tetrachloro-m-xylene	1.51	1.51	0.00	+/-1.0	94	80 - 120	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	94	80 - 120	
DUP-6 (0711431-02)		**Lab File ID: A190084-0**		**Analyzed: 12/07/07 07:11**			
Decachlorobiphenyl	9.25	9.26	-0.01	+/-1.0	89	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	93	60 - 125	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	94	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	98	32 - 129	
38SB5A (0711431-03)		**Lab File ID: A190085-0**		**Analyzed: 12/07/07 07:28**			
Decachlorobiphenyl	9.26	9.26	0.00	+/-1.0	81	60 - 125	
Decachlorobiphenyl [2C]	12.61	12.61	0.00	+/-1.0	88	60 - 125	
Tetrachloro-m-xylene	1.52	1.51	0.01	+/-1.0	91	32 - 129	
Tetrachloro-m-xylene [2C]	2.65	2.65	0.00	+/-1.0	94	32 - 129	

022359

STATEMENT OF DATA QUALIFICATIONS

Polychlorinated Biphenyls (PCBs) by EPA Method 8082

Qualification: Sample integrity for the parameter was suspect upon receipt; all results, including non-detects, are considered estimated. Sample was received in a plastic container.

Analysis: USEPA-8082

Sample/Analyte:
0711396-21 DUP-5
0711396-21RE1 DUP-5
0711431-01 38SB4A
0711431-02 DUP-6
0711431-03 38SB5A

Qualification: The EPA hold time for sample pretreatment was exceeded and the sample result(s) are considered estimated.

Analysis: USEPA-8082

Sample/Analyte:
0711396-08RE1 38SB10A
0711396-21RE1 DUP-5

Qualification: Sample was re-extracted out of hold due to failing surrogates in the initial extract.

Analysis: USEPA-8082

Sample/Analyte:
0711396-08RE1 38SB10A
0711396-21RE1 DUP-5

Qualification: Surrogate results are above control limits, all spiked compounds are within limits, no qualification is necessary.

Analysis: USEPA-8082

0714046-BS5

Qualification: One or more surrogate recoveries for the sample were less than the lower control limit but greater than or equal to 10%. All results are considered estimated.

Analysis: USEPA-8082

Sample/Analyte:
0711396-01 37SB8A
0711396-04 DUP-4
0711396-08 38SB10A
0711396-21 DUP-5

Qualification: This sample was re-extracted due to low surrogate recovery in the initial extract. The re-extracted sample also had low surrogate recovery, confirming matrix interference. The original sample extract result was reported.

Analysis: USEPA-8082

Sample/Analyte:
0711396-01 37SB8A
0711396-04 DUP-4

Qualification: One or more of the surrogate recoveries were outside of the laboratory control limits on the confirmation column. However, since there were no positive results on the primary column, no qualification is necessary.

Analysis: USEPA-8082

0714046-BLK5

Quality Control Results – Polychlorinated Biphenyls

Note: second column (confirmation) data is identified as "compound[2C]".

Calibration

Initial instrument calibrations, second source verification (SCV), and continuing calibration verifications (CCV) for both the primary and confirmation columns were method-compliant.

Method Blanks

No target analytes were detected.

Surrogates

All surrogate recoveries were in control for both the primary column and confirmation column runs with the exception of one or both surrogates for samples 37SB8A, DUP-4, 38SB10A, and DUP-5 plus one method blank and LCS; see sample report forms and Narrative Attachment 2 for details. The affected samples were re-extracted and analyzed; the same surrogate(s) also recovered low in samples 37SB8A and DUP-4 confirming sample matrix interference.

Laboratory Control Samples

The Laboratory Control Samples (LCS) were fortified with Aroclors 1016 and 1260. All recoveries were in control.

Matrix Spikes

Samples 37SB5A and 38SB5A were fortified with Aroclors 1016 and 1260. All recoveries and RPDs for both the primary column and confirmation column runs were in control.

Sample Results

Please see Section F and Narrative Attachment 2. For the four samples taken from plastic containers for extraction, there is no evidence that any phthalate contamination, if present, impacted the results reported.

Corrective Action

Corrective action involved the re-extraction and reanalysis of four samples due to low surrogate recoveries for one of both surrogates.

Preventative measures to further reduce the potential for the misplacement of a received sample container are being evaluated.

Statements of Data Qualification

See Narrative Attachment 2.

This report shall not be reproduced except in full, without written authorization of TriMatrix Laboratories, Inc.
Individual sample results relate only to the sample tested.

DATA VALIDATION WORKSHEET

Explosives

Reviewer: RA
Date: 1/22/08
DV Level: II III IV
Review Document:
_X__ Region III Modified for National Functional Guidelines
_X__ SW-846
_X__ Project QAPP/SAP

Project Name: RAAP 10
Project Number: 21354887
Laboratory: Tri Matrix
SDG No.: 36440-44
Test Name: Explosives
Method No.: 8330

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 ^{O}C, then flag L(+)/UL(-).			
1.4	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 Laboratory Control Sample (LCS)		Yes	No	NA
5.1	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.2	Are there any %R for LCS/LCSD recoveries outside the QC limits?	✓		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
5.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.	✓		

Notes: batch 714379 2-nitrotoluene < 80% at 79%. Professional judgement applied, J

batch 714136 RPD 730% at 34%. 3-nitrotoluene all NDs, No action

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			✓
6.3	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			✓

		<10%	low	high
	Positives	L	L	K
	Non-detects	R	UL	No action

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.2	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
7.3	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
	Action: No action is required based on MS/MSd failure alone. Note in the report and use professional judgement.			

Notes: MS/MSD for 375B5A %Rs<QC for 2-Amino-4,6-DNT 70%/70%, 4-amino-2,6-DNT 68/68 and 2,6-DNT 74%. parent NDs → U,m

MS/MSD for 385B5A %QC for 2,6-DNT 132%, RPD>QC at 32%. | Parent all NDs, No action
2,4-DNT %QC 195%, RPD>QC 49%. |
4-nitrotoluene %QC 142%, " " 51%. |

8.0 Field Duplicate		Yes	No	NA
8.1	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: 375B8A and DUP-4 RL 385B4A and DUP-6
2,4-DNT 0.82 ND 2.5 OK✓ Both NDs ✓
385B7A and DUP-5
Both NDs ✓

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes, is all positive identifications were confirmed in second column? Apply J flag if RPD >40% between first and second columns.	✓		
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes:

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
10.1.1	Number of samples:			
10.1.2	Number of target compounds in each analysis: 14			
10.1.3	Number of results rejected or not reported:			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100 %			

Notes:

STATEMENT OF DATA QUALIFICATIONS

Nitroaromatics & Nitramines by EPA Method 8330

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8330

Sample/Analyte:	
0711396-06 37SB5A	2-Amino-4,6-dinitrotoluene
0711396-06 37SB5A	4-Amino-2,6-dinitrotoluene
0711431-03 38SB5A	2,4-Dinitrotoluene
0711431-03 38SB5A	2,6-Dinitrotoluene

Qualification: The RPD between the MS and MSD results exceeded the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8330

Sample/Analyte:	
0711431-03 38SB5A	2,4-Dinitrotoluene
0711431-03 38SB5A	2,6-Dinitrotoluene
0711431-03 38SB5A	4-Nitrotoluene

Qualification: The MS or MSD recovery, but not both, was outside the control limit. The RPD is within the control limit. The unspiked sample result is considered estimated.

Analysis: USEPA-8330

Sample/Analyte:	
0711396-06 37SB5A	2,6-Dinitrotoluene

Qualification: The LCS/LCSD RPD exceeded the control limit. A positive result for this analyte in any sample from the associated QC batch is considered estimated. Non-detectable results are not qualified.

Analysis: USEPA-8330

0714136-BSD1	3-Nitrotoluene

Qualification: The LCS recovery was outside of the control limit with no allowed marginal exceedences. The result for this analyte in any sample from the associated QC batch is considered qualified.

Analysis: USEPA-8330

0714379-BS1	2-Nitrotoluene

Qualification: Sample integrity for the parameter was suspect upon receipt; all results, including non-detects, are considered estimated. Sample was received in a plastic container.

Analysis: USEPA-8330

Sample/Analyte:
0711396-21 DUP-5
0711431-01 38SB4A
0711431-02 DUP-6
0711431-03 38SB5A

Quality Control Results – Nitroaromatic Explosives

Calibration

All initial instrument calibrations, second source calibration verifications (SCV), and continuing calibration verifications (CCV) for the primary column were method-compliant. Initial instrument calibration, SCV, and applicable CCVs associated with the confirmation analysis were also in control.

Note: Confirmation column data (QC and instrument calibration summaries plus raw data) follows the primary column summaries and raw data.

Method Blanks

No target analytes were detected.

Surrogates

All surrogate recoveries were in control.

Laboratory Control Samples

Each Laboratory Control Sample (LCS) was fortified with all target analytes. For one QC batch, an LCS Duplicate was also analyzed. All recoveries (and RPDs in the case of the LCS/LCSD) were in control with the exception of the RPD (34%) for 3-Nitrotoluene and the recovery (79%) for 2-Nitrotoluene in a separate LCS.

Matrix Spikes

Samples 37SB5A and 38SB5A were fortified with all target analytes. For sample 37SB5A, all recoveries and RPDs were in control with the exception of both recoveries (ranging from 68% to 70%) for two analytes and one recovery (74%) for a third analyte; see the MS/MSD summary form and Narrative Attachment 2 for details. For sample 38SB5A, all recoveries and RPDs were in control with the exception of both recoveries (ranging from 132% to 195%) for one analyte, one recovery (142%) for a third analyte, and RPDs (ranging from 32% to 51%) for three analytes; see the MS/MSD summary form and Narrative Attachment 2 for details.

Sample Results

Please see Section B. One sample required confirmation analysis for one or more target analytes.

For the four samples taken from plastic containers for extraction (those samples collected and received in glass containers could not be located in the laboratory's storage unit before the extraction hold time was to expire), there is no evidence that any phthalate contamination, if present, impacted the results reported. Furthermore, the following excerpt regarding explosive residues is taken from a document entitled "Collecting a Representative Soil Sample", EPA's Technology Innovation Program, Characterization and Monitoring (of) Explosives, dated July 2006: "Clean polyethylene plastic bags or glass jars should be used as containers while collecting soil samples in the field and for storage prior to and after subsampling.".

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Individual sample results relate only to the sample tested.

Quality Control Results – Nitroaromatic Explosives – (continued)

Corrective Actions

No corrective actions were taken. Preventative measures to further reduce the potential for the misplacement of a received sample container are being evaluated.

Statements of Data Qualification

See Narrative Attachment 2.

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Individual sample results relate only to the sample tested.

LCS / LCS DUPLICATE RECOVERY
USEPA-8330

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil

Laboratory ID: 0714379-BS1

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 8330 Extraction
Initial/Final: 2 g / 20 mL
QC Batch: 0714379
Sequence: 7121601

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
1,3,5-Trinitrobenzene	2.00	2.12	106	75 - 125	mg/kg dry wt.
1,3-Dinitrobenzene	2.00	2.05	103	80 - 125	mg/kg dry wt.
2,4,6-Trinitrotoluene	2.00	2.16	108	55 - 140	mg/kg dry wt.
2,4-Dinitrotoluene	2.00	2.16	108	80 - 125	mg/kg dry wt.
2,6-Dinitrotoluene	2.00	2.25	112	80 - 120	mg/kg dry wt.
2-Amino-4,6-dinitrotoluene	4.00	3.96	99	80 - 125	mg/kg dry wt.
2-Nitrotoluene	2.00	1.59	79 *	80 - 125	mg/kg dry wt.
3-Nitrotoluene	2.00	1.73	86	75 - 120	mg/kg dry wt.
4-Amino-2,6-dinitrotoluene	2.00	2.19	109	80 - 125	mg/kg dry wt.
4-Nitrotoluene	2.00	1.64	82	75 - 125	mg/kg dry wt.
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	2.00	1.97	99	70 - 135	mg/kg dry wt.
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	2.00	2.47	124	10 - 150	mg/kg dry wt.
Nitrobenzene	2.00	2.09	104	75 - 125	mg/kg dry wt.
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2.00	1.90	95	75 - 125	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00159

LCS / LCS DUPLICATE RECOVERY
USEPA-8330

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

Laboratory ID: 0714136-BSD1

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Preparation: 8330 Extraction
Initial/Final: 770 mL / 10 mL
QC Batch: 0714136
Sequence: 7121601

Analyte	Spike Added ug/L	LCSD Conc.	LCSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
1,3,5-Trinitrobenzene	2.60	2.31	89	5	30	65 - 140	ug/L
1,3-Dinitrobenzene	2.60	2.37	91	11	30	45 - 160	ug/L
2,4,6-Trinitrotoluene	2.60	2.67	103	23	30	50 - 145	ug/L
2,4-Dinitrotoluene	2.60	2.79	107	22	30	60 - 135	ug/L
2,6-Dinitrotoluene	2.60	2.92	112	26	30	60 - 135	ug/L
2-Amino-4,6-dinitrotoluene	5.19	5.42	104	25	30	50 - 155	ug/L
2-Nitrotoluene	2.60	2.29	88	2	30	45 - 135	ug/L
3-Nitrotoluene	2.60	2.84	109	34 *	30	50 - 130	ug/L
4-Amino-2,6-dinitrotoluene	2.60	2.79	107	26	30	55 - 155	ug/L
4-Nitrotoluene	2.60	2.38	92	9	30	50 - 130	ug/L
Hexahydro-1,3,5-trinitro-1,3,5-tria	2.60	2.38	92	13	30	50 - 160	ug/L
Methyl-2,4,6-trinitrophenylnitram	2.60	2.16	83	6	30	20 - 175	ug/L
Nitrobenzene	2.60	2.41	93	15	30	50 - 140	ug/L
Octahydro-1,3,5,7-tetranitro-1,3,5	2.60	2.40	93	10	30	80 - 115	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 001157

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

37SB5A

USEPA-8330

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-44

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 8330 Extraction

Initial/Final: 2 g / 20 mL

Laboratory ID: 0714378-MS1

QC Batch: 0714378

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
1,3,5-Trinitrobenzene	2.00	ND	1.85	93	75 - 125	mg/kg dry wt.
1,3-Dinitrobenzene	2.00	ND	1.81	90	80 - 125	mg/kg dry wt.
2,4,6-Trinitrotoluene	2.00	ND	1.76	88	55 - 140	mg/kg dry wt.
2,4-Dinitrotoluene	2.00	ND	1.81	90	80 - 125	mg/kg dry wt.
2,6-Dinitrotoluene	2.00	ND	1.84	92	80 - 120	mg/kg dry wt.
2-Amino-4,6-dinitrotoluene	4.00	ND	2.78	70 *	80 - 125	mg/kg dry wt.
2-Nitrotoluene	2.00	ND	1.77	88	80 - 125	mg/kg dry wt.
3-Nitrotoluene	2.00	ND	1.85	92	75 - 120	mg/kg dry wt.
4-Amino-2,6-dinitrotoluene	2.00	ND	1.37	68 *	80 - 125	mg/kg dry wt.
4-Nitrotoluene	2.00	ND	1.91	95	75 - 125	mg/kg dry wt.
Hexahydro-1,3,5-trinitro-1,3,5-tria	2.00	ND	1.76	88	70 - 135	mg/kg dry wt.
Methyl-2,4,6-trinitrophenylnitram	2.00	ND	1.79	90	10 - 150	mg/kg dry wt.
Nitrobenzene	2.00	ND	2.05	102	75 - 125	mg/kg dry wt.
Octahydro-1,3,5,7-tetranitro-1,3,5	2.00	ND	1.93	97	75 - 125	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8330

37SB5A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-44

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 8330 Extraction

Initial/Final: 2 g / 20 mL

Laboratory ID: 0714378-MSD1

QC Batch: 0714378

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
1,3,5-Trinitrobenzene	2.00	1.85	93	0.1	30	75 - 125	mg/kg dry wt.
1,3-Dinitrobenzene	2.00	1.83	91	1	30	80 - 125	mg/kg dry wt.
2,4,6-Trinitrotoluene	2.00	1.67	83	6	30	55 - 140	mg/kg dry wt.
2,4-Dinitrotoluene	2.00	1.63	81	11	30	80 - 125	mg/kg dry wt.
2,6-Dinitrotoluene	2.00	1.48	74 *	22	30	80 - 120	mg/kg dry wt.
2-Amino-4,6-dinitrotoluene	4.00	2.79	70 *	0.06	30	80 - 125	mg/kg dry wt.
2-Nitrotoluene	2.00	1.95	97	10	30	80 - 125	mg/kg dry wt.
3-Nitrotoluene	2.00	1.83	92	0.8	30	75 - 120	mg/kg dry wt.
4-Amino-2,6-dinitrotoluene	2.00	1.36	68 *	0.8	30	80 - 125	mg/kg dry wt.
4-Nitrotoluene	2.00	1.88	94	2	30	75 - 125	mg/kg dry wt.
Hexahydro-1,3,5-trinitro-1,3,5-tria	2.00	1.69	85	4	30	70 - 135	mg/kg dry wt.
Methyl-2,4,6-trinitrophenylnitram	2.00	1.91	96	6	30	10 - 150	mg/kg dry wt.
Nitrobenzene	2.00	1.90	95	8	30	75 - 125	mg/kg dry wt.
Octahydro-1,3,5,7-tetranitro-1,3,5	2.00	1.70	85	13	30	75 - 125	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

001153

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8330

38SB5A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-44

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 8330 Extraction

Initial/Final: 2 g / 20 mL

Laboratory ID: 0714379-MS1

QC Batch: 0714379

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
1,3,5-Trinitrobenzene	2.00	ND	1.95	98	75 - 125	mg/kg dry wt.
1,3-Dinitrobenzene	2.00	ND	1.98	99	80 - 125	mg/kg dry wt.
2,4,6-Trinitrotoluene	2.00	ND	2.09	105	55 - 140	mg/kg dry wt.
2,4-Dinitrotoluene	2.00	ND	2.38	119	80 - 125	mg/kg dry wt.
2,6-Dinitrotoluene	2.00	ND	2.63	132 *	80 - 120	mg/kg dry wt.
2-Amino-4,6-dinitrotoluene	4.00	ND	4.17	104	80 - 125	mg/kg dry wt.
2-Nitrotoluene	2.00	ND	2.15	107	80 - 125	mg/kg dry wt.
3-Nitrotoluene	2.00	ND	1.95	97	75 - 120	mg/kg dry wt.
4-Amino-2,6-dinitrotoluene	2.00	ND	2.33	117	80 - 125	mg/kg dry wt.
4-Nitrotoluene	2.00	ND	1.69	85	75 - 125	mg/kg dry wt.
Hexahydro-1,3,5-trinitro-1,3,5-tria	2.00	ND	2.07	104	70 - 135	mg/kg dry wt.
Methyl-2,4,6-trinitrophenylnitram	2.00	ND	2.12	106	10 - 150	mg/kg dry wt.
Nitrobenzene	2.00	ND	1.87	93	75 - 125	mg/kg dry wt.
Octahydro-1,3,5,7-tetranitro-1,3,5	2.00	ND	1.89	95	75 - 125	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 00155

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8330

38SB5A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-44

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 8330 Extraction

Initial/Final: 2 g / 20 mL

Laboratory ID: 0714379-MSD1

QC Batch: 0714379

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
1,3,5-Trinitrobenzene	2.00	1.81	91	8	30	75 - 125	mg/kg dry wt.
1,3-Dinitrobenzene	2.00	1.88	94	5	30	80 - 125	mg/kg dry wt.
2,4,6-Trinitrotoluene	2.00	1.96	98	7	30	55 - 140	mg/kg dry wt.
2,4-Dinitrotoluene	2.00	3.90	195 *	49 *	30	80 - 125	mg/kg dry wt.
2,6-Dinitrotoluene	2.00	1.91	95	32 *	30	80 - 120	mg/kg dry wt.
2-Amino-4,6-dinitrotoluene	4.00	3.41	85	20	30	80 - 125	mg/kg dry wt.
2-Nitrotoluene	2.00	2.16	108	0.6	30	80 - 125	mg/kg dry wt.
3-Nitrotoluene	2.00	1.76	88	10	30	75 - 120	mg/kg dry wt.
4-Amino-2,6-dinitrotoluene	2.00	2.00	100	15	30	80 - 125	mg/kg dry wt.
4-Nitrotoluene	2.00	2.84	142 *	51 *	30	75 - 125	mg/kg dry wt.
Hexahydro-1,3,5-trinitro-1,3,5-tri	2.00	1.88	94	10	30	70 - 135	mg/kg dry wt.
Methyl-2,4,6-trinitrophenylnitram	2.00	2.23	111	5	30	10 - 150	mg/kg dry wt.
Nitrobenzene	2.00	2.00	100	7	30	75 - 125	mg/kg dry wt.
Octahydro-1,3,5,7-tetranitro-1,3,5	2.00	1.61	81	16	30	75 - 125	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

QA135

DATA VALIDATION WORKSHEET

Nitroglycerin

Reviewer: RA
Date: 1/22/08
DV Level: II (III) IV
Review Document:
_X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
____ Project QAPP/SAP

Project Name: RAAP 10
Project Number: 21354887
Laboratory: TriMatrix
SDG No.: 36440-44
Test Name: Nitroglycerin
Method No.: 8332-HPLC

All QC OK ✓ No flags

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. %	✓		
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	✓		

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	✓		
	Action: If the temperature of the cooler was elevated (> 10 ^{o}C), then flag all positive results with a "J" and all non-detects "UJ".			✓
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		✓	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		✓	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	✓		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	✓		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	✓		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	✓		
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).	✓		
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).	✓		
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	✓		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	✓		
5.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			✓
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			✓
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
6.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	✓		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: 37SB8A & DUP-4 both NDs✓

38SB7A and DUP-5 both NDs✓

38SB4A & DUP-6 both NDs✓

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes, is all positive identifications were confirmed in second column? Apply J flag if RPD >40% between first and second columns.		✓	
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes:

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)	✓		
10.1.1	Number of samples:			
10.1.3	Number of results rejected and not reported:			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%			
	% Completeness =			

Notes:

Quality Control Results – PETN and Nitroglycerin

Calibration

All initial instrument calibrations, second source calibration verifications (SCV), and continuing calibration verifications (CCV) for the primary column were method-compliant. Initial instrument calibration, SCV, and applicable CCVs associated with the confirmation analysis were also in control.

Note: for the SCV, the DoD QSM limit of 80-120% was used for assessment although the summary forms lists 85-115%.

Note: Confirmation column data (QC and instrument calibration summaries plus raw data) follows the primary column summaries and raw data.

Method Blanks

No target analytes were detected.

Surrogates

All surrogate recoveries were in control.

Laboratory Control Samples

Each Laboratory Control Sample (LCS) was fortified with both target analytes. For one QC batch, an LCS Duplicate was also analyzed. All recoveries (and RPDs in the case of the LCS/LCSD) were in control.

Matrix Spikes

Samples 37SB5A and 38SB5A were fortified with both target analytes. All recoveries and RPDs were in control.

Sample Results

Please see Section C. No sample required confirmation analysis.

For the four samples taken from plastic containers for extraction (those samples collected and received in glass containers could not be located in the laboratory's storage unit before the extraction hold time was to expire), there is no evidence that any phthalate contamination, if present, impacted the results reported. Furthermore, the following excerpt regarding explosive residues is taken from a document entitled "Collecting a Representative Soil Sample", EPA's Technology Innovation Program, Characterization and Monitoring (of) Explosives, dated July 2006: "Clean polyethylene plastic bags or glass jars should be used as containers while collecting soil samples in the field and for storage prior to and after subsampling.".

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Individual sample results relate only to the sample tested.

Quality Control Results – PETN and Nitroglycerin – (continued)

Corrective Actions

No corrective actions were deemed necessary. Preventative measures to further reduce the potential for the misplacement of a received sample container are being evaluated.

Statements of Data Qualification

See Narrative Attachment 2.

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Individual sample results relate only to the sample tested.

STATEMENT OF DATA QUALIFICATIONS

Nitroglycerine by EPA Method 8332

Qualification: Sample integrity for the parameter was suspect upon receipt; all results, including non-detects, are considered estimated. Sample was received in a plastic container.

Analysis: USEPA-8332

Sample/Analyte:
0711396-21 DUP-5
0711431-01 38SB4A
0711431-02 DUP-6
0711431-03 38SB5A

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-44
Project No.: 21354887

Project Name: RAAP 10
Reviewer: RA
Date: 1/22/08

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓			✓			✓					
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓			✓			✓					
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓			✓			✓				
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{o}C \pm 2\ ^{o}C$)	✓			✓			✓					
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓			✓			✓					

Note:

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		✓			✓			✓				

Note:

3.0 Instrument Calibration

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	✓			✓			✓					
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	✓			✓			✓					
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.												
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	✓			✓			✓					
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	✓			✓			✓					
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	✓			✓			✓					
	ICV and CCV:												
	Action: L(+)/R(-) L(+)/UL(-) K(+)												
	Mercury < 65% 65% - 79% > 120%												
	Cyanide < 65% 65% - 84% > 115%												
	Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	✓			✓								
	<50% 50%-79% >120%												
	2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K												

Note: _____

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓			✓			✓					
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	✓			✓			✓					
4.3	Are there reported MB or ICB/CCBs values > MDL?	✓			✓				✓				
	Sample Results > MDL												
	< 5X Blank Contamination B		✓			✓			✓				
4.4	Are there negative blank results with the absolute value > MDL?		✓			✓			✓				
	Sample Results Non-detects > MDL												
	< 5X absolute Blank Contamination UL L					✓							
4.5	Are there reported field blank > ± MDL?	✓			✓				✓				
	Sample Results > MDL												
	< 5X Blank Contamination B												

Note: 6010→MB Ca, 8.33 mg/kg, Cd 0.169 mg/kg, Cd 0.266 mg/kg <5x→B,P
6010 EBS→Ca, Fe all >5x, No action
6020→MB Pb 1.61 mg/kg, 0.196 mg/kg, ±0.0205 mg/kg, Zn 2.31 ug/L, V 0.479 ug/L →<5x, B,P
<0.05
6020 EBS→Ca, Fe, Mn all >5x, No action

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	✓			✓								
5.2	Are the ICS AB recoveries within 80% - 120%?	✓			✓								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	✓			✓								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			✓			✓						
	If not...												
	Action: Not Spiked Analytes < -MDL L(+)/UL(-); > MDL K(+); Spiked analytes (ICS AB analytes) < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note:

URS

6.0 Laboratory Control Sample (LCS)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	✓			✓			✓					
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		✓			✓			✓				
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note:

7.0 Laboratory Duplicates (MSD)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	✓			✓			✓					
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	✓			✓			✓					

Note:

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	✓			✓			✓					
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous matrices or lab limits for soil matrices?	✓			✓			✓					
	%R > 125% 30%< %R < 74% < 30%		✓										
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.			✓			✓			✓			

Note: ~~6010 MS for 375B5A 3M 125% OK~~

6020 MS for ~~375B5A~~ 375B5A <QC AS 70%/71%, SE 68%/67% L,UL,M all samples

9.0 Instrument Detection Limits (IDL)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	✓			✓			✓					

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	✓			✓								
10.2	Was a five-fold dilution performed?	✓			✓								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).		✓			✓							

Note: 6010 for 375B5A Fe 15% 7QC all POS→J/s

6020 for 375B5A 7QC Cu 15%, Pb 11%, Ni 14% all POS→J/s

11.0 Field Duplicate Samples		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	✓			✓			✓					
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	✓			✓			✓					

Note: Also see attached

37SB8A, DUP-4 RL
Hg 0.94 1.3 0.1 ✓ DLC

38SB7A, DUP-5
Hg 0.14 0.14 OK ✓

38SB4A, DUP-6 RL
Hg 0.013 0.019 0.05 OK ✓

12.0 Result Verification/ Internal Standards/ Tune		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	✓			✓			✓					
12.2	Were all dilution reflected in the positive results and detection limits?	✓			✓			✓					
12.3	Were the Internal Standard recoveries within 30-120%	✓			✓								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	✓											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	✓											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	✓											

Note:

13.0 Completeness Calculation		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	✓			✓			✓					
13.1.1	Number of samples:												
13.1.2	Number of target compounds in each analysis:												
13.1.3	Number of results rejected and not reported:												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100 %												

Note:

URS

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714534-BLK1
File ID: 7120303-044
Prepared: 11/28/07 07:00
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 12/03/07 12:05
Instrument: 116
QC Batch: 0714534
Sequence: 7120303
Calibration: 7L04006

CAS No.	Analyte	MDL	MRL	Concentration	Q
7429-90-5	Aluminum, Total	2.1	10	10 mg/kg dry wt.	U
7440-39-3	Barium, Total	0.17	1.0	1.0 mg/kg dry wt.	U
7440-70-2	Calcium, Total	4.2	50	8.33 mg/kg dry wt.	J
7439-89-6	Iron, Total	0.48	10	10 mg/kg dry wt.	U
7439-95-4	Magnesium, Total	5.0	50	50 mg/kg dry wt.	U
7439-96-5	Manganese, Total	0.16	1.0	1.0 mg/kg dry wt.	U

Ca → 41.65

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714534-BLK1
File ID: 7120303-044
Prepared: 11/28/07 07:00
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 12/03/07 12:07
Instrument: 116
QC Batch: 0714534
Sequence: 7120303
Calibration: 7L04006

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-41-7	Beryllium, Total	0.021	1.0	1.0 mg/kg dry wt.	U
7440-43-9	Cadmium, Total	0.11	2.0	0.169 mg/kg dry wt.	J
7440-47-3	Chromium, Total	0.72	5.0	5.0 mg/kg dry wt.	U
7440-48-4	Cobalt, Total	0.37	2.0	2.0 mg/kg dry wt.	U
7440-66-6	Zinc, Total	1.0	5.0	5.0 mg/kg dry wt.	U

Cd → 0.845

: 00071

METHOD BLANK DATA SHEET
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714578-BLK1
File ID: 7120303-031
Prepared: 11/29/07 10:30
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 50 mL
Analyzed: 12/03/07 10:45
Instrument: 116
QC Batch: 0714578
Sequence: 7120303
Calibration: 7L04006

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-41-7	Beryllium, Total	0.021	1.0	1.0 mg/kg dry wt.	U
7440-43-9	Cadmium, Total	0.11	2.0	0.266 mg/kg dry wt.	J
7440-47-3	Chromium, Total	0.72	5.0	5.0 mg/kg dry wt.	U
7440-48-4	Cobalt, Total	0.37	2.0	2.0 mg/kg dry wt.	U
7440-66-6	Zinc, Total	1.0	5.0	5.0 mg/kg dry wt.	U

Cd → 1.33

00875

SERIAL DILUTION
USEPA-6010B

38SB5A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Soil
% Solids: 88.70
Laboratory ID: 7120303-SRD5
Lab Source ID: 0711431-03

SDG: 36440-44
Project: RFAAP RAAP 10 RFI/CMS, WO 004
QC Batch: 7120303
Sequence: 7120303

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Iron, Total	0.702		0.597		15.0	*	mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

URS

Page ____ of ____

Job ____ Project No. ____ Sheet ____ of ____

Description ____ Computed by ____ Date ____

____ Checked by ____ Date ____

Reference

Field DUPs for 6010

	37SB8-A	&	DUP-4	RL	RPD
Al	17000		16000	10	6% ✓
Ba	80		69	1	15% ✓
Be	0.9		1.2	1	OK ✓
Cd	2.2		2.3	2	OK ✓
Ca	73000		79000	50	8% ✓
Cr	170		190	5	11% ✓
Co	5.1		4.6	2	OK ✓
Fe	25000		22000	10	13% ✓
Mg	2900		2700	50	7% ✓
Mn	130		130	1	OK ✓
K	1100		940	50	OK ✓
Na	91		93	100	OK ✓
Zn	99		85	5	15% ✓

All OK ✓

	38SB7A	&	DUP-5	RL	RPD
Al	21000		21000	10	0% OK ✓
Ba	120		120	1	0% OK ✓
Be	0.5		0.43	1	OK ✓
Cd	1.4		1.2	2	OK ✓
Ca	11000		9600	50	14% ✓
Cr	57		52	5	9% ✓
Co	10		9.9	2	OK ✓
Fe	26000		27000	10	4% ✓
Mg	4700		4700	50	OK ✓
Mn	450		450	1	0% OK ✓
K	2400		2400	50	0% OK ✓
Na	65		64	100	OK ✓
Zn	72		76	5	5% ✓

All OK ✓

URS

Page ____ of ____

Job ____ Project No. ____ Sheet ____ of ____

Description ____ Computed by ____ Date ____

____ Checked by ____ Date ____

Reference

Field DUPs for 6010 (continued)

	385B4A	&	DUP-6	RL	%RPD
Al	8500		7500	10	12% ✓
Ba	94		80	1	16% ✓
Be	0.61		0.57	1	OK ✓
Cd	1.2		1.1	2	OK ✓
Ca	1100		990	50	10% ✓
Cr	16		14	5	OK ✓
Co	6.8		6.1	2	OK ✓
Fe	15000		13000	10	14% ✓
Mg	2500		2200	50	13% ✓
Mn	360		310	1	15% ✓
K	1100		1000	5	10% ✓
Na	29		25	100	OK ✓
Zn	49		42	5	15% ✓

All OK ✓

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714427-BLK1
File ID: 7120424-014
Prepared: 11/28/07 07:00
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 250 mL
Analyzed: 12/04/07 12:11
Instrument: 114
QC Batch: 0714427
Sequence: 7120424
Calibration: 7L04009

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.071	0.20	0.20 mg/kg dry wt.	U
7440-50-8	Copper, Total	0.044	0.20	0.20 mg/kg dry wt.	U
7439-92-1	Lead, Total	0.022	0.20	1.61 mg/kg dry wt.	
7440-02-0	Nickel, Total	0.036	0.10	0.10 mg/kg dry wt.	U
7782-49-2	Selenium, Total	0.089	0.30	0.30 mg/kg dry wt.	U
7440-22-4	Silver, Total	0.013	0.10	0.10 mg/kg dry wt.	U
7440-28-0	Thallium, Total	0.0049	0.10	0.10 mg/kg dry wt.	U
7440-62-2	Vanadium, Total	0.034	0.10	0.10 mg/kg dry wt.	U

Pb 8.05

01342

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714535-BLK1
File ID: 7120112-045
Prepared: 11/28/07 07:00
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 250 mL
Analyzed: 12/01/07 12:49
Instrument: 114
QC Batch: 0714535
Sequence: 7120112
Calibration: 7L03009

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.071	0.20	0.20 mg/kg dry wt.	U
7440-50-8	Copper, Total	0.044	0.20	0.20 mg/kg dry wt.	U
7439-92-1	Lead, Total	0.022	0.20	0.196 mg/kg dry wt.	J
7440-02-0	Nickel, Total	0.036	0.10	0.10 mg/kg dry wt.	U
7782-49-2	Selenium, Total	0.089	0.30	0.30 mg/kg dry wt.	U
7440-22-4	Silver, Total	0.013	0.10	0.10 mg/kg dry wt.	U
7440-28-0	Thallium, Total	0.0049	0.10	0.0205 mg/kg dry wt.	J
7440-62-2	Vanadium, Total	0.034	0.10	0.10 mg/kg dry wt.	U

Pb 0.98
Tl 0.1025

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Water
Laboratory ID: 0714543-BLK1
File ID: 7113030-019
Prepared: 11/29/07 07:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 11/30/07 13:45
Instrument: 114
QC Batch: 0714543
Sequence: 7113030
Calibration: 7L03010

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-38-2	Arsenic, Total	0.74	3.0	3.0 ug/L	U
7440-39-3	Barium, Total	0.52	2.0	2.0 ug/L	U
7440-41-7	Beryllium, Total	0.31	2.0	2.0 ug/L	U
7440-43-9	Cadmium, Total	0.062	0.20	0.20 ug/L	U
7440-48-4	Cobalt, Total	0.096	1.0	1.0 ug/L	U
7440-50-8	Copper, Total	0.33	1.0	1.0 ug/L	U
7439-96-5	Manganese, Total	0.43	3.0	3.0 ug/L	U
7440-02-0	Nickel, Total	0.28	2.0	2.0 ug/L	U
7782-49-2	Selenium, Total	0.92	3.0	3.0 ug/L	U
7440-22-4	Silver, Total	0.12	0.50	0.50 ug/L	U
7440-62-2	Vanadium, Total	0.83	5.0	5.0 ug/L	U
7440-66-6	Zinc, Total	0.84	10	2.31 ug/L	J

Zn 11.55

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Water
Laboratory ID: 0714750-BLK2
File ID: 7120471-014
Prepared: 12/04/07 07:05
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 12/04/07 21:35
Instrument: 201
QC Batch: 0714750
Sequence: 7120471
Calibration: 7L04022

CAS No.	Analyte	MDL	MRL	Concentration	Q
7440-62-2	Vanadium, Total	0.83	5.0	0.979 ug/L	J

V 4.895

01345

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
Laboratory ID: 0714857-BLK1
File ID: 7120553-014
Prepared: 12/05/07 07:00
Preparation: 3050B Digestion
Initial/Final: 0.5 g / 250 mL
Analyzed: 12/05/07 17:10
Instrument: 114
QC Batch: 0714857
Sequence: 7120553
Calibration: 7L05012

CAS No.	Analyte	MDL	MRL	Concentration	Q
7439-92-1	Lead, Total	0.022	0.20	0.0500 mg/kg dry wt.	J

Pb 0.25

: 01358

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

37SB5A

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-44

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 3050B Digestion

Initial/Final: 0.4995 g / 250 mL

Laboratory ID: 0714535-MS1

QC Batch: 0714535

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Arsenic, Total	20.0	2.47	16.5	70 *	80 - 120	mg/kg dry wt.
Copper, Total	20.0	15.1	32.2	85	80 - 120	mg/kg dry wt.
Lead, Total	20.0	18.1	39.1	105	80 - 120	mg/kg dry wt.
Nickel, Total	20.0	12.4	30.5	90	80 - 120	mg/kg dry wt.
Selenium, Total	20.0	0.166	13.8	68 *	80 - 120	mg/kg dry wt.
Silver, Total	20.0	0.0415	18.9	94	75 - 120	mg/kg dry wt.
Thallium, Total	20.0	0.197	19.2	95	80 - 120	mg/kg dry wt.
Vanadium, Total	20.0	48.7	68.8	100	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01357

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

37SB5A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Soil

SDG: 36440-44

Project: RFAAP RAAP 10 RFI/CMS, WO 004

Preparation: 3050B Digestion

Initial/Final: 0.5002 g / 250 mL

Laboratory ID: 0714535-MSD1

QC Batch: 0714535

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Arsenic, Total	20.0	16.7	71 *	0.8	20	80 - 120	mg/kg dry wt.
Copper, Total	20.0	32.3	86	0.3	20	80 - 120	mg/kg dry wt.
Lead, Total	20.0	38.6	103	1	20	80 - 120	mg/kg dry wt.
Nickel, Total	20.0	29.7	87	3	20	80 - 120	mg/kg dry wt.
Selenium, Total	20.0	13.5	67 *	2	20	80 - 120	mg/kg dry wt.
Silver, Total	20.0	19.3	96	2	20	75 - 120	mg/kg dry wt.
Thallium, Total	20.0	19.4	96	0.7	20	80 - 120	mg/kg dry wt.
Vanadium, Total	20.0	68.5	99	0.5	20	80 - 120	mg/kg dry wt.

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01358

SERIAL DILUTION
USEPA-6020A

37SB5A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-44
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 004
Matrix: Soil
% Solids: 84.89
Laboratory ID: 7120112-SRD1
QC Batch: 7120112
Lab Source ID: 0711396-06
Sequence: 7120112

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	Units	QC Limits % Difference
Arsenic, Total	0.00494		0.00558		13.0 #		mg/L	10
Copper, Total	0.0303		0.0349		15.0	*	mg/L	10
Lead, Total	0.0363		0.0402		11.0	*	mg/L	10
Nickel, Total	0.0248		0.0283		14.0	*	mg/L	10
Selenium, Total	0.000332	J	0.000435	U	31.0 #		mg/L	10
Silver, Total	0.0000830	J	0.000120	U	45.0 #		mg/L	10
Thallium, Total	0.000395		0.000455	J	15.0 #		mg/L	10

* Values outside of QC limits

Initial Sample Result (I) was less than 50xMDL (for 6010) or 100xMDL (for 6020), therefore serial dilution is not required.

: 01381

URS

Page ____ of ____

Job ____ Project No. ____ Sheet ____ of ____

Description ____ Computed by ____ Date ____

____ Checked by ____ Date ____

Reference

Field DUPs for 6020

	375B8A	&	DUP-4	RL	%RPD
Sb	0.99		1.1	0.2	OK✓
As	6.1		7.5	0.2	20%✓
Cu	120		150	2	22%✓
Pb	290		340	2	16%✓
Ni	56		50	0.1	11%✓
Se	0.12		ND	0.3	OK✓
Ag	0.15		0.19	0.1	OK✓
Tl	0.095		0.076	0.1	OK✓
V	21		20	0.1	5%✓

All OK✓

	385B7A	&	DUP-5	RL	%RPD
Sb	0.43		0.22	0.2	OK✓
As	2.8		3.1	0.2	OK✓
Cu	35		38	0.2	8%✓
Pb	33		29	0.2	13%✓
Ni	25		25	0.1	0%✓
Se	0.12		0.1	0.3	OK✓
Ag	0.1		0.092	0.1	OK✓
Tl	0.18		0.2	0.1	OK✓
V	38		39	0.1	3%✓

All OK✓

URS

Page ____ of ____

Job ____ Project No. ____ Sheet ____ of ____

Description ____ Computed by ____ Date ____

____ Checked by ____ Date ____

Reference

Field Dups for 6020 (cont.)

	305B4A	DUP-6	RL	%RPD
Sb	0.05	0.2	0.2	OK✓
As	0.63	0.64	0.2	OK✓
Cu	7.3	7.3	0.2	OK✓
Ni	9.4	9.2	0.1	OK✓
Se	0.16	0.13	0.3	OK✓
Ag	0.037	0.033	0.1	OK✓
Tl	0.11	0.11	0.1	OK✓
V	15	15	0.1	0% OK✓
Pb	8	6.4	0.2	22% OK✓

All OK✓

STATEMENT OF DATA QUALIFICATIONS

Total Metals by EPA 6000/7000 Series Methods

Qualification:	The MS or MSD recovery, but not both, was outside the control limit. The RPD is within the control limit. The unspiked sample result is considered estimated.	
Analysis:	USEPA-6010B	
Sample/Analyte:	0711396-06 37SB5A	Barium
	0711396-06 37SB5A	Zinc
Analysis:	USEPA-6020A	
Sample/Analyte:	0711431-03 38SB5A	Arsenic
	0711431-03 38SB5A	Selenium
Qualification:	The analyte concentration in the associated MB was greater than or equal to 1/2 the RL. The positive sample result, which was greater than 5 times the MB value, is not considered estimated.	
Analysis:	USEPA-6020A	
Sample/Analyte:	0711396-01 37SB8A	Lead
	0711396-02 37SB8B	Lead
	0711396-03 37SB8C	Lead
	0711396-04 DUP-4	Lead
	0711396-05 37SB4A	Lead
	0711396-06 37SB5A	Lead
	0711396-07 37SB6A	Lead
	0711396-08 38SB10A	Lead
	0711396-09 38SB10B	Lead
	0711396-10 38SB10C	Lead
	0711396-11 38SB9A	Lead
	0711396-12 38SB9B	Lead
	0711396-13 38SB9C	Lead
	0711396-14 38SB8A	Lead
	0711396-15 38SB8B	Lead
	0711396-16 38SB8C	Lead
	0711396-18 38SB7A	Lead
	0711396-19 38SB7B	Lead
	0711396-20 38SB7C	Lead
	0711396-21 DUP-5	Lead
	0711431-03 38SB5A	Lead
	0711431-04 38SB6A	Lead
Qualification:	The % difference in results between the sample and a serial dilution of the sample exceeded the control limit. Sample matrix interference is suspected and the reported result is considered estimated.	
Analysis:	USEPA-6010B	
Sample/Analyte:	0711431-03 38SB5A	Iron
Analysis:	USEPA-6020A	
Sample/Analyte:	0711396-06 37SB5A	Copper
	0711396-06 37SB5A	Lead
	0711396-06 37SB5A	Nickel
Qualification:	This analyte was not present in this sample at a concentration greater than 50 times the MDL, therefore serial dilution is not required.	
Analysis:	USEPA-6010B	
Sample/Analyte:	0711396-06 37SB5A	Beryllium

Continued on next page

STATEMENT OF DATA QUALIFICATIONS

Total Metals by EPA 6000/7000 Series Methods (Continued)

Qualification: This analyte was not present in this sample at a concentration greater than 50 times the MDL, therefore serial dilution is not required.

Analysis: USEPA-6010B

Sample/Analyte:	
0711396-06 37SB5A	Cadmium
0711396-06 37SB5A	Cobalt
0711431-03 38SB5A	Cadmium

Qualification: This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.

Analysis: USEPA-6020A

Sample/Analyte:	
0711396-06 37SB5A	Antimony
0711396-06 37SB5A	Arsenic
0711396-06 37SB5A	Thallium

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample result is considered estimated.

Analysis: USEPA-6020A

Sample/Analyte:	
0711396-06 37SB5A	Arsenic
0711396-06 37SB5A	Selenium

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was greater than or equal to 4 times the spiked amount; the non-spiked sample result is not qualified.

Analysis: USEPA-6010B

Sample/Analyte:	
0711396-06 37SB5A	Aluminum
0711396-06 37SB5A	Iron
0711396-06 37SB5A	Manganese
0711431-03 38SB5A	Aluminum
0711431-03 38SB5A	Iron
0711431-03 38SB5A	Manganese
0711431-03 38SB5A	Zinc

Quality Control Results – ICP Metals

Calibration

All instrument calibrations and continuing calibrations were method-compliant. Note: instrument reports for ICP include the listing of initial calibration correlation coefficients and internal standard recoveries; those values may either be imbedded with raw data from each run or included as a summary (also within the instrument printout).

Note: TriMatrix interprets the QSM requirement for a "low-level calibration check standard" as one pertaining to a one-point initial calibration. Given that a multi-point initial calibration was performed, the specification for a low-level calibration check either does not apply or has been satisfied since the lowest calibration standard is equivalent in concentration to the reporting limit.

Method Blanks

No target analytes were detected at a concentration greater than one-half the RL.

Internal Standard Response

Internal standard responses for all standards, samples, and quality control samples were method-compliant.

Laboratory Control Samples

Each Laboratory Control Sample (LCS) and, for several batches, LCS Duplicates were fortified with all target analytes. All recoveries (and RPDs in the case of LCSDs) were in control.

Matrix Spikes

Samples 37SB5A and 38SB5A were fortified with all target analytes. Several recoveries were outside the control limit; all RPDs were in control. See the MS/MSD summary and see Narrative Attachment 2 for details.

Serial Dilutions and Post-Digestion Spikes

Serial dilution (SD) and post-digestion spike (PDS) analysis was performed on the samples employed for MS/MSD analysis; all values were in control with the exception of the SD value for Iron for 38SB5A.

Sample Results

Please see Section D.

Note: Method 6020A was the predominant method used for the analysis of target analytes for aqueous samples (including equipment blanks). This was discussed with the Client prior to receipt of any samples.

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Individual sample results relate only to the sample tested.

Quality Control Results – ICP Metals – (continued)

Corrective Action

No corrective actions were deemed necessary.

Statements of Data Qualification

See Narrative Attachment 2.

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Quality Control Results – ICP/MS Metals

Calibration

All instrument calibrations and continuing calibrations were method-compliant. Note: instrument reports for ICP/MS include the listing of initial calibration correlation coefficients and internal standard recoveries; those values may either be imbedded with raw data from each run or included as a summary (also within the instrument printout).

Method Blanks

For two of the soil method blanks, no target analytes except Lead were detected at a concentration greater than one-half the RL. However, the concentration of that analyte in almost all of the samples was greater than five times the associated method blank concentration. The few remaining samples associated with the blanks were redigested with the concentration of Lead in that blank detected but less than one-half the RL. The presence of this analyte at any significant concentration in method blanks is unusual but the situation has been brought to the attention of both the supervisor of the metals preparation laboratory and the laboratory manager.

Internal Standard Response

Internal standard responses for all standards, samples, and quality control samples were method-compliant.

Laboratory Control Samples

Each Laboratory Control Sample (LCS) and, for several batches, LCS Duplicates were fortified with all target analytes. All recoveries (and RPDs in the case of LCSDs) were in control.

Matrix Spikes

Samples 37SB5A and 38SB5A were fortified with all target analytes. The majority of recoveries and all RPDs were in control; see MS/MSD summary forms and Narrative Attachment 2 for details.

Serial Dilutions and Post-Digestion Spikes

Serial dilution (SD) and post-digestion spike (PDS) analysis was performed on the samples employed for MS/MSD analysis; all values were in control with the exception of the SD values for three analytes for 37SB5A were in control.

Sample Results

Please see Section D.

Note: Method 6020A was the predominant method used for the analysis of target analytes for aqueous samples (including equipment blanks). This was discussed with the Client prior to receipt of any samples.

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Quality Control Results – ICP/MS Metals – (continued)

Corrective Action

No corrective action, aside from the redigestion of several samples for lead, was taken. An after-the fact assessment of the Lead data indicated that the laboratory should have made a decision to redigest all affected samples even though the existing data met QSM criteria (to include TriMatrix variances).

Statements of Data Qualification

See Narrative Attachment 2.

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Quality Control Results – CVAA Hg

Note: Summary forms and raw data for Method 7470A for the aqueous equipment blanks precedes the forms and raw data for Method 7471A for soil samples.

Calibration

All instrument calibrations and continuing calibrations were method-compliant.

Method Blanks

Mercury was not detected.

Laboratory Control Samples

Each Laboratory Control Sample (LCS) was fortified with all target analytes. All recoveries were in control.

Matrix Spikes

Samples 37SB5A and 38SB5A were fortified with Mercury. All recoveries and the RPDs were in control.

Serial Dilution

Serial dilution analysis was not necessary.

Sample Results

Please see Section D.

Corrective Action

No corrective actions were deemed necessary.

Statements of Data Qualification

No statements were generated.

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Individual sample results relate only to the sample tested.

Receipt Event Two

On November 17, 2007 at 08:50 hrs, one sample cooler containing multiple soil samples, an equipment blank, and an IDM sample was received at TriMatrix via FedEx (the carrier). The cooler had been shipped from the Site on November 16.

The external custody seal affixed to the cooler was intact. The samples were received on ice and in good condition. The receipt temperature of the interior of the cooler was measured via a 'temperature blank' shipped in it; the measured temperature, in °C, was 1.4. The IDM sample was logged into a separate work order and SDG 36440-45 and it will not be discussed further in the narrative for this SDG.

Shipping documents included two field chains-of-custody (COC) and associated carrier air bills.

Sample 38SB5A was designated by the Client for MS/MSD analysis.

Samples were assigned to Work Order 0711431 and SDG 36440-44.

Both Events

Copies of all referenced receipt and custody documents are provided in Section A of this data package. Correspondence regarding completed sample log-in activities will be found in Attachment 1 of this narrative.

Provision of Sample Receipt Information to Client

A copy of the COCs and receipt checklist were transmitted to the Client within one day of sample receipt. The Client did not request any modification(s) to the analyses, as listed on the COC.

Post-Receipt Sample Custody

Custody of the sample during sample preparation (if applicable) and analysis was assigned to individual analysts. Copies of completed 'internal chain of custody' forms are included in Section A.

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Variances

Data Qualifier Flags

Data qualifier flags other than those listed in the DoD QSM were employed or the definition of an existing flag was modified.

J – Estimated: the analyte was detected at a concentration greater than the limit of detection (i.e., MDL) but less than the reporting limit (i.e., MRL).

B – Blank contamination: The analyte was detected above one-half the reporting limit in an associated method blank. The same analyte in the sample was detected at less than five times the method blank concentration. (If a common laboratory contaminant is present in the method blank at a concentration greater than one-half the reporting limit but less than or equal to that reporting limit, any associated sample results are flagged but corrective action is not necessarily taken. A text qualifier is also associated with such a result.)

E – Exceeds calibration range: The analyte response exceeded the calibrated range of the instrument. (With the exception of metals for which only the final non-qualified result is reported, both the initial E-qualified result and final non-qualified result from reanalysis-at-dilution are reported.)

Text Qualifier

A LIMS-generated text qualifier is substituted for many instances in which the DoD QSM "Q" flag would otherwise apply. The text qualifiers are listed in a summary format by parameter with applicable samples identified.

Methods 6010B and 6020A

The acceptance criterion of < 2 x RL is substituted for < 2 x MDL for interference check solution ICS-A.

Analytical Methods

Sample preparation and analytical methods that were employed are per the SOW.

Method Detection Limits, Target Analytes, and Reporting Limits

All method detection limits (MDL) for analytes in this report are compliant with the DoD QSM specification that each reporting limit (RL) employed is to be at least three times the MDL. In addition, no RL is less than the equivalent concentration of the lowest instrument calibration standard. The target analyte list was specified by the Client. Proposed RLs were submitted by TriMatrix to the Client prior to the receipt of any samples.

Project-specific Analytes of Concern

No project-specific analytes of concern were identified in the SOW, however, it is assumed that Method 8330 and 8332 target analytes are of concern.

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Individual sample results relate only to the sample tested.

Quality Control Limits

Quality control limits specified in the DoD QSM were employed. For cases in which the analyte is not listed in the QSM, internal laboratory control limits were used.

Hold Times

All samples were extracted/digested (where applicable) and analyzed within hold time with the exception that two samples for PCBs with one or more low surrogate recoveries were re-extracted past the extraction hold time (but within twice that hold time).

Technical Issues

There were no general technical issues. Any issues unique to a particular parameter will be discussed in the QC section for it.

Sample Result Reporting Convention

Sample results are reported as RL 'U' (e.g., 0.001 U) if the target analyte was not detected above the MDL. If a sample for an organic parameter is reanalyzed and also reported, the second analysis includes the suffix 'REn' where n = the first, second, etc. reanalysis. If a sample is reanalyzed for confirmation purposes, is confirmed, and also reported, the second analysis includes the suffix 'RE1'. If the confirmation was not performed simultaneously, the second set of sample results is reported on a second Form 1 since that confirmation analysis did not occur at the same time and/or date.

Data Qualifier Designation

If applicable, a sample result is qualified with:

- a "U" flag if the analyte was not detected at a concentration greater than the MDL,
- a "B", "J", and/or an "E" flag as defined in the preceding Variance section,
- a LIMS-generated statement of qualification. Qualifying statements, if any, will be found in Attachment 2 to this narrative.

QC Batch and Analytical Batch Designation

A QC Batch is a seven digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation); it is limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.).

An Analytical Batch (or Sequence) is a seven digit number that associates all samples analyzed as a set under one analytical sequence.

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Individual sample results relate only to the sample tested.

Quality Control Results – Wet Chemistry (Percent Solids)

Calibration

Instrument calibrations (i.e., analytical balance) were in control.

Method Blank

The method blank was in control.

Laboratory Control Sample

Not applicable.

Matrix Spikes

Not applicable.

Laboratory Duplicates

Samples 37SB5A and 38SB5A were analyzed in duplicate; the RPDs were in control.

Sample Results

Please see Section E.

Corrective Actions

No corrective actions were needed.

Statements of Data Qualification

No statements were generated.

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Individual sample results relate only to the sample tested.

SDG CASE NARRATIVE

URS Corporation
Radford Army Ammunition Plant
RAAP 10 RFI/CMS
Soil Investigation

SDG – 36440-44
JANUARY 18, 2008

This case narrative is applicable to soil and equipment blank samples collected from RAAP 10 at Radford Army Ammunition Plant (the Site), Radford, Virginia by URS Corporation (the Client) and received by TriMatrix Laboratories, Inc. (TriMatrix) on November 16 and 17, 2007. The samples were assigned to TriMatrix project sample delivery group (SDG) 36440-44 for analytical services (the Project) to be performed according to:

a) URS Project #11656421.80000, Subcontract NCA-07-1107, Work Order # 004.

b) the Scope of Work (SOW) for the above,

c) Department of Defense Quality Systems Manual for Environmental Laboratories, Final Version 3, January 2006 (by reference)

d) any verbal and written correspondence between the Client and TriMatrix as the Project progressed.

No part of this Project was subcontracted.

Field Sample and Assigned Laboratory Sample ID Summary

For the samples received, a field sample to laboratory sample ID cross-reference table follows below and on the next page.

Field Sample Name	Sample Matrix	Laboratory Sample ID	Date Sampled	Date Received
37SB8A	Soil	0711396-01	11/15/07	11/16/07
37SB8B	Soil	0711396-02	11/15/07	11/16/07
37SB8C	Soil	0711396-03	11/15/07	11/16/07
DUP-4	Soil	0711396-04	11/15/07	11/16/07
37SB4A	Soil	0711396-05	11/15/07	11/16/07
37SB5A	Soil	0711396-06	11/15/07	11/16/07
37SB6A	Soil	0711396-07	11/15/07	11/16/07
38SB10A	Soil	0711396-08	11/15/07	11/16/07
38SB10B	Soil	0711396-09	11/15/07	11/16/07
38SB10C	Soil	0711396-10	11/15/07	11/16/07
38SB9A	Soil	0711396-11	11/15/07	11/16/07
38SB9B	Soil	0711396-12	11/15/07	11/16/07

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Individual sample results relate only to the sample tested.

Field Sample and Assigned Laboratory Sample ID Summary – (continued)

Field Sample Name	Sample Matrix	Laboratory Sample ID	Date Sampled	Date Received
38SB9C	Soil	0711396-13	11/15/07	11/16/07
38SB8A	Soil	0711396-14	11/15/07	11/16/07
38SB8B	Soil	0711396-15	11/15/07	11/16/07
38SB8C	Soil	0711396-16	11/15/07	11/16/07
EQBK-3	Water	0711396-17	11/15/07	11/16/07
38SB7A	Soil	0711396-18	11/15/07	11/16/07
38SB7B	Soil	0711396-19	11/15/07	11/16/07
38SB7C	Soil	0711396-20	11/15/07	11/16/07
DUP-5	Soil	0711396-21	11/15/07	11/16/07
38SB4A	Soil	0711431-01	11/16/07	11/17/07
DUP-6	Soil	0711431-02	11/16/07	11/17/07
38SB5A	Soil	0711431-03	11/16/07	11/17/07
38SB6A	Soil	0711431-04	11/16/07	11/17/07
QSB4A	Soil	0711431-05	11/16/07	11/17/07
EQBK-4	Water	0711431-06	11/16/07	11/17/07

Sample Receipt and Log-in

There were two receipt events.

Receipt Event One

On November 16, 2007 at 08:45 hrs, three sample coolers containing multiple soil samples were received at TriMatrix via FedEx (the carrier). The coolers had been shipped from the Site on November 15.

The external custody seal affixed to each cooler was intact. The samples were received on ice and in good condition. The receipt temperature of the interior of each cooler was measured via a 'temperature blank' shipped in it; the measured temperatures, in °C, were 0.6, 1.3, and 1.9. No sample was received frozen.

Shipping documents included three field chains-of-custody (COC) and associated carrier air bills. Per discussion with the Client, the field sample ID was modified as indicated on the COC.

Sample 37SB5A was designated by the Client for MS/MSD analysis.

The samples were assigned to Work Order 0711396 and SDG 36440-44.

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Individual sample results relate only to the sample tested.

Data Review and Approval

All data was reviewed and approved by the group supervisor/manager prior to further review by the project chemist.

Data Deliverables

The data deliverables, both hardcopy and electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. The EDD has been issued separate from this hardcopy report.

Walt Roudebush, Project Chemist

1/18/08
Date

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Individual sample results relate only to the sample tested.

1 of 3

TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 121978

Page 1 of 1

For Lab Use Only
Cart: 1
VOA Rack/Tray:
Receipt Log No.: 13-12
Project Chemist: WSR
Laboratory Project No.: E071396

Client Name: URS/RFAAP
Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230
Phone: 804-965-9000
Fax: 804-965-9764

Project Name: RAAP 10 RFI/CMS
Client Project No./P.O. No.: 21354887.20002
Invoice No.: ☑ Client ☐ Other (comments)
Contact/Report To: Tina DeVine

Analyses Requested

	A	A	A										
	Metals	PCB/PEST 8332/8082	%Solids	TCLP Full List & pH									
Container Type (corresponds to Container Packing List)	16	17	20	6									
Number of Containers Submitted												Total	Sample Comments
1	✓	✓	1									3	
2	✓	✓	1									3	
3	✓	✓	1									3	
4	✓	✓	1									3	
5	✓	✓	1									3	
6	✓	✓	1									3	
7	✓	✓	1									3	
8				3								3	MF
9													
10													

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix
07	SO	01	1	37SB8A (0-1ft)	TM 1551	11/15/07	0740		X	S
07	SO	02	2	37SB8B (4-5ft)		11/15/07	0800		X	S
07	SO	03	3	37SB8C (7-8ft)		11/15/07	0800		X	S
08	SO	04	4	DUP-4					X	S
07	SO	05	5	37SB4A (0-1ft)		11/15/07	0850		X	S
11	SO	06	6	37SB5A (0-1ft) +MS/MSD		11/15/07	0930		X	S
07	SO	07	7	37SB6A (0-1ft)		11/15/07	10:00		X	S
~~Logged into Paperwork only~~			8	~~Scomm 37 SC~~		11/15/07	10:20		X	S
			9							
			10							

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS COT

How Shipped? Hand Carrier: Fed Ex
Tracking No.:

Comments: For MS/MSD PCB/PEST will be in 500 ml wm glass
Soil Depths removed from field sample ID - per client
DUP-4 collection date & time = 11/15/07 @ 0900 hrs.
DO NOT INCLUDE "4 MS/MSD" in sample name

1. Relinquished By	Date	Time
Jim Carter	11-15-07	1600

2. Relinquished By	Date	Time

3. Relinquished By	Date	Time

1. Received By	Date	Time

2. Received By	Date	Time

3. Received For Lab By	Date	Time
Kim Ziegler	11-16-07	0845

TriMatrixCOC -- COC WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

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Chain of Custody Record

COC No. 121977

Page 1 of 1

For Lab Use Only

Cart: 1
VOA Rack/Tray:
Receipt Log No.: 13-12
Project Chemist: WJR
Laboratory Project No.: E07/1396

Client Name	Project Name
URS / RFAAP	RAA10 RFI / CMS
Address: 5540 Falmouth St., Suite 201	Client Project No./P.O. No.: 21854887.20002
Richmond, VA 23230	Invoice No. ☑ Client ☐ Other (comments)
Phone 804-965-9020	Contact/Report To: Tina DeVine
Fax 804-965-9764	

Analyses Requested

Preservatives: A NONE pH~7; B HNO_3 pH<2; C H_2SO_4 pH<2; D 1+1 HCl pH<2; E NaOH pH>12; F ZnAc/NaOH pH>9; G MeOH; H Other (note below)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type (corresponds to Container Packing List) 16 oz	1	2 oz	Total	Sample Comments
											Number of Containers Submitted				
07	SO	08	8	38SB10A	TM443	11-15-07	10:58		X	S	✓	4	1	3	38SB10A
07	SO	09	9	38SB10B		11-15-07	10:58		X	S	✓	4	1	3	38SB10B
07	SO	10	10	38SB10C		11-15-07	11:10		X	S	✓	4	1	3	38SB10C
07	SO	11	11	38SB9A		11-15-07	11:35		X	S	✓	4	1	3	
07	SO	12	12	38SB9B		11-15-07	11:35		X	S	✓	4	1	3	
07	SO	13	13	38SB9C		11-15-07	11:40		X	S	✓	4	1	3	
07	SO	14	14	38SB8A		11-15-07	13:18		X	S	✓	4	1	3	
07	SO	15	15	38SB8B		11-15-07	13:18		X	S	✓	4	1	3	
07	SO	16	16	38SB8C		11-15-07	13:22		X	S	✓	4	1	3	
			17												

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp.

How Shipped? Hand Carrier FedEx
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	11-15-07	1553						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						Kim Ziegler	11-16-07	8:45

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Chain of Custody Record

COC No. 121975

For Lab Use Only
Cart:
VOA Rack/Tray:
Receipt Log No. 13-12
Project Chemist: WR
Laboratory Project No. E071396

Client Name: URS/RFAAP
Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230
Phone 804-965-9000
Fax 804-965-9764

Project Name: RAAP 10RFI/CMS
Client Project No./P.O. No.: 21354887.20002
Invoice No. ☑ Client ☐ Other (comments)
Contact/Report To: Tina DeVine

Page ____ of ____

Analyses Requested

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals	PCB/Pest 8330/8082	%o Solids	Metals	PCB	Pesticides	Explosives 8330	Nitroglycerin PETN			Total	Sample Comments
				Container Type (corresponds to Container Packing List)							16	17	20	6	2	2	2	2				
				Number of Containers Submitted																		
12	SQ		17	EQBK-3	Tm 0005	11/15/07	12:50			W				1	1	1	1				5	
07	SO		18	3SSB7A		11/15/07	14:15		X	S	✓	✓	1								3	
07	SO		19	3SSB7B		11/15/07	14:15		X	S	✓	✓	1								3	
07	SO		20	3SSB7C		11/15/07	14:20		X	S	✓	✓	1								3	
07	SO		21	DUP-5		11/15/07	(1300)		X	S	✓	✓	1								3	
			6																			
			7																			
			8																			
			9																			
			10																			

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS COC

How Shipped? Hand Carrier FedEx
Tracking No.

Comments: Dup-5 sample time = 1300 (WR)

1. Relinquished By	Date	Time
Jim Carter	11-15-07	1610

1. Received By	Date	Time

2. Relinquished By	Date	Time

2. Received By	Date	Time

3. Relinquished By	Date	Time

3. Received For Lab By	Date	Time
Kim Ziegler	11-16-07	8:45

TriMatrix Laboratories, Inc.

SAMPLE PRESERVATION VERIFICATION FORM

page 1 of 1

Client		Project-Submittal No.
URS		E071396
Receipt Log No.	Completed By (initials/date)	Project Chemist
13-12	KZ 11-16-07	WDR

COC ID No.			Adjusted by: / Date:		DO NOT ADJUST pH FOR THESE CONTAINER TYPES			
121975								
Container Type	5	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		~7	<2	<2	
COC Line No. 1						✓		
COC Line No. 2								
COC Line No. 3								
COC Line No. 4								
COC Line No. 5								
COC Line No. 6								
COC Line No. 7								
COC Line No. 8								
COC Line No. 9								
COC Line No. 10								

Comments

pH strip lot No. ☑ OC694240 ☐

Aqueous Samples: For each sample and container type, check the box if pH is acceptable. **If pH is not acceptable for any sample container, record pH in box, and note on Sample Receiving Checklist and on Sample Receiving Non-Conformance Form.** If approved by Project Chemist, add acid or base to the sample to achieve the correct pH. Add up to, but do not exceed 2x the volume initially added at container prep (see table below for initial volumes used). **Add orange pH tag to sample container and record information requested. Record adjusted pH on this form. Do not adjust pH for container types 3, 6, and 15.**

COC ID No.			Adjusted by: / Date:		DO NOT ADJUST pH FOR THESE CONTAINER TYPES			
Container Type	5	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		~7	<2	<2	
COC Line No. 1								
COC Line No. 2								
COC Line No. 3								
COC Line No. 4								
COC Line No. 5								
COC Line No. 6								
COC Line No. 7								
COC Line No. 8								
COC Line No. 9								
COC Line No. 10								

Comments

Container Size (mL)	Original Vol. of Preservative (mL)
Container Type 5:	NaOH
500	2.5
1000	5.0
Container Type 4:	H_2SO_4
125	0.5
250	1.0
500	2.0
1000	4.0
Container Type 13	H_2SO_4
500	2.5

TriMatrix Laboratories, Inc.

SAMPLE RECEIVING / LOG-IN CHECKLIST

Client: URS | Project-Submittal No.: new / add to E0711396
Receipt Record Page/Line No.: 13-12 | Project Chemist: WGR | Sample Nos.:

Coolers Received

Recorded by (initials/date): KZ 11-16-07

☑ Cooler ☐ Box ☐ Other ____ | Qty Received: 3

Thermometer Used: ☑ IR Gun (#94) ☐ Digital Thermometer (#54) ☐ Other (# ____) | ☐ See Additional Cooler Information Form

Cooler No.	Time	Custody Seals	Coolant Location	Coolant / Temperature Taken Via	Alternate Temperature Taken Via	Recorded °C	Correction Factor °C	Actual °C	tb location: representative / in ice	Average °C	Cooler ID on COC?	VOC trip blank received?
TM0005	11:00	☐ none ☒ present / intact ☐ present / not intact	Dispersed / Top / Middle / Bottom	☒ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☒ temperature blank (tb) ☐ 1 container	tb 0.6	—	0.6	1 1.4 — 1.4; 2 1.3 — 1.3; 3 1.1 — 1.1	1.3	☑	☐
TM1551	11:10	☐ none ☒ present / intact ☐ present / not intact	Dispersed / Top / Middle / Bottom	☒ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☒ temperature blank (tb) ☐ 1 container	tb 1.3	—	1.3	1 5.7 — 5.7; 2 4.8 — 4.8; 3 4.2 — 4.2	4.9	☑	☐
TM1443	11:12	☐ none ☒ present / intact ☐ present / not intact	Dispersed / Top / Middle / Bottom	☒ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☒ temperature blank (tb) ☐ 1 container	tb 1.9	—	1.9	1 5.8 — 5.8; 2 5.1 — 5.1; 3 3.2 — 3.2	4.7	☑	☐
		☐ none ☐ present / intact ☐ present / not intact	Dispersed / Top / Middle / Bottom	☐ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☐ temperature blank (tb) ☐ 1 container	tb			1 2 3	Average °C	☐ Cooler ID on COC?	☐ VOC trip blank received?

If any shaded areas checked, complete Sample Receiving Non-Conformance Form

Paperwork Received

☐ No COC received

N/A	Yes	No	
	☑	☐	Chain of Custody Record(s)?
	☐		If No, COC initiated by ____
	☒		Rec'd for Lab signed/date/time?
☐	☒		Shipping Document?
☒	☐		Other ____

COC ID Nos.: 121975 121977 121978

☒ TriMatrix

☐ Other (name or ID#) ____

Check COC for Accuracy

☐ No analysis requested

Yes	No	
☒	☐	Sample ID matches COC?
☒	☐	Sample date and time matches COC?
☒		Container type completed on COC?
☒	☐	All container types indicated are received?

Sample Condition Summary

☐ Non-TriMatrix containers, see Notes

N/A	Yes	No	
		☒	Broken containers/lids?
		☒	Missing or incomplete labels?
		☒	Illegible information on labels?
		☒	Low volume received?
		☒	Inappropriate containers received?
		☒	VOC vials have headspace?
☒		☐	Extra sample locations / containers not listed on COC?

Check Sample Preservation

N/A	Yes	No	
	☒	☐	Average sample temperature ≤6° C?
☐	☒		Completed Sample Preservation Verification Form?
☐	☒	☐	Samples preserved correctly?
☒	☐		If "No", added orange tag?
☒	☐		Received pre-preserved VOC soils?

☐ MeOH ☐ Na_2SO_4

Check for Short Hold-Time Prep/Analyses

☐ Bacteriological
☐ Air Bags
☐ EnCores / Methanol Pre-Preserved
☐ Formaldehyde/Aldehyde
☐ Green-tagged Containers
☐ Yellow/White-tagged 1L Ambers (SV Prep-Lab)

Metals / Semi.

AFTER HOURS ONLY:
COPIES OF COC TO LAB AREA(S)
☐ NONE RECEIVED
☑ RECEIVED, COCs TO LAB(S)

Notes

☐ Trip blank received ☐ Trip blank not listed on COC
☐ No COC received, Proj. Chemist reviewed (init./date) ____
☐ No analysis requested, Proj. Chemist completed (init./date) ____

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
11-16-07 8:45	11-16-07 11:30	Yes / No

TriMatrix Laboratories, Inc.

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Chain of Custody Record

COC No. 121972

Page 1 of 1

For Lab Use Only
Cart: 3
VOA Rack/Tray:
Receipt Log No.: 17-11
Project Chemist: WAR
Laboratory Project No.: E 071431

Client Name: URS / RFAAP
Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230
Phone: 804-965-9000
Fax: 804-965-9764

Project Name: RAAP IU RFI/CMS
Client Project No./P.O. No.: 21354887.20002
Invoice No.: ☒ Client ☐ Other (comments)
Contact/Report To: Tina DeVine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals	PCB/PEST 8330 8332	% Solids	Total	Sample Comments
			Container Type (corresponds to Container Packing List)							A	A	A		
			Number of Containers Submitted							16	17	20		
07	SO	01	1 38SB4A	TM1525	11/16/07	0810		X	S	✓	✓	1	3	
08	SO	02	2 DUP-6		11/16/07			X	S	✓	✓	1	3	
11	SO	03	3 38SB5A + MS/MSD		11/16/07	0835		X	S	✓	✓	1	3	
07	SO	04	4 38SB6A		11/16/07	0945		X	S	✓	✓	1	3	
13	SO	05	5 QSB4A		11/16/07	10:20		X	S		✓		1	
			6											
			7											
			8											
			9											
			10											

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp.

How Shipped? Hand Carrier FedEx
Tracking No.:

Comments: MS/MSD PCB/PEST - 500 ml um glass
DUP-6 collection time = 0900 (WR)
DO NOT INCLUDE "+MS/MSD" as part of sample ID for 38SB5A

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	11-16-07	1232						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						[illegible]	11-17-07	0850

TriMatrixCOC -- COC WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

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Chain of Custody Record

COC No. 121993

Page 1 of 1

For Lab Use Only
Cart: 3
VOA Rack/Tray:
Receipt Log No: 17-10
Project Chemist: [illegible]
Laboratory Project No: E 071431

Client Name	Project Name
URS/RFAAP	RAAP 10 RFI/CMS
Address: 5540 Falmouth St, Suite 201	Client Project No./P.O. No.: 21354887.20002
Richmond, VA 23230	Invoice No. ☒ Client ☐ Other (comments)
Phone 804-965-9000	Contact/Report To: Tina DeVine
Fax 804-965-9764	

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Number of Containers Submitted: TCLP Full List + Explosives	Perch + Sink PH	Metals	PCB	Pesticides	Explosives 8330	Nitroglycerin PETN	Total	Sample Comments
			1 35-37-38 IDW	TM1877	11-16-07	10:00	✓		S	3	1						4	
			2 EQBK-4	↓	11/16/07	10:58			W			1	1	1	1	1	5	
			3															
			4															
			5															
			6															
			7															
			8															
			9															
			10															

Container Type (corresponds to Container Packing List): 16 17 18 | 6 | 2 | 2 | 2 | 2

PRESERVATIVES
A NONE pH>7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<
E NaOH pH>12
F ZnAc/NaOH pH>
G MeOH
H Other (note below)

Sampled By (print): Jim Carter
Sampler's Signature: Jim Carter
Company: URS Corp.

How Shipped? Hand Carrier FedEx
Tracking No.

Comments: Empty bottles included as filler - no content can't ship.

1. Relinquished By	Date	Time
Jim Carter	11-16-07	1223

2. Relinquished By	Date	Time

3. Relinquished By	Date	Time

1. Received By	Date	Time

2. Received By	Date	Time

3. Received For Lab By	Date	Time
[illegible]	11/17/07	08:50

TriMatrix Laboratories, Inc.

SAMPLE PRESERVATION VERIFICATION FORM

page 1 of 1

Client		Project-Submittal No.
VRS		E
Receipt Log No. 17-16	Completed By (initials/date) 11-17-07	Project Chemist

COC ID No. 121993	Adjusted by: / Date:	DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Container Type	5	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		~7	<2	<2	
COC Line No. 1						✓		
COC Line No. 2								
COC Line No. 3								
COC Line No. 4								
COC Line No. 5								
COC Line No. 6								
COC Line No. 7								
COC Line No. 8								
COC Line No. 9								
COC Line No. 10								

Comments

pH strip lot No.
☑ OC694240
☐ _____

Aqueous Samples: For each sample and container type, check the box if pH is acceptable. **If pH is not acceptable for any sample container, record pH in box, and note on Sample Receiving Checklist and on Sample Receiving Non-Conformance Form.** If approved by Project Chemist, add acid or base to the sample to achieve the correct pH. Add up to, but do not exceed 2x the volume initially added at container prep (see table below for initial volumes used). **Add orange pH tag to sample container and record information requested. Record adjusted pH on this form. Do not adjust pH for container types 3, 6, and 15.**

COC ID No.	Adjusted by: / Date:	DO NOT ADJUST pH FOR THESE CONTAINER TYPES

Container Type	5	4	13		3	6	15	
Tag Color	Lt. Blue	Blue	Brown		Green	Red	Red Stripe	
Preservative	NaOH	H_2SO_4	H_2SO_4		None	HNO_3	HNO_3	
Expected pH	>12	<2	<2		~7	<2	<2	
COC Line No. 1								
COC Line No. 2								
COC Line No. 3								
COC Line No. 4								
COC Line No. 5								
COC Line No. 6								
COC Line No. 7								
COC Line No. 8								
COC Line No. 9								
COC Line No. 10								

Comments

Container Size (mL)	Original Vol. of Preservative (mL)
Container Type 5:	NaOH
500	2.5
1000	5.0
Container Type 4:	H_2SO_4
125	0.5
250	1.0
500	2.0
1000	4.0
Container Type 13	H_2SO_4
500	2.5

TriMatrix Laboratories, Inc.

SAMPLE RECEIVING / LOG-IN CHECKLIST

Client	Project-Submittal No.
VRS	new / add to E 071431
Receipt Record Page/Line No. 17-11	Project Chemist WSR / Sample Nos.

Coolers Received

Recorded by (initials/date) AC 11-17-07

☑ Cooler ☐ Box ☐ Other ____ | Qty Received 1

Thermometer Used: ☑ IR Gun (#94) ☐ Digital Thermometer (#54) ☐ Other (#____) | ☐ See Additional Cooler Information Form

Cooler No.	Time
TM	11:15

Custody Seals: ☐ none ☑ present / intact ☐ present / not intact

Coolant Location: Dispersed / Top / Middle / Bottom

Coolant / Temperature Taken Via: ☑ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers

Alternate Temperature Taken Via: ☑ temperature blank (tb) ☐ 1 container

	Recorded °C	Correction Factor °C	Actual °C
tb	1.4	—	1.4
tb location: representative / in ice			
1	1.9	—	1.9
2	2.6	—	2.6
3	1.1	—	1.1
Average °C			1.8

☑ Cooler ID on COC? ☐ VOC trip blank received?

Cooler No.	Time

Custody Seals: ☐ none ☐ present / intact ☐ present / not intact

Coolant Location: Dispersed / Top / Middle / Bottom

Coolant / Temperature Taken Via: ☐ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☑ none / avg 2-3 containers

Alternate Temperature Taken Via: ☐ temperature blank (tb) ☐ 1 container

	Recorded °C	Correction Factor °C	Actual °C
tb			
tb location: representative / in ice			
1			
2			
3			
Average °C			

☐ Cooler ID on COC? ☐ VOC trip blank received?

Cooler No.	Time

Custody Seals: ☐ none ☐ present / intact ☐ present / not intact

Coolant Location: Dispersed / Top / Middle / Bottom

Coolant / Temperature Taken Via: ☐ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☑ none / avg 2-3 containers

Alternate Temperature Taken Via: ☐ temperature blank (tb) ☐ 1 container

	Recorded °C	Correction Factor °C	Actual °C
tb			
tb location: representative / in ice			
1			
2			
3			
Average °C			

☐ Cooler ID on COC? ☐ VOC trip blank received?

Cooler No.	Time

Custody Seals: ☐ none ☐ present / intact ☐ present / not intact

Coolant Location: Dispersed / Top / Middle / Bottom

Coolant / Temperature Taken Via: ☐ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☑ none / avg 2-3 containers

Alternate Temperature Taken Via: ☐ temperature blank (tb) ☐ 1 container

	Recorded °C	Correction Factor °C	Actual °C
tb			
tb location: representative / in ice			
1			
2			
3			
Average °C			

☐ Cooler ID on COC? ☐ VOC trip blank received?

If any shaded areas checked, complete Sample Receiving Non-Conformance Form

Paperwork Received

☐ No COC received

N/A	Yes	No	
	☑	☐	**Chain of Custody Record(s)?**
	☐		If No, COC initiated by ____
	☑		Rec'd for Lab signed/date/time?
☑	☐		Shipping Document?
☑	☐		Other ____

COC ID Nos. 121972

☑ TriMatrix

☐ Other (name or ID#)____

Check COC for Accuracy

☐ **No analysis requested**

Yes	No	
☑	☐	Sample ID matches COC?
☑	☐	Sample date and time matches COC?
☑	☐	Container type completed on COC?
☑	☐	All container types indicated are received?

Sample Condition Summary

☐ **Non-TriMatrix containers, see Notes**

N/A	Yes	No	
		☑	Broken containers/lids?
		☑	Missing or incomplete labels?
		☐	Illegible information on labels?
		☑	Low volume received?
		☑	Inappropriate containers received?
☑		☐	VOC vials have headspace?
☐		☐	Extra sample locations / containers not listed on COC?

Check Sample Preservation

N/A	Yes	No	
	☑	☐	Average sample temperature ≤6° C?
☑	☐		Completed Sample Preservation Verification Form?
☑	☐		Samples preserved correctly?
☑	☐		If "No", added orange tag?
☑	☐		Received pre-preserved VOC soils?

☐ MeOH ☐ Na_2SO_4

Check for Short Hold-Time Prep/Analyses

☐ Bacteriological
☐ Air Bags
☐ EnCores / Methanol Pre-Preserved
☐ Formaldehyde/Aldehyde
☐ Green-tagged Containers
☐ Yellow/White-tagged 1L Ambers (SV Prep-Lab)

AFTER HOURS ONLY:
COPIES OF COC TO LAB AREA(S)
☐ NONE RECEIVED
☑ RECEIVED, COCs TO LAB(S)

Notes Pest Semi VOA

☐ Trip blank received ☐ Trip blank not listed on COC
☐ No COC received, Proj. Chemist reviewed (init./date) ____
☐ No analysis requested, Proj. Chemist completed (init./date) ____

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
AC 11-17-07	AC 11-17-07	Yes / No

TriMatrix Laboratories, Inc.

SAMPLE RECEIVING / LOG-IN CHECKLIST

Client	Project-Submittal No.
VES	new / add to E
Receipt Record Page/Line No.	Project Chemist / Sample Nos.
17-10	WAR

Coolers Received

Recorded by (initials/date): TE 1/17/07

☑ Cooler ☐ Box ☐ Other ____ | Qty Received: 1

Thermometer Used: ☐ IR Gun (#94) ☐ Digital Thermometer (#54) ☐ Other (# ____) ☐ See Additional Cooler Information Form

Cooler No. / Time	Custody Seals	Coolant Location	Coolant/Temperature Taken Via	Alternate Temperature Taken Via	Recorded °C	Correction Factor °C	Actual °C
1 / 11:05	☐ none ☑ present / intact ☐ present / not intact	Dispersed / Top / Middle / Bottom	☐ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☑ temperature blank (tb) ☐ 1 container	tb 1.7	—	1.7
					tb location: representative / in ice		
					1 1.9	=	1.9
					2 1.1	=	1.1
					3 1.2	—	1.2
						Average °C	1.0
					☑ Cooler ID on COC?		
					☐ VOC trip blank received?		

Cooler No. / Time	Custody Seals	Coolant Location	Coolant / Temperature Taken Via	Alternate Temperature Taken Via	Recorded °C	Correction Factor °C	Actual °C
/	☐ none ☐ present / intact ☐ present / not intact	Dispersed / Top / Middle / Bottom	☐ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☐ temperature blank (tb) ☐ 1 container	tb		
					tb location: representative / in ice		
					1		
					2		
					3		
						Average °C	
					☐ Cooler ID on COC?		
					☐ VOC trip blank received?		

Cooler No. / Time	Custody Seals	Coolant Location	Coolant / Temperature Taken Via	Alternate Temperature Taken Via	Recorded °C	Correction Factor °C	Actual °C
/	☐ none ☐ present / intact ☐ present / not intact	Dispersed / Top / Middle / Bottom	☐ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☐ temperature blank (tb) ☐ 1 container	tb		
					tb location: representative / in ice		
					1		
					2		
					3		
						Average °C	
					☐ Cooler ID on COC?		
					☐ VOC trip blank received?		

Cooler No. / Time	Custody Seals	Coolant Location	Coolant / Temperature Taken Via	Alternate Temperature Taken Via	Recorded °C	Correction Factor °C	Actual °C
/	☐ none ☐ present / intact ☐ present / not intact	Dispersed / Top / Middle / Bottom	☐ loose ice / avg 2-3 containers ☐ bagged ice / avg 2-3 containers ☐ blue ice / avg 2-3 containers ☐ none / avg 2-3 containers	☐ temperature blank (tb) ☐ 1 container	tb		
					tb location: representative / in ice		
					1		
					2		
					3		
						Average °C	
					☐ Cooler ID on COC?		
					☐ VOC trip blank received?		

If any shaded areas checked, complete Sample Receiving Non-Conformance Form

Paperwork Received

☐ No COC received

N/A	Yes	No	
	☑	☐	Chain of Custody Record(s)?
	☐		If No, COC initiated by ____
	☑		Rec'd for Lab signed/date/time?
☑	☐		Shipping Document?
☑	☐		Other ____

COC ID Nos. 121493

☑ TriMatrix

☐ Other (name or ID#) ____

Check COC for Accuracy

☐ No analysis requested

Yes	No	
☑	☐	Sample ID matches COC?
☑	☐	Sample date and time matches COC?
☑		Container type completed on COC?
☑	☐	All container types indicated are received?

Sample Condition Summary

☐ Non-TriMatrix containers, see Notes

N/A	Yes	No	
		☐	Broken containers/lids?
		☑	Missing or incomplete labels?
		☐	Illegible information on labels?
		☑	Low volume received?
		☐	Inappropriate containers received?
☑		☐	VOC vials have headspace?
☐		☐	Extra sample locations / containers not listed on COC?

Check Sample Preservation

N/A	Yes	No	
	☐	☐	Average sample temperature ≤6° C?
☐	☑		Completed Sample Preservation Verification Form?
☐	☑	☐	Samples preserved correctly?
☑	☐		If "No", added orange tag?
☑	☐		Received pre-preserved VOC soils?

☐ MeOH ☐ Na_2SO_4

Check for Short Hold-Time Prep/Analyses

- ☐ Bacteriological
- ☐ Air Bags
- ☐ EnCores / Methanol Pre-Preserved
- ☐ Formaldehyde/Aldehyde
- ☐ Green-tagged Containers
- ☐ Yellow/White-tagged 1L Ambers (SV Prep-Lab)

AFTER HOURS ONLY:
COPIES OF COC TO LAB AREA(S)
☐ NONE RECEIVED
☑ RECEIVED, COCs TO LAB(S)

Notes pesticides
semi-vol.

☐ Trip blank received ☐ Trip blank not listed on COC
☐ No COC received, Proj. Chemist reviewed (init./date) ____
☐ No analysis requested, Proj. Chemist completed (init./date) ____

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
1/17/07	1/17/07	Yes / No

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCS/LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	g	Laboratory duplicate imprecision
g	Tuning failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	h	Holding time violation
h	Holding time violation	h	Holding time violation	k	Cooler receipt temperature exceeds limits
i	Internal standard failure	i	Internal standard failure	l	LCS recovery failure
k	Cooler receipt temperature exceeds limits	k	Cooler receipt temperature exceeds limits	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination	n	Failed Signal to noise ratio		

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-50 **Fraction:** VOCs, SVOCs, Pest, PCBs, Explosives, & Metals

Lab: TriMatrix **Project Name** Radford RAAP 10

Reviewer: RA **Date:** March 19, 2008

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the Region III Modifications to the USEPA National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical method employed and provisions of the approved project-specific QAPP.

Major Anomalies: For the SVOCs analyses, the laboratory control sample analyzed for sequence 8021856 displayed a percent recovery (%R) less than the lower control limit of 25% for caprolactam at 10%. The laboratory control sample analyzed for sequence 8022735 displayed a %R less than the lower control limit of 25% for caprolactam at 22%. The associated field sample results were non-detects and were qualified "R, l".

Minor Anomalies: For the VOCs analyses, it was noted by the laboratory that the sample temperatures exceeded the method requirements for 35MW2, Trip Blank (2/7/08), and 35MW1 during the storage and/or incubation. Positive associated field sample results were qualified "L, h", and non-detects were qualified "UL, h", unless subsequently qualified for method blank contamination.

The method blanks displayed positive detections for acetone at 2 ug/L and toluene at 0.08 ug/L. Positive associated field sample results less than ten times the method blank concentration for acetone and less than five times the method blank concentration for toluene were qualified "B, z". One trip blank displayed a positive detection for chloromethane at 0.27 ug/L. The associated field sample results were non-detects, and no data qualifying action was necessary.

The continuing calibration analyzed for sequence 8022253 displayed percent differences (%Ds) greater than the control limit (i.e., 20%) with a positive bias for carbon tetrachloride at 23.3%, cyclohexane at 28.7%, methylcyclohexane at 33.9%, and 1,1,2-trichloro-1,2,2-trifluoroethane at 24.4%. The continuing calibration analyzed for sequence 8022255 displayed a %D greater than the control limit with a positive bias for methylcyclohexane at 22.5%. The associated field sample results were non-detects, and no data qualifying action was necessary.

The laboratory control sample analyzed for sequence 8022253 displayed %Rs greater than the upper control limits for cyclohexane at 129%, and methylcyclohexane at

134%. The associated field sample results were non-detects, and no data qualifying action was necessary.

For the SVOCs analyses, the method blank analyzed for batch 801787 displayed positive detections for acenaphthene at 0.02 ug/L, and isophorone at 0.08 ug/L. The associated positive field sample result for isophorone was less than five times the method blank concentration, and was qualified "B, z". Equipment blank, EQBK-5 displayed positive detections for butyl benzyl phthalate at 0.26 ug/L, bis (2-ethylhexyl) phthalate at 0.72 ug/L, isophorone at 0.057 ug/L, and naphthalene at 0.047 ug/L. Positive associated field sample results less than ten times the equipment blank concentrations for the phthalates, and less than five times the equipment blank concentrations for the other compounds were qualified "B, x", unless previously qualified for method blank contamination.

The matrix spike pair analyzed for sample 35 D-4 displayed %Rs less than the lower control limit of 25% for caprolactam at 14% and 13%, respectively. The associated parent sample result was previously qualified for a laboratory control sample anomaly, and no further data qualifying action was required.

For the pesticides analyses, the continuing calibration analyzed for sequence 8022165 displayed a %D greater than the control limit (i.e., 15%) with a negative bias for toxaphene at 42.8%. The associated field sample results were non-detects and were qualified "UJ, c".

Several compounds displayed relative percent differences (RPDs) greater than the control limit of 40% between the two analytical columns for several samples. These results were qualified "J, g" in the associated samples.

Alpha-chlordane in sample 37MW1 and alpha-BHC in sample 37MW2 exceeded the calibration range of the instrument and were flagged "E" by the laboratory. These results were qualified "J, q" by the reviewer. These samples were re-analyzed at dilution factor of two with acceptable results that should be used for data interpretation purposes.

For the PCBs analyses, sample DUP-7 displayed a %R less than the lower control limit of 36% for surrogate tetrachloro-m-xylene at 35% for the second column. No data qualifying action is required based on one surrogate failure, and no data flags were applied.

For the explosives analyses by method 8330, 2,6-dinitrotoluene displayed an RPD greater than the control limit of 40% between the two analytical columns for sample 37MW3 at 45.8%. This result was qualified "J, g" in this sample.

For the explosives analyses by method 8332, the matrix spike duplicate analyzed for sample 35 D-4 displayed a %R greater than the upper control limit of 120% for pentaerythritol tetranitrate at 122%. The associated parent sample result was a non-detect, and no data qualifying action was required.

For the metals analyses by method 6020, the initial and continuing calibration blanks displayed positive detections for antimony. Positive associated field sample results less than five times the calibration blank concentrations were qualified "B, o".

The method blanks displayed positive detections for dissolved chromium, dissolved nickel, and total and dissolved zinc. Positive associated field sample results less than five times the method blank concentrations were qualified "B, p".

The equipment blank, EQBK-5 displayed positive detections for total chromium and total nickel. Positive associated field sample results less than five times the equipment blank concentrations were qualified "B, x".

Correctable Anomalies: None.

Comments: On the basis of this evaluation, the laboratory appears to have followed the specified method. All data, except for data flagged "R", are usable, as qualified, for their intended purpose based on the data reviewed. It should be noted that detection limits were raised in several samples due to dilutions.

Signed: Rayan

SAMPLE ID SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-50

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Client Sample Id:	Lab Sample Id:
35MW2	0802167-01
Trip Blank	0802167-02
35MW1	0802167-03
35 D-2	0802204-01
DUP-7	0802204-02
Trip Blank	0802204-03
35 D-4	0802204-04
EQBK-5	0802204-05
37MW1	0802207-01
Trip Blank	0802207-02
37MW2	0802207-03
37MW3	0802208-01
Trip Blank	0802208-02
38MW1	0802208-03
38MW2	0802208-04
38MW3	0802262-01

01393

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-01 File ID: 16701.D

Sampled: 02/07/08 13:50 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 14:22

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U UL, h
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U UL, h

01426

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-01 File ID: 16701.D

Sampled: 02/07/08 13:50 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 14:22

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U UL,h
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	1.0	1.0	0.072	U
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U UL,h

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.0	100	85 - 115	
1,2-Dichloroethane-d4	40.0	42.0	105	70 - 120	
Toluene-d8	40.0	39.8	99	85 - 120	
4-Bromofluorobenzene	40.0	39.5	99	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	846302	5.15	891900	5.15	
Chlorobenzene-d5	634166	8.08	678467	8.08	
1,4-Dichlorobenzene-d4	311960	10.38	355999	10.38	

* Values outside of QC limits

01427

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Water Laboratory ID: 0802167-02 File ID: 16702.D

Sampled: 02/07/08 00:00 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 11:17

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	2.1	20	1.2	J B,z
71-43-2	Benzene	1	1.0	1.0	0.12	U UL,h
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U UL,h
74-87-3	Chloromethane	1	0.27	1.0	0.060	J L,J,h
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U UL,h
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U UL,h

01431

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Water Laboratory ID: 0802167-02 File ID: 16702.D

Sampled: 02/07/08 00:00 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 11:17

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U UL, h
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	1.0	1.0	0.072	U
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U UL, h

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	39.8	100	85 - 115	
1,2-Dichloroethane-d4	40.0	41.6	104	70 - 120	
Toluene-d8	40.0	39.4	99	85 - 120	
4-Bromofluorobenzene	40.0	39.5	99	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	860544	5.15	891900	5.15	
Chlorobenzene-d5	643421	8.08	678467	8.08	
1,4-Dichlorobenzene-d4	318026	10.38	355999	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-03 File ID: 16703.D

Sampled: 02/07/08 16:20 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 14:59

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U UL, sh
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U UL, sh
67-66-3	Chloroform	1	0.36	1.0	0.061	J L, sh
74-87-3	Chloromethane	1	1.0	1.0	0.060	U UL, sh
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U UL, sh

01437

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-03 File ID: 16703.D

Sampled: 02/07/08 16:20 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 14:59

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U UL, h
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U U L, h
108-88-3	Toluene	1	0.13	1.0	0.072	J B, Z
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U UL, h
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U UL, h

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	39.8	100	85 - 115	
1,2-Dichloroethane-d4	40.0	41.7	104	70 - 120	
Toluene-d8	40.0	39.8	99	85 - 120	
4-Bromofluorobenzene	40.0	39.7	99	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	835282	5.15	891900	5.15	
Chlorobenzene-d5	620844	8.08	678467	8.08	
1,4-Dichlorobenzene-d4	309408	10.38	355999	10.38	

* Values outside of QC limits

01438

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35 D-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-01 File ID: 20401.D

Sampled: 02/08/08 09:45 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 15:36

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

014443

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35 D-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-01 File ID: 20401.D

Sampled: 02/08/08 09:45 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 15:36

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.22	1.0	0.072	J B2
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.4	101	85 - 115	
1,2-Dichloroethane-d4	40.0	42.4	106	70 - 120	
Toluene-d8	40.0	40.2	101	85 - 120	
4-Bromofluorobenzene	40.0	39.2	98	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	837872	5.15	891900	5.15	
Chlorobenzene-d5	633994	8.08	678467	8.08	
1,4-Dichlorobenzene-d4	314582	10.38	355999	10.38	

* Values outside of QC limits

01444

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-02 File ID: 20402.D

Sampled: 02/08/08 00:00 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 16:49

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

014449

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-02 File ID: 20402.D

Sampled: 02/08/08 00:00 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 16:49

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.23	1.0	0.072	J B
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.1	100	85 - 115	
1,2-Dichloroethane-d4	40.0	42.2	106	70 - 120	
Toluene-d8	40.0	39.7	99	85 - 120	
4-Bromofluorobenzene	40.0	39.3	98	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	809298	5.15	891900	5.15	
Chlorobenzene-d5	604579	8.08	678467	8.08	
1,4-Dichlorobenzene-d4	297337	10.38	355999	10.38	

* Values outside of QC limits

01450

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Water Laboratory ID: 0802204-03 File ID: 20403.D

Sampled: 02/08/08 09:45 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 13:08

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	1.6	20	1.2	J B-2
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01455

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Water Laboratory ID: 0802204-03 File ID: 20403.D

Sampled: 02/08/08 09:45 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 13:08

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.090	1.0	0.072	J B2 F
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.1	100	85 - 115	
1,2-Dichloroethane-d4	40.0	42.0	105	70 - 120	
Toluene-d8	40.0	39.6	99	85 - 120	
4-Bromofluorobenzene	40.0	39.5	99	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	872911	5.15	891900	5.15	
Chlorobenzene-d5	654424	8.08	678467	8.08	
1,4-Dichlorobenzene-d4	322676	10.38	355999	10.38	

* Values outside of QC limits

01455

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35 D-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-04 File ID: 20404.D

Sampled: 02/08/08 12:00 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 16:12

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	13	1.0	0.061	
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01461

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

35 D-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-04 File ID: 20404.D

Sampled: 02/08/08 12:00 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 16:12

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.18	1.0	0.072	J B,E
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.7	102	85 - 115	
1,2-Dichloroethane-d4	40.0	42.2	105	70 - 120	
Toluene-d8	40.0	39.6	99	85 - 120	
4-Bromofluorobenzene	40.0	39.6	99	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	849919	5.15	891900	5.15	
Chlorobenzene-d5	632580	8.08	678467	8.08	
1,4-Dichlorobenzene-d4	310101	10.38	355999	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-05 File ID: 20405.D

Sampled: 02/08/08 14:00 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 13:45

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01467

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-05 File ID: 20405.D

Sampled: 02/08/08 14:00 Prepared: 02/20/08 08:00 Analyzed: 02/20/08 13:45

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022253 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.080	1.0	0.072	J B>Z
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.4	101	85 - 115	
1,2-Dichloroethane-d4	40.0	42.0	105	70 - 120	
Toluene-d8	40.0	39.7	99	85 - 120	
4-Bromofluorobenzene	40.0	39.4	99	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	858438	5.15	891900	5.15	
Chlorobenzene-d5	647048	8.08	678467	8.08	
1,4-Dichlorobenzene-d4	323060	10.38	355999	10.38	

* Values outside of QC limits

01468

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

37MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802207-01 File ID: 20701.D

Sampled: 02/11/08 12:50 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 15:50

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01473

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

37MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802207-01 File ID: 20701.D

Sampled: 02/11/08 12:50 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 15:50

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.17	1.0	0.072	J B2E
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.1	103	85 - 115	
1,2-Dichloroethane-d4	40.0	43.7	109	70 - 120	
Toluene-d8	40.0	40.2	100	85 - 120	
4-Bromofluorobenzene	40.0	39.8	100	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	786747	5.15	854542	5.15	
Chlorobenzene-d5	592540	8.08	644631	8.08	
1,4-Dichlorobenzene-d4	293164	10.38	344085	10.38	

* Values outside of QC limits

01474

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Water Laboratory ID: 0802207-02 File ID: 20702.D

Sampled: 02/11/08 12:50 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 14:36

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	1.9	20	1.2	J B, E
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01479

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Water Laboratory ID: 0802207-02 File ID: 20702.D

Sampled: 02/11/08 12:50 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 14:36

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.11	1.0	0.072	J B7Z
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.9	102	85 - 115	
1,2-Dichloroethane-d4	40.0	42.8	107	70 - 120	
Toluene-d8	40.0	40.1	100	85 - 120	
4-Bromofluorobenzene	40.0	38.9	97	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	784527	5.15	854542	5.15	
Chlorobenzene-d5	588920	8.08	644631	8.08	
1,4-Dichlorobenzene-d4	286664	10.38	344085	10.38	

* Values outside of QC limits

01480

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

37MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802207-03 File ID: 20703.D

Sampled: 02/11/08 15:30 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 16:27

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	16	20	1.2	J B7E
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	0.21	1.0	0.12	J
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

014485

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

37MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802207-03 File ID: 20703.D

Sampled: 02/11/08 15:30 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 16:27

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.25	1.0	0.072	J B,Z
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.7	102	85 - 115	
1,2-Dichloroethane-d4	40.0	43.8	110	70 - 120	
Toluene-d8	40.0	39.8	99	85 - 120	
4-Bromofluorobenzene	40.0	40.1	100	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	781521	5.15	854542	5.15	
Chlorobenzene-d5	587126	8.08	644631	8.08	
1,4-Dichlorobenzene-d4	294984	10.38	344085	10.38	

* Values outside of QC limits

01486

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

37MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-01 File ID: 20801.D

Sampled: 02/12/08 09:45 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 17:04

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	0.28	1.0	0.061	J
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01492

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

37MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-01 File ID: 20801.D

Sampled: 02/12/08 09:45 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 17:04

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.13	1.0	0.072	J B-Z
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.9	102	85 - 115	
1,2-Dichloroethane-d4	40.0	43.7	109	70 - 120	
Toluene-d8	40.0	40.2	101	85 - 120	
4-Bromofluorobenzene	40.0	39.2	98	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	780369	5.15	854542	5.15	
Chlorobenzene-d5	590744	8.08	644631	8.08	
1,4-Dichlorobenzene-d4	287928	10.38	344085	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Water Laboratory ID: 0802208-02 File ID: 20802.D

Sampled: 02/12/08 09:45 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 15:13

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	1.7	20	1.2	J B2
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

014998

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Water Laboratory ID: 0802208-02 File ID: 20802.D

Sampled: 02/12/08 09:45 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 15:13

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.13	1.0	0.072	J B,Z
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.9	102	85 - 115	
1,2-Dichloroethane-d4	40.0	43.6	109	70 - 120	
Toluene-d8	40.0	39.9	100	85 - 120	
4-Bromofluorobenzene	40.0	39.8	99	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	802603	5.15	854542	5.15	
Chlorobenzene-d5	605291	8.08	644631	8.08	
1,4-Dichlorobenzene-d4	297804	10.38	344085	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

38MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-03 File ID: 20803.D

Sampled: 02/12/08 11:40 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 17:41

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.7	1.0	0.061	
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01504

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

38MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-03 File ID: 20803.D

Sampled: 02/12/08 11:40 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 17:41

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.18	1.0	0.072	J B-E
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.3	103	85 - 115	
1,2-Dichloroethane-d4	40.0	44.1	110	70 - 120	
Toluene-d8	40.0	40.2	101	85 - 120	
4-Bromofluorobenzene	40.0	39.8	100	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	773372	5.15	854542	5.15	
Chlorobenzene-d5	587418	8.08	644631	8.08	
1,4-Dichlorobenzene-d4	292484	10.38	344085	10.38	

* Values outside of QC limits

01505

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

38MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-04 File ID: 20804.D

Sampled: 02/12/08 14:40 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 18:18

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	1.0	1.0	0.060	U
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01510

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

38MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-04 File ID: 20804.D

Sampled: 02/12/08 14:40 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 18:18

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.16	1.0	0.072	J B2E
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	40.3	101	85 - 115	
1,2-Dichloroethane-d4	40.0	43.7	109	70 - 120	
Toluene-d8	40.0	40.1	100	85 - 120	
4-Bromofluorobenzene	40.0	39.8	100	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	783040	5.15	854542	5.15	
Chlorobenzene-d5	584140	8.08	644631	8.08	
1,4-Dichlorobenzene-d4	290007	10.38	344085	10.38	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

38MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802262-01 File ID: 26201.D

Sampled: 02/13/08 10:10 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 18:54

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	1.2	U
71-43-2	Benzene	1	1.0	1.0	0.12	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.20	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.19	U
75-25-2	Bromoform	1	1.0	1.0	0.23	U
74-83-9	Bromomethane	1	1.0	1.0	0.19	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.28	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.15	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.12	U
75-00-3	Chloroethane	1	1.0	1.0	0.20	U
67-66-3	Chloroform	1	1.0	1.0	0.061	U
74-87-3	Chloromethane	1	0.34	1.0	0.060	J
110-82-7	Cyclohexane	1	5.0	5.0	0.14	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.29	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.065	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.12	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.13	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.17	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.076	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.15	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.14	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.17	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.16	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.10	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.14	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.16	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.13	U
591-78-6	2-Hexanone	1	10	10	0.42	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.12	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.16	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.096	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.15	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.051	U
78-93-3	2-Butanone (MEK)	1	10	10	0.33	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.38	U

01516

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

38MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802262-01 File ID: 26201.D

Sampled: 02/13/08 10:10 Prepared: 02/21/08 12:00 Analyzed: 02/21/08 18:54

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006 Instrument: 224

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.10	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.15	U
108-88-3	Toluene	1	0.23	1.0	0.072	J B7E
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.13	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.11	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.21	U
79-01-6	Trichloroethene	1	1.0	1.0	0.17	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.18	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.14	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.17	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.36	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.0	102	85 - 115	
1,2-Dichloroethane-d4	40.0	44.6	112	70 - 120	
Toluene-d8	40.0	40.7	102	85 - 120	
4-Bromofluorobenzene	40.0	39.9	100	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	764754	5.15	854542	5.15	
Chlorobenzene-d5	585224	8.08	644631	8.08	
1,4-Dichlorobenzene-d4	288740	10.38	344085	10.38	

* Values outside of QC limits

01517

SAMPLE ID SUMMARY

USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-50

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Client Sample Id:	Lab Sample Id:
35MW2	0802167-01
35MW1	0802167-03
35 D-2	0802204-01
DUP-7	0802204-02
35 D-4	0802204-04
EQBK-5	0802204-05
38MW3	0802262-01

01626

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-01 File ID: 0802167-01.D

Sampled: 02/07/08 13:50 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 11:33

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	5.0	5.0	0.043	U
120-12-7	Anthracene	1	0.019	0.50	0.014	J
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.051	U
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	0.26	5.0	0.029	J B2X
105-60-2	Caprolactam	1	5.0	5.0	0.14	U R2
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	5.0	5.0	0.38	U
91-94-1	3,3´-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	5.0	5.0	0.034	U
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

01668

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-01 File ID: 0802167-01.D

Sampled: 02/07/08 13:50 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 11:33

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	0.54	5.0	0.41	J B, X
206-44-0	Fluoranthene	1	0.019	0.50	0.016	J
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	0.066	5.0	0.031	J B, X
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.50	0.50	0.023	U
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.019	0.50	0.015	J
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	8.72	46	20 - 110	
Phenol-d6	18.9	5.27	28	10 - 115	
Nitrobenzene-d5	9.81	7.50	76	40 - 110	
2-Fluorobiphenyl	9.43	6.22	66	50 - 110	
2,4,6-Tribromophenol	19.0	14.3	75	40 - 125	
o-Terphenyl	9.43	8.50	90	50 - 135	

01669

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35MW2

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-50 4MD
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Matrix: Ground Water
Laboratory ID: 0802167-01
File ID: 0802167-01.D
Sampled: 02/07/08 13:50
Prepared: 02/14/08 07:49
Analyzed: 02/18/08 11:33
Solids:
Preparation: 3510C Liquid-Liquid Extı
Initial/Final: 1060 mL / 1 mL
QC Batch: 0801651
Sequence: 8021856
Calibration: 8B18005
Instrument: 308

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	148859	7.786	151682	7.786	
Naphthalene-d8	481577	10.508	509326	10.514	
Acenaphthene-d10	244678	14.623	250624	14.629	
Phenanthrene-d10	314570	18.032	345118	18.032	
Chrysene-d12	268718	21.623	305261	21.623	
Perylene-d12	254768	23.348	253067	23.348	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-03 File ID: 0802167-03.D

Sampled: 02/07/08 16:20 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 12:07

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	5.0	5.0	0.043	U
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.051	U
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	0.26	5.0	0.029	J B2X
105-60-2	Caprolactam	1	5.0	5.0	0.14	U B2
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	0.38	5.0	0.38	J
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	5.0	5.0	0.034	U
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

01682

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-03 File ID: 0802167-03.D

Sampled: 02/07/08 16:20 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 12:07

Solids: Preparation: 3510C Liquid-Liquid Extn Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	0.54	5.0	0.41	J B?X
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	0.075	5.0	0.031	J B?X
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.50	0.50	0.023	U
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.019	0.50	0.015	J
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	9.60	50	20 - 110	
Phenol-d6	18.9	5.85	31	10 - 115	
Nitrobenzene-d5	9.81	8.64	88	40 - 110	
2-Fluorobiphenyl	9.43	6.77	72	50 - 110	
2,4,6-Tribromophenol	19.0	14.3	75	40 - 125	
o-Terphenyl	9.43	8.75	93	50 - 135	

01683

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-03 File ID: 0802167-03.D

Sampled: 02/07/08 16:20 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 12:07

Solids: Preparation: 3510C Liquid-Liquid Extn Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	134571	7.78	151682	7.786	
Naphthalene-d8	446448	10.508	509326	10.514	
Acenaphthene-d10	228058	14.623	250624	14.629	
Phenanthrene-d10	299367	18.032	345118	18.032	
Chrysene-d12	258025	21.623	305261	21.623	
Perylene-d12	234367	23.342	253067	23.348	

* Values outside of QC limits

01684

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35 D-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-01 File ID: 0802204-01.D

Sampled: 02/08/08 09:45 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 12:42

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	5.0	5.0	0.043	U
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.051	U
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	0.26	5.0	0.029	J B0X
105-60-2	Caprolactam	1	5.0	5.0	0.14	U R1 2
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	5.0	5.0	0.38	U
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	5.0	5.0	0.034	U
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35 D-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-01 File ID: 0802204-01.D

Sampled: 02/08/08 09:45 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 12:42

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	0.50	5.0	0.41	J B0X
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	0.057	5.0	0.031	J B?X
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.50	0.50	0.023	U
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	8.56	45	20 - 110	
Phenol-d6	18.9	5.35	28	10 - 115	
Nitrobenzene-d5	9.81	7.65	78	40 - 110	
2-Fluorobiphenyl	9.43	6.39	68	50 - 110	
2,4,6-Tribromophenol	19.0	14.4	76	40 - 125	
o-Terphenyl	9.43	8.87	94	50 - 135	

01695

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35 D-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-01 File ID: 0802204-01.D

Sampled: 02/08/08 09:45 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 12:42

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	156496	7.786	151682	7.786	
Naphthalene-d8	511554	10.513	509326	10.514	
Acenaphthene-d10	259631	14.623	250624	14.629	
Phenanthrene-d10	331605	18.032	345118	18.032	
Chrysene-d12	283267	21.623	305261	21.623	
Perylene-d12	266555	23.348	253067	23.348	

* Values outside of QC limits

01696

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-02 File ID: 0802204-02.D

Sampled: 02/08/08 00:00 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 13:17

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	5.0	5.0	0.043	U
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.051	U
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	0.26	5.0	0.029	J B2X
105-60-2	Caprolactam	1	5.0	5.0	0.14	U R1Q
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	5.0	5.0	0.38	U
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	5.0	5.0	0.034	U
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

01704

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-02 File ID: 0802204-02.D

Sampled: 02/08/08 00:00 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 13:17

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	0.45	5.0	0.41	J B 2X
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	0.075	5.0	0.031	J B 2X
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.50	0.50	0.023	U
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	8.52	45	20 - 110	
Phenol-d6	18.9	5.47	29	10 - 115	
Nitrobenzene-d5	9.81	7.97	81	40 - 110	
2-Fluorobiphenyl	9.43	6.09	65	50 - 110	
2,4,6-Tribromophenol	19.0	13.7	72	40 - 125	
o-Terphenyl	9.43	8.44	90	50 - 135	

01705

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-02 File ID: 0802204-02.D

Sampled: 02/08/08 00:00 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 13:17

Solids: Preparation: 3510C Liquid-Liquid Extn Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	150153	7.78	151682	7.786	
Naphthalene-d8	479682	10.508	509326	10.514	
Acenaphthene-d10	248509	14.623	250624	14.629	
Phenanthrene-d10	317514	18.032	345118	18.032	
Chrysene-d12	271515	21.623	305261	21.623	
Perylene-d12	244628	23.348	253067	23.348	

* Values outside of QC limits

01706

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35 D-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-04 File ID: 0802204-04.D

Sampled: 02/08/08 12:00 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 13:52

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	5.0	5.0	0.043	U
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.051	U
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	0.26	5.0	0.029	J B2 X Q
105-60-2	Caprolactam	1	5.0	5.0	0.14	U R2
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	0.42	5.0	0.38	J
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	5.0	5.0	0.034	U
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

01715

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35 D-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-04 File ID: 0802204-04.D

Sampled: 02/08/08 12:00 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 13:52

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	0.51	5.0	0.41	J B2X
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	0.066	5.0	0.031	J B2X
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.50	0.50	0.023	U
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	8.59	45	20 - 110	
Phenol-d6	18.9	5.47	29	10 - 115	
Nitrobenzene-d5	9.81	7.91	81	40 - 110	
2-Fluorobiphenyl	9.43	6.30	67	50 - 110	
2,4,6-Tribromophenol	19.0	13.8	73	40 - 125	
o-Terphenyl	9.43	8.49	90	50 - 135	

01716

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

35 D-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-04 File ID: 0802204-04.D

Sampled: 02/08/08 12:00 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 13:52

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	148538	7.78	151682	7.786	
Naphthalene-d8	487874	10.508	509326	10.514	
Acenaphthene-d10	246197	14.623	250624	14.629	
Phenanthrene-d10	323505	18.032	345118	18.032	
Chrysene-d12	274676	21.623	305261	21.623	
Perylene-d12	257267	23.348	253067	23.348	

* Values outside of QC limits

01717

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-05 File ID: 0802204-05.D

Sampled: 02/08/08 14:00 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 14:27

Solids: Preparation: 3510C Liquid-Liquid Extr Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	5.0	5.0	0.043	U
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.051	U
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	0.26	5.0	0.029	J
105-60-2	Caprolactam	1	5.0	5.0	0.14	U R1
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	5.0	5.0	0.38	U
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	5.0	5.0	0.034	U
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

01728

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-05 File ID: 0802204-05.D

Sampled: 02/08/08 14:00 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 14:27

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	0.72	5.0	0.41	J
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	0.057	5.0	0.031	J
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.047	0.50	0.023	J
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	8.93	47	20 - 110	
Phenol-d6	18.9	5.49	29	10 - 115	
Nitrobenzene-d5	9.81	8.11	83	40 - 110	
2-Fluorobiphenyl	9.43	6.44	68	50 - 110	
2,4,6-Tribromophenol	19.0	14.5	76	40 - 125	
o-Terphenyl	9.43	8.60	91	50 - 135	

01729

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-05 File ID: 0802204-05.D

Sampled: 02/08/08 14:00 Prepared: 02/14/08 07:49 Analyzed: 02/18/08 14:27

Solids: Preparation: 3510C Liquid-Liquid Extr Initial/Final: 1060 mL / 1 mL

QC Batch: 0801651 Sequence: 8021856 Calibration: 8B18005 Instrument: 308

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	152985	7.78	151682	7.786	
Naphthalene-d8	497898	10.508	509326	10.514	
Acenaphthene-d10	257636	14.623	250624	14.629	
Phenanthrene-d10	326589	18.032	345118	18.032	
Chrysene-d12	289441	21.623	305261	21.623	
Perylene-d12	271378	23.348	253067	23.348	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

38MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802262-01 File ID: 80226201.D

Sampled: 02/13/08 10:10 Prepared: 02/18/08 07:49 Analyzed: 02/26/08 15:54

Solids: Preparation: 3510C Liquid-Liquid Extı Initial/Final: 1060 mL / 1 mL

QC Batch: 0801787 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
83-32-9	Acenaphthene	1	0.50	0.50	0.013	U
208-96-8	Acenaphthylene	1	0.50	0.50	0.012	U
98-86-2	Acetophenone	1	5.0	5.0	0.043	U
120-12-7	Anthracene	1	0.50	0.50	0.014	U
1912-24-9	Atrazine	1	5.0	5.0	0.026	U
100-52-7	Benzaldehyde	1	5.0	5.0	0.051	U
56-55-3	Benzo(a)anthracene	1	0.50	0.50	0.037	U
50-32-8	Benzo(a)pyrene	1	0.50	0.50	0.023	U
205-99-2	Benzo(b)fluoranthene	1	0.50	0.50	0.040	U
207-08-9	Benzo(k)fluoranthene	1	0.50	0.50	0.036	U
191-24-2	Benzo(g,h,i)perylene	1	0.50	0.50	0.022	U
92-52-4	1,1'-Biphenyl	1	5.0	5.0	0.015	U
101-55-3	4-Bromophenyl Phenyl Ether	1	5.0	5.0	0.026	U
85-68-7	Butyl Benzyl Phthalate	1	5.0	5.0	0.029	U
105-60-2	Caprolactam	1	5.0	5.0	0.14	U R, J
86-74-8	Carbazole	1	5.0	5.0	0.018	U
59-50-7	4-Chloro-3-methylphenol	1	5.0	5.0	0.021	U
106-47-8	4-Chloroaniline	1	5.0	5.0	0.021	U
111-91-1	Bis(2-chloroethoxy)methane	1	5.0	5.0	0.016	U
111-44-4	Bis(2-chloroethyl) Ether	1	5.0	5.0	0.016	U
108-60-1	Bis(2-chloroisopropyl) Ether	1	5.0	5.0	0.047	U
91-58-7	2-Chloronaphthalene	1	5.0	5.0	0.012	U
95-57-8	2-Chlorophenol	1	5.0	5.0	0.016	U
7005-72-3	4-Chlorophenyl Phenyl Ether	1	5.0	5.0	0.016	U
218-01-9	Chrysene	1	0.50	0.50	0.020	U
53-70-3	Dibenz(a,h)anthracene	1	0.50	0.50	0.026	U
132-64-9	Dibenzofuran	1	5.0	5.0	0.016	U
84-74-2	Di-n-butyl Phthalate	1	5.0	5.0	0.38	U
91-94-1	3,3'-Dichlorobenzidine	1	5.0	5.0	0.21	U
120-83-2	2,4-Dichlorophenol	1	5.0	5.0	0.015	U
84-66-2	Diethyl Phthalate	1	0.057	5.0	0.034	J
105-67-9	2,4-Dimethylphenol	1	5.0	5.0	0.33	U
131-11-3	Dimethyl Phthalate	1	5.0	5.0	0.016	U
534-52-1	4,6-Dinitro-2-methylphenol	1	5.0	5.0	0.12	U
51-28-5	2,4-Dinitrophenol	1	5.0	5.0	1.5	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.21	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.050	U

01748

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

38MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802262-01 File ID: 80226201.D

Sampled: 02/13/08 10:10 Prepared: 02/18/08 07:49 Analyzed: 02/26/08 15:54

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0801787 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
117-84-0	Di-n-octyl Phthalate	1	5.0	5.0	0.34	U
117-81-7	Bis(2-ethylhexyl) Phthalate	1	5.0	5.0	0.41	U
206-44-0	Fluoranthene	1	0.50	0.50	0.016	U
86-73-7	Fluorene	1	0.50	0.50	0.011	U
118-74-1	Hexachlorobenzene	1	5.0	5.0	0.019	U
87-68-3	Hexachlorobutadiene	1	5.0	5.0	0.018	U
77-47-4	Hexachlorocyclopentadiene	1	5.0	5.0	0.13	U
67-72-1	Hexachloroethane	1	5.0	5.0	0.038	U
193-39-5	Indeno(1,2,3-cd)pyrene	1	0.50	0.50	0.014	U
78-59-1	Isophorone	1	0.12	5.0	0.031	J B2 Z
91-57-6	2-Methylnaphthalene	1	5.0	5.0	0.015	U
95-48-7	2-Methylphenol	1	5.0	5.0	0.14	U
106-44-5	4-Methylphenol	1	5.0	5.0	0.16	U
91-20-3	Naphthalene	1	0.50	0.50	0.023	U
88-74-4	2-Nitroaniline	1	5.0	5.0	0.12	U
99-09-2	3-Nitroaniline	1	5.0	5.0	0.13	U
100-01-6	4-Nitroaniline	1	5.0	5.0	0.14	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.026	U
100-02-7	4-Nitrophenol	1	5.0	5.0	1.3	U
88-75-5	2-Nitrophenol	1	5.0	5.0	0.026	U
86-30-6	N-Nitroso-diphenylamine	1	5.0	5.0	0.019	U
621-64-7	N-Nitroso-di-n-propylamine	1	5.0	5.0	0.030	U
87-86-5	Pentachlorophenol	1	5.0	5.0	0.19	U
85-01-8	Phenanthrene	1	0.50	0.50	0.015	U
108-95-2	Phenol	1	5.0	5.0	0.028	U
129-00-0	Pyrene	1	0.50	0.50	0.047	U
95-94-3	1,2,4,5-Tetrachlorobenzene	1	5.0	5.0	0.024	U
58-90-2	2,3,4,6-Tetrachlorophenol	1	5.0	5.0	0.16	U
88-06-2	2,4,6-Trichlorophenol	1	5.0	5.0	0.027	U
95-95-4	2,4,5-Trichlorophenol	1	5.0	5.0	0.11	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
2-Fluorophenol	19.1	9.94	52	20 - 110	
Phenol-d6	18.9	6.11	32	10 - 115	
Nitrobenzene-d5	9.81	8.25	84	40 - 110	
2-Fluorobiphenyl	9.43	7.76	82	50 - 110	
2,4,6-Tribromophenol	19.0	18.0	95	40 - 125	
o-Terphenyl	9.43	9.63	102	50 - 135	

01744

ORGANIC ANALYSIS DATA SHEET
USEPA-8270C

38MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802262-01 File ID: 80226201.D

Sampled: 02/13/08 10:10 Prepared: 02/18/08 07:49 Analyzed: 02/26/08 15:54

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 1 mL

QC Batch: 0801787 Sequence: 8022735 Calibration: 8B27007 Instrument: 195

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
1,4-Dichlorobenzene-d4	649668	7.78	649877	7.78	
Naphthalene-d8	1957384	10.51	1985360	10.52	
Acenaphthene-d10	1013747	14.63	1079508	14.64	
Phenanthrene-d10	1590973	18.04	1769503	18.04	
Chrysene-d12	1333241	21.63	1456557	21.63	
Perylene-d12	1136306	23.37	1410647	23.38	

* Values outside of QC limits

01742

SAMPLE ID SUMMARY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-50
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001

Client Sample Id:	Lab Sample Id:
35MW2	0802167-01
35MW1	0802167-03
35 D-2	0802204-01
DUP-7	0802204-02
35 D-4	0802204-04
EQBK-5	0802204-05
37MW1	0802207-01
37MW1	0802207-01RE1
37MW2	0802207-03
37MW2	0802207-03RE1
37MW3	0802208-01
38MW1	0802208-03
38MW2	0802208-04
38MW3	0802262-01

ANALYSIS DATA SHEET

35MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802167-01 File ID: A66_159-0

Sampled: 02/07/08 13:50 Prepared: 02/13/08 08:05 Analyzed: 02/20/08 19:08

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1050 mL / 2 mL

QC Batch: 0801577 Sequence: 8022165 Calibration: 8B21011 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U UJ, C

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.190	0.130	68	25 - 140	
Decachlorobiphenyl	0.190	0.163	86	30 - 135	

* Values outside of QC limits

ANALYSIS DATA SHEET

35MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802167-03 File ID: A66_158-0

Sampled: 02/07/08 16:20 Prepared: 02/13/08 08:05 Analyzed: 02/20/08 18:32

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1050 mL / 2 mL

QC Batch: 0801577 Sequence: 8022165 Calibration: 8B21011 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U V J, C

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.190	0.137	72	25 - 140	
Decachlorobiphenyl	0.190	0.168	88	30 - 135	

* Values outside of QC limits

ANALYSIS DATA SHEET

35 D-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802204-01 File ID: A66_173-0

Sampled: 02/08/08 09:45 Prepared: 02/14/08 07:45 Analyzed: 02/21/08 03:28

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801648 Sequence: 8022165 Calibration: 8B21011 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.0038	0.050	0.0021	J
5103-74-2	gamma-Chlordane	1	0.0028	0.050	0.0021	J
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U UJC

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.0732	39	25 - 140	
Decachlorobiphenyl	0.189	0.164	87	30 - 135	

* Values outside of QC limits

ANALYSIS DATA SHEET

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802204-02 File ID: A66_172-0

Sampled: 02/08/08 00:00 Prepared: 02/14/08 07:45 Analyzed: 02/21/08 02:52

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801648 Sequence: 8022165 Calibration: 8B2101I Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.0045	0.050	0.0021	J
5103-74-2	gamma-Chlordane	1	0.0030	0.050	0.0021	J
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U UJ IC

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.0547	29	25 - 140	
Decachlorobiphenyl	0.189	0.165	88	30 - 135	

* Values outside of QC limits

ANALYSIS DATA SHEET

35 D-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802204-04 File ID: A66_171-0

Sampled: 02/08/08 12:00 Prepared: 02/14/08 07:45 Analyzed: 02/21/08 02:16

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801648 Sequence: 8022165 Calibration: 8B21011 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.034	0.050	0.0021	J
5103-74-2	gamma-Chlordane	1	0.024	0.050	0.0021	J
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U UJ IC

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.0598	32	25 - 140	
Decachlorobiphenyl	0.189	0.159	84	30 - 135	

* Values outside of QC limits

ANALYSIS DATA SHEET

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802204-05 File ID: A66_170-0

Sampled: 02/08/08 14:00 Prepared: 02/14/08 07:45 Analyzed: 02/21/08 01:41

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801648 Sequence: 8022165 Calibration: 8B21011 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U UJ, C

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.120	64	25 - 140	
Decachlorobiphenyl	0.189	0.165	88	30 - 135	

* Values outside of QC limits

ANALYSIS DATA SHEET

37MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802207-01 File ID: A66_167-0

Sampled: 02/11/08 12:50 Prepared: 02/14/08 07:45 Analyzed: 02/20/08 23:53

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801648 Sequence: 8022165 Calibration: 8B21011 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.33	0.050	0.0021	E J (from D)
5103-74-2	gamma-Chlordane	1	0.13	0.050	0.0021	
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.15	0.050	0.0021	J
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U UJ,C

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.0740	39	25 - 140	
Decachlorobiphenyl	0.189	0.155	82	30 - 135	

* Values outside of QC limits

00926

ANALYSIS DATA SHEET

37MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802207-01RE1 File ID: A66_421-0

Sampled: 02/11/08 12:50 Prepared: 02/14/08 07:45 Analyzed: 02/29/08 00:30

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1060 mL / 2 mL

QC Batch: 0801648 Sequence: 8030318 Calibration: 8C03004 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	2	0.10	0.10	0.0038	U
319-85-7	beta-BHC	2	0.10	0.10	0.0064	U
58-89-9	gamma-BHC (Lindane)	2	0.10	0.10	0.0036	U
319-86-8	delta-BHC	2	0.0094	0.20	0.0046	J J,g
5103-71-9	alpha-Chlordane ✓	2	0.29	0.10	0.0042	J,g
5103-74-2	gamma-Chlordane	2	0.12	0.10	0.0042	
72-54-8	4,4'-DDD	2	0.20	0.20	0.0038	U
72-55-9	4,4'-DDE	2	0.20	0.20	0.0054	U
50-29-3	4,4'-DDT	2	0.20	0.20	0.0040	U
309-00-2	Aldrin	2	0.10	0.10	0.016	U
60-57-1	Dieldrin	2	0.10	0.10	0.0040	U
959-98-8	Endosulfan I	2	0.20	0.20	0.0046	U
33213-65-9	Endosulfan II	2	0.20	0.20	0.0036	U
1031-07-8	Endosulfan Sulfate	2	0.20	0.20	0.0066	U
72-20-8	Endrin	2	0.20	0.20	0.0040	U
7421-93-4	Endrin Aldehyde	2	0.20	0.20	0.0058	U
53494-70-5	Endrin Ketone	2	0.10	0.10	0.0066	U
76-44-8	Heptachlor	2	0.10	0.10	0.0060	U
1024-57-3	Heptachlor Epoxide	2	0.14	0.10	0.0042	J,g
72-43-5	Methoxychlor	2	1.0	1.0	0.010	U
8001-35-2	Toxaphene	2	10	10	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.0811	43	25 - 140	
Decachlorobiphenyl	0.189	0.161	85	30 - 135	

* Values outside of QC limits

use only ✓ result.
RA 3/14/08

ANALYSIS DATA SHEET

37MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802207-03 File ID: B66_166-0

Sampled: 02/11/08 15:30 Prepared: 02/14/08 07:45 Analyzed: 02/20/08 23:18

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801648 Sequence: 8022165 Calibration: 8B21011 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
~~319-84-6~~	~~alpha-BHC~~	1	~~0.56~~	0.050	0.0019	~~E~~ J, 3, c
319-85-7	beta-BHC	1	0.052	0.050	0.0032	J, 9
58-89-9	gamma-BHC (Lindane)	1	0.013	0.050	0.0018	J
319-86-8	delta-BHC	1	0.016	0.10	0.0023	J
5103-71-9	alpha-Chlordane	1	0.046	0.050	0.0021	J J, 9
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U VJ, C

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.0772	41	25 - 140	
Decachlorobiphenyl	0.189	0.162	86	30 - 135	

* Values outside of QC limits

ANALYSIS DATA SHEET

37MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802207-03RE1 File ID: A66_422-0

Sampled: 02/11/08 15:30 Prepared: 02/14/08 07:45 Analyzed: 02/29/08 01:06

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801648 Sequence: 8030318 Calibration: 8C03004 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	2	0.49	0.10	0.0038	
319-85-7	beta-BHC	2	0.047	0.10	0.0064	J
58-89-9	gamma-BHC (Lindane)	2	0.012	0.10	0.0036	J
319-86-8	delta-BHC	2	0.017	0.20	0.0046	J
5103-71-9	alpha-Chlordane	2	0.10	0.10	0.0042	U
5103-74-2	gamma-Chlordane	2	0.10	0.10	0.0042	U
72-54-8	4,4'-DDD	2	0.20	0.20	0.0038	U
72-55-9	4,4'-DDE	2	0.20	0.20	0.0054	U
50-29-3	4,4'-DDT	2	0.20	0.20	0.0040	U
309-00-2	Aldrin	2	0.10	0.10	0.016	U
60-57-1	Dieldrin	2	0.10	0.10	0.0040	U
959-98-8	Endosulfan I	2	0.20	0.20	0.0046	U
33213-65-9	Endosulfan II	2	0.20	0.20	0.0036	U
1031-07-8	Endosulfan Sulfate	2	0.20	0.20	0.0066	U
72-20-8	Endrin	2	0.20	0.20	0.0040	U
7421-93-4	Endrin Aldehyde	2	0.20	0.20	0.0058	U
53494-70-5	Endrin Ketone	2	0.10	0.10	0.0066	U
76-44-8	Heptachlor	2	0.10	0.10	0.0060	U
1024-57-3	Heptachlor Epoxide	2	0.10	0.10	0.0042	U
72-43-5	Methoxychlor	2	1.0	1.0	0.010	U
8001-35-2	Toxaphene	2	10	10	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.0762	40	25 - 140	
Decachlorobiphenyl	0.189	0.177	94	30 - 135	

* Values outside of QC limits

Use only Result.
RA
3/14/08

00953

ANALYSIS DATA SHEET

37MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802208-01 File ID: A66_165-0

Sampled: 02/12/08 09:45 Prepared: 02/14/08 07:45 Analyzed: 02/20/08 22:42

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801648 Sequence: 8022165 Calibration: 8B21011 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.10	0.050	0.0021	J,g
5103-74-2	gamma-Chlordane	1	0.058	0.050	0.0021	J,g
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.013	0.10	0.0018	J J,g
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U VJ,C

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.0849	45	25 - 140	
Decachlorobiphenyl	0.189	0.163	87	30 - 135	

* Values outside of QC limits

00962

ANALYSIS DATA SHEET

38MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802208-03 File ID: A66_177-0

Sampled: 02/12/08 11:40 Prepared: 02/14/08 07:45 Analyzed: 02/21/08 05:50

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1060 mL / 2 mL

QC Batch: 0801648 Sequence: 8022165 Calibration: 8B21011 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U UJ, C

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.121	64	25 - 140	
Decachlorobiphenyl	0.189	0.158	84	30 - 135	

* Values outside of QC limits

60971

ANALYSIS DATA SHEET

38MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802208-04 File ID: A66_178-0

Sampled: 02/12/08 14:40 Prepared: 02/14/08 07:45 Analyzed: 02/21/08 06:26

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801648 Sequence: 8022165 Calibration: 8B21011 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.0047	0.10	0.0018	J
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U UJ, C

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.147	78	25 - 140	
Decachlorobiphenyl	0.189	0.158	84	30 - 135	

* Values outside of QC limits

00980

ANALYSIS DATA SHEET

38MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802262-01 File ID: A66_432-0

Sampled: 02/13/08 10:10 Prepared: 02/19/08 17:08 Analyzed: 02/29/08 07:01

Solids: Preparation: 3510C Liquid-Liquid Ex Initial/Final: 1060 mL / 2 mL

QC Batch: 0801825 Sequence: 8030318 Calibration: 8C03004 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	U
319-85-7	beta-BHC	1	0.016	0.050	0.0032	J J, 8
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.10	0.10	0.0023	U
5103-71-9	alpha-Chlordane	1	0.050	0.050	0.0021	U
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.10	0.10	0.0018	U
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.050	0.050	0.0021	U
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.189	0.119	63	25 - 140	
Decachlorobiphenyl	0.189	0.200	106	30 - 135	

* Values outside of QC limits

00989

SAMPLE ID SUMMARY

USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-50

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Client Sample Id:	Lab Sample Id:
35MW2	0802167-01
35MW1	0802167-03
35 D-2	0802204-01
DUP-7	0802204-02
35 D-4	0802204-04
EQBK-5	0802204-05
37MW1	0802207-01
37MW2	0802207-03
37MW3	0802208-01
38MW1	0802208-03
38MW2	0802208-04
38MW3	0802262-01

00205

ANALYSIS DATA SHEET

35MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802167-01 File ID: A195251-0

Sampled: 02/07/08 13:50 Prepared: 02/13/08 07:46 Analyzed: 02/20/08 16:29

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1050 mL / 2 mL

QC Batch: 0801490 Sequence: 8022021 Calibration: 8B21006 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Decachlorobiphenyl	0.190	0.197	104	40 - 135	
Tetrachloro-m-xylene	0.190	0.169	89	36 - 114	

* Values outside of QC limits

00235

ANALYSIS DATA SHEET

35MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802167-03 File ID: A195252-0

Sampled: 02/07/08 16:20 Prepared: 02/13/08 07:46 Analyzed: 02/20/08 16:54

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1050 mL / 2 mL

QC Batch: 0801490 Sequence: 8022021 Calibration: 8B21006 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Decachlorobiphenyl	0.190	0.194	102	40 - 135	
Tetrachloro-m-xylene	0.190	0.189	99	36 - 114	

* Values outside of QC limits

00244

ANALYSIS DATA SHEET

35 D-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802204-01 File ID: A195255-0

Sampled: 02/08/08 09:45 Prepared: 02/14/08 07:44 Analyzed: 02/20/08 18:10

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801647 Sequence: 8022021 Calibration: 8B21006 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Decachlorobiphenyl	0.189	0.193	102	40 - 135	
Tetrachloro-m-xylene	0.189	0.0917	49	36 - 114	

* Values outside of QC limits

00253

ANALYSIS DATA SHEET

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802204-02 File ID: A195256-0

Sampled: 02/08/08 00:00 Prepared: 02/14/08 07:44 Analyzed: 02/20/08 18:35

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801647 Sequence: 8022021 Calibration: 8B21006 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Decachlorobiphenyl	0.189	0.202	107	40 - 135	
Tetrachloro-m-xylene	0.189	0.0698	37	36 - 114	

* Values outside of QC limits

00262

ANALYSIS DATA SHEET

35 D-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802204-04 File ID: A195257-0

Sampled: 02/08/08 12:00 Prepared: 02/14/08 07:44 Analyzed: 02/20/08 19:00

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801647 Sequence: 8022021 Calibration: 8B21006 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.189	0.191	101	40 - 135	
Tetrachloro-m-xylene		0.189	0.0781	41	36 - 114	

* Values outside of QC limits

00271

ANALYSIS DATA SHEET

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802204-05 File ID: A195258-0

Sampled: 02/08/08 14:00 Prepared: 02/14/08 07:44 Analyzed: 02/20/08 19:26

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801647 Sequence: 8022021 Calibration: 8B21006 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Decachlorobiphenyl	0.189	0.186	98	40 - 135	
Tetrachloro-m-xylene	0.189	0.139	74	36 - 114	

* Values outside of QC limits

00280

ANALYSIS DATA SHEET

37MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802207-01 File ID: A195262-0

Sampled: 02/11/08 12:50 Prepared: 02/14/08 07:44 Analyzed: 02/20/08 21:06

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801647 Sequence: 8022021 Calibration: 8B21006 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Decachlorobiphenyl	0.189	0.184	97	40 - 135	
Tetrachloro-m-xylene	0.189	0.102	54	36 - 114	

* Values outside of QC limits

ANALYSIS DATA SHEET

37MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802207-03 File ID: A195263-0

Sampled: 02/11/08 15:30 Prepared: 02/14/08 07:44 Analyzed: 02/20/08 21:31

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801647 Sequence: 8022021 Calibration: 8B21006 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.189	0.184	97	40 - 135	
Tetrachloro-m-xylene		0.189	0.0932	49	36 - 114	

* Values outside of QC limits

00298

ANALYSIS DATA SHEET

37MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802208-01 File ID: A195264-0

Sampled: 02/12/08 09:45 Prepared: 02/14/08 07:44 Analyzed: 02/20/08 21:56

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801647 Sequence: 8022021 Calibration: 8B21006 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Decachlorobiphenyl	0.189	0.189	100	40 - 135	
Tetrachloro-m-xylene	0.189	0.114	60	36 - 114	

* Values outside of QC limits

ANALYSIS DATA SHEET

38MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802208-03 File ID: A195265-0

Sampled: 02/12/08 11:40 Prepared: 02/14/08 07:44 Analyzed: 02/20/08 22:21

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801647 Sequence: 8022021 Calibration: 8B21006 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.189	0.185	98	40 - 135	
Tetrachloro-m-xylene		0.189	0.133	71	36 - 114	

* Values outside of QC limits

00319

ANALYSIS DATA SHEET

38MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802208-04 File ID: A195266-0

Sampled: 02/12/08 14:40 Prepared: 02/14/08 07:44 Analyzed: 02/20/08 22:46

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801647 Sequence: 8022021 Calibration: 8B21006 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U
System Monitoring Compound		**ADDED (ug/L)**	**CONC (ug/L)**	**% Rec.**	**QC Limits**	**Q**
Decachlorobiphenyl		0.189	0.188	100	40 - 135	
Tetrachloro-m-xylene		0.189	0.154	82	36 - 114	

* Values outside of QC limits

00328

ANALYSIS DATA SHEET

38MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0802262-01 File ID: A196152-0

Sampled: 02/13/08 10:10 Prepared: 02/19/08 17:06 Analyzed: 02/26/08 20:18

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1060 mL / 2 mL

QC Batch: 0801824 Sequence: 8022706 Calibration: 8B27001 Instrument: 144

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
12674-11-2	PCB-1016	1	0.20	0.20	0.050	U
11104-28-2	PCB-1221	1	0.20	0.20	0.068	U
11141-16-5	PCB-1232	1	0.20	0.20	0.031	U
53469-21-9	PCB-1242	1	0.20	0.20	0.035	U
12672-29-6	PCB-1248	1	0.20	0.20	0.040	U
11097-69-1	PCB-1254	1	0.20	0.20	0.034	U
11096-82-5	PCB-1260	1	0.20	0.20	0.034	U
37324-23-5	PCB-1262	1	0.20	0.20	0.022	U
11100-14-4	PCB-1268	1	0.20	0.20	0.049	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Decachlorobiphenyl	0.189	0.206	109	40 - 135	
Tetrachloro-m-xylene	0.189	0.135	72	36 - 114	

* Values outside of QC limits

00337

SAMPLE ID SUMMARY

USEPA-8330

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

SDG: 36440-50

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Client Sample Id:	Lab Sample Id:
35MW2	0802167-01
35MW2	0802167-01RE1
35MW1	0802167-03
35MW1	0802167-03RE1
35 D-2	0802204-01
35 D-2	0802204-01RE1
DUP-7	0802204-02
DUP-7	0802204-02RE1
35 D-4	0802204-04
35 D-4	0802204-04RE1
EQBK-5	0802204-05
37MW1	0802207-01
37MW2	0802207-03
37MW3	0802208-01
37MW3	0802208-01RE1
38MW1	0802208-03
38MW2	0802208-04
38MW3	0802262-01

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-01 File ID: expa005-0

Sampled: 02/07/08 13:50 Prepared: 02/14/08 07:46 Analyzed: 02/15/08 18:56

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8021818 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	0.88	5.0	0.20	J

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.43	75	29 - 138	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-01RE1 File ID: EXa005-0

Sampled: 02/07/08 13:50 Prepared: 02/14/08 07:46 Analyzed: 02/19/08 15:50

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8022059 Calibration: 8A02004 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.1	5.0	0.20	J

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.53	78	29 - 138	

* Values outside of QC limits

CONF. RESULT DO NOT USE RA 3/7/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-03 File ID: expa006-0

Sampled: 02/07/08 16:20 Prepared: 02/14/08 07:46 Analyzed: 02/15/08 19:33

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8021818 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.0	5.0	0.20	J

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.31	71	29 - 138	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-03RE1 File ID: EXa006-0

Sampled: 02/07/08 16:20 Prepared: 02/14/08 07:46 Analyzed: 02/19/08 16:42

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8022059 Calibration: 8A02004 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.3	5.0	0.20	J

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.63	81	29 - 138	

* Values outside of QC limits

Do Not Use
RA
3/17/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35 D-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-01 File ID: expa007-0

Sampled: 02/08/08 09:45 Prepared: 02/14/08 07:46 Analyzed: 02/15/08 20:10

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8021818 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.4	5.0	0.20	J

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.11	65	29 - 138	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35 D-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-01RE1 File ID: EXa007-0

Sampled: 02/08/08 09:45 Prepared: 02/14/08 07:46 Analyzed: 02/19/08 17:34

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8022059 Calibration: 8A02004 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.6	5.0	0.20	J

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.35	72	29 - 138	

* Values outside of QC limits

DO NOT USE
RA
3/17/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-02 File ID: expa008-0

Sampled: 02/08/08 00:00 Prepared: 02/14/08 07:46 Analyzed: 02/15/08 20:47

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8021818 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.3	5.0	0.20	J

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.29	70	29 - 138	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-02RE1 File ID: EXa008-0

Sampled: 02/08/08 00:00 Prepared: 02/14/08 07:46 Analyzed: 02/19/08 18:26

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8022059 Calibration: 8A02004 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	1.7	5.0	0.20	J

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.58	79	29 - 138	

* Values outside of QC limits

Do Not Use RA 5/17/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35 D-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-04 File ID: expa009-0

Sampled: 02/08/08 12:00 Prepared: 02/14/08 07:46 Analyzed: 02/15/08 21:25

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8021818 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	4.3	5.0	0.20	J

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.37	73	29 - 138	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

35 D-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-04RE1 File ID: EXa009-0

Sampled: 02/08/08 12:00 Prepared: 02/14/08 07:46 Analyzed: 02/19/08 19:18

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8022059 Calibration: 8A02004 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	4.4	5.0	0.20	J

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.48	76	29 - 138	

* Values outside of QC limits

Do not use RA 3/17/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-05 File ID: expa010-0

Sampled: 02/08/08 14:00 Prepared: 02/14/08 07:46 Analyzed: 02/15/08 22:02

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8021818 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.39	74	29 - 138	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802207-01 File ID: expa011-0

Sampled: 02/11/08 12:50 Prepared: 02/14/08 07:46 Analyzed: 02/15/08 22:39

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8021818 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.40	74	29 - 138	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802207-03 File ID: expa012-0

Sampled: 02/11/08 15:30 Prepared: 02/14/08 07:46 Analyzed: 02/15/08 23:16

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8021818 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	1.82	56	29 - 138	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-01 File ID: expa014-0

Sampled: 02/12/08 09:45 Prepared: 02/14/08 07:46 Analyzed: 02/16/08 00:30

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8021818 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	0.18	5.0	0.071	J
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	0.59	5.0	0.16	J J,8
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.39	5.0	0.24	J
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.49	5.0	0.22	J
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.14	66	29 - 138	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

37MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-01RE1 File ID: EXa010-0

Sampled: 02/12/08 09:45 Prepared: 02/14/08 07:46 Analyzed: 02/19/08 20:10

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8022059 Calibration: 8A02004 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	0.18	5.0	0.071	J
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	0.37	5.0	0.16	J
35572-78-2	2-Amino-4,6-dinitrotoluene	1	0.34	5.0	0.24	J
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	0.40	5.0	0.22	J
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.77	85	29 - 138	

* Values outside of QC limits

Do Not use RA 3/17/08

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-03 File ID: expa015-0

Sampled: 02/12/08 11:40 Prepared: 02/14/08 07:46 Analyzed: 02/16/08 01:07

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8021818 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.14	66	29 - 138	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-04 File ID: expa016-0

Sampled: 02/12/08 14:40 Prepared: 02/14/08 07:46 Analyzed: 02/16/08 01:44

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801649 Sequence: 8021818 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.24	69	29 - 138	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8330

38MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802262-01 File ID: EXa005-0

Sampled: 02/13/08 10:10 Prepared: 02/20/08 08:01 Analyzed: 02/20/08 20:54

Solids: Preparation: 8330 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801906 Sequence: 8022302 Calibration: 7L28008 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
99-35-4	1,3,5-Trinitrobenzene	1	5.0	5.0	0.045	U
99-65-0	1,3-Dinitrobenzene	1	5.0	5.0	0.071	U
118-96-7	2,4,6-Trinitrotoluene	1	5.0	5.0	0.10	U
121-14-2	2,4-Dinitrotoluene	1	5.0	5.0	0.092	U
606-20-2	2,6-Dinitrotoluene	1	5.0	5.0	0.16	U
35572-78-2	2-Amino-4,6-dinitrotoluene	1	5.0	5.0	0.24	U
88-72-2	2-Nitrotoluene	1	5.0	5.0	0.28	U
99-08-1	3-Nitrotoluene	1	5.0	5.0	0.17	U
1946-51-0	4-Amino-2,6-dinitrotoluene	1	5.0	5.0	0.22	U
99-99-0	4-Nitrotoluene	1	5.0	5.0	0.49	U
121-82-4	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1	5.0	5.0	0.092	U
479-45-8	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1	5.0	5.0	0.15	U
98-95-3	Nitrobenzene	1	5.0	5.0	0.15	U
2691-41-0	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	1	5.0	5.0	0.20	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
4-Nitroaniline	3.25	2.17	67	29 - 138	

* Values outside of QC limits

SAMPLE ID SUMMARY

USEPA-8332

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-50
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001

Client Sample Id:	Lab Sample Id:
35MW2	0802167-01
35MW1	0802167-03
35 D-2	0802204-01
DUP-7	0802204-02
35 D-4	0802204-04
EQBK-5	0802204-05
37MW1	0802207-01
37MW2	0802207-03
37MW3	0802208-01
38MW1	0802208-03
38MW2	0802208-04
38MW3	0802262-01

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-01 File ID: data005-0

Sampled: 02/07/08 13:50 Prepared: 02/14/08 07:47 Analyzed: 02/18/08 10:57

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801650 Sequence: 8021905 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.19	99	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802167-03 File ID: data006-0

Sampled: 02/07/08 16:20 Prepared: 02/14/08 07:47 Analyzed: 02/18/08 11:39

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801650 Sequence: 8021905 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.14	98	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35 D-2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-01 File ID: data007-0

Sampled: 02/08/08 09:45 Prepared: 02/14/08 07:47 Analyzed: 02/18/08 12:22

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801650 Sequence: 8021905 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.25	101	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

DUP-7

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-02 File ID: data008-0

Sampled: 02/08/08 00:00 Prepared: 02/14/08 07:47 Analyzed: 02/18/08 13:04

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801650 Sequence: 8021905 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.19	99	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

35 D-4

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-04 File ID: data009-0

Sampled: 02/08/08 12:00 Prepared: 02/14/08 07:47 Analyzed: 02/18/08 13:46

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801650 Sequence: 8021905 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.23	100	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

EQBK-5

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802204-05 File ID: data010-0

Sampled: 02/08/08 14:00 Prepared: 02/14/08 07:47 Analyzed: 02/18/08 14:29

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801650 Sequence: 8021905 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.19	99	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802207-01 File ID: data011-0

Sampled: 02/11/08 12:50 Prepared: 02/14/08 07:47 Analyzed: 02/18/08 15:11

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801650 Sequence: 8021905 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.18	99	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802207-03 File ID: data012-0

Sampled: 02/11/08 15:30 Prepared: 02/14/08 07:47 Analyzed: 02/18/08 15:53

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801650 Sequence: 8021905 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.24	101	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

37MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-01 File ID: data014-0

Sampled: 02/12/08 09:45 Prepared: 02/14/08 07:47 Analyzed: 02/18/08 17:18

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801650 Sequence: 8021905 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.17	99	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38MW1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-03 File ID: data015-0

Sampled: 02/12/08 11:40 Prepared: 02/14/08 07:47 Analyzed: 02/18/08 18:00

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801650 Sequence: 8021905 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.21	100	50 - 150	

* Values outside of QC limits

02324

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802208-04 File ID: data016-0

Sampled: 02/12/08 14:40 Prepared: 02/14/08 07:47 Analyzed: 02/18/08 18:42

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801650 Sequence: 8021905 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.27	102	50 - 150	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8332

38MW3

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50 4MD

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Ground Water Laboratory ID: 0802262-01 File ID: data005-0

Sampled: 02/13/08 10:10 Prepared: 02/19/08 11:33 Analyzed: 02/21/08 13:31

Solids: Preparation: 8332 Extraction Initial/Final: 770 mL / 10 mL

QC Batch: 0801848 Sequence: 8022286 Calibration: 8A18005 Instrument: 221

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
55-63-0	Nitroglycerin	1	5.0	5.0	0.58	U
78-11-5	Pentaerythritol Tetranitrate	1	5.0	5.0	0.61	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
1-Nitronaphthalene	3.21	3.34	104	50 - 150	

* Values outside of QC limits

02336

SAMPLE ID SUMMARY
USEPA-6010B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-50
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001

Client Sample Id:	Lab Sample Id:
35MW2	0802167-01
35MW1	0802167-03
35 D-2	0802204-01
DUP-7	0802204-02
35 D-4	0802204-04
EQBK-5	0802204-05
37MW1	0802207-01
37MW2	0802207-03
37MW3	0802208-01
38MW1	0802208-03
38MW2	0802208-04
38MW3	0802262-01

02444

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 13:50
Solids: 0.00
Laboratory ID: 0802167-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	140	ug/L	1	200	44	J	02/26/08 11:17
7440-70-2	Calcium, Total	140000	ug/L	1	500	40		02/26/08 11:17
7439-89-6	Iron, Total	200	ug/L	1	20	5.7		02/26/08 11:17
7439-95-4	Magnesium, Total	37000	ug/L	1	500	38		02/26/08 11:17
7440-09-7	Potassium, Total	1400	ug/L	1	200	54		02/28/08 03:45
7440-23-5	Sodium, Total	8300	ug/L	1	500	84		02/26/08 16:01

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 13:50
Solids: 0.00
Laboratory ID: 0802167-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/20/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801814

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 13:16
7440-70-2	Calcium, Dissolved	130000	ug/L	1	500	40		02/26/08 13:16
7439-89-6	Iron, Dissolved	12	ug/L	1	20	5.7	J	02/26/08 13:16
7439-95-4	Magnesium, Dissolved	35000	ug/L	1	500	38		02/26/08 13:16
7440-09-7	Potassium, Dissolved	1200	ug/L	1	200	54		02/28/08 01:05
7440-23-5	Sodium, Dissolved	7600	ug/L	1	500	84		02/26/08 18:48

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 16:20
Solids: 0.00
Laboratory ID: 0802167-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	420	ug/L	1	200	44		02/26/08 11:21
7440-70-2	Calcium, Total	87000	ug/L	1	500	40		02/26/08 11:21
7439-89-6	Iron, Total	370	ug/L	1	20	5.7		02/26/08 11:21
7439-95-4	Magnesium, Total	35000	ug/L	1	500	38		02/26/08 11:21
7440-09-7	Potassium, Total	1600	ug/L	1	200	54		02/28/08 03:50
7440-23-5	Sodium, Total	9400	ug/L	1	500	84		02/26/08 16:05

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 16:20
Solids: 0.00
Laboratory ID: 0802167-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/20/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801814

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 13:19
7440-70-2	Calcium, Dissolved	85000	ug/L	1	500	40		02/26/08 13:19
7439-89-6	Iron, Dissolved	12	ug/L	1	20	5.7	J	02/26/08 13:19
7439-95-4	Magnesium, Dissolved	34000	ug/L	1	500	38		02/26/08 13:19
7440-09-7	Potassium, Dissolved	1500	ug/L	1	200	54		02/28/08 01:10
7440-23-5	Sodium, Dissolved	9100	ug/L	1	500	84		02/26/08 18:52

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35 D-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 09:45
Solids: 0.00
Laboratory ID: 0802204-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	02/26/08 11:24
7440-70-2	Calcium, Total	51000	ug/L	1	500	40		02/26/08 11:24
7439-89-6	Iron, Total	10	ug/L	1	20	5.7	J	02/26/08 11:24
7439-95-4	Magnesium, Total	30000	ug/L	1	500	38		02/26/08 11:24
7440-09-7	Potassium, Total	1500	ug/L	1	200	54		02/28/08 03:55
7440-23-5	Sodium, Total	5900	ug/L	1	500	84		02/26/08 16:10

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35 D-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 09:45
Solids: 0.00
Laboratory ID: 0802204-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/20/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801814

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 13:50
7440-70-2	Calcium, Dissolved	53000	ug/L	1	500	40		02/26/08 13:50
7439-89-6	Iron, Dissolved	13	ug/L	1	20	5.7	J	02/26/08 13:50
7439-95-4	Magnesium, Dissolved	32000	ug/L	1	500	38		02/26/08 13:50
7440-09-7	Potassium, Dissolved	1400	ug/L	1	200	54		02/28/08 01:15
7440-23-5	Sodium, Dissolved	5800	ug/L	1	500	84		02/26/08 18:57

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 00:00
Solids: 0.00
Laboratory ID: 0802204-02

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	02/26/08 11:28
7440-70-2	Calcium, Total	51000	ug/L	1	500	40		02/26/08 11:28
7439-89-6	Iron, Total	13	ug/L	1	20	5.7	J	02/26/08 11:28
7439-95-4	Magnesium, Total	30000	ug/L	1	500	38		02/26/08 11:28
7440-09-7	Potassium, Total	1400	ug/L	1	200	54		02/28/08 04:00
7440-23-5	Sodium, Total	5800	ug/L	1	500	84		02/26/08 16:15

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 00:00
Solids: 0.00
Laboratory ID: 0802204-02

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/20/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801814

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 13:54
7440-70-2	Calcium, Dissolved	49000	ug/L	1	500	40		02/26/08 13:54
7439-89-6	Iron, Dissolved	20	ug/L	1	20	5.7	U	02/26/08 13:54
7439-95-4	Magnesium, Dissolved	29000	ug/L	1	500	38		02/26/08 13:54
7440-09-7	Potassium, Dissolved	1300	ug/L	1	200	54		02/28/08 01:20
7440-23-5	Sodium, Dissolved	5600	ug/L	1	500	84		02/26/08 19:02

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35 D-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 12:00
Solids: 0.00
Laboratory ID: 0802204-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	74	ug/L	1	200	44	J	02/26/08 11:31
7440-70-2	Calcium, Total	40000	ug/L	1	500	40		02/26/08 11:31
7439-89-6	Iron, Total	30	ug/L	1	20	5.7		02/26/08 11:31
7439-95-4	Magnesium, Total	20000	ug/L	1	500	38		02/26/08 11:31
7440-09-7	Potassium, Total	1300	ug/L	1	200	54		02/28/08 04:05
7440-23-5	Sodium, Total	8700	ug/L	1	500	84		02/26/08 16:20

02453

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

35 D-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 12:00
Solids: 0.00
Laboratory ID: 0802204-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/20/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801814

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 13:57
7440-70-2	Calcium, Dissolved	41000	ug/L	1	500	40		02/26/08 13:57
7439-89-6	Iron, Dissolved	20	ug/L	1	20	5.7	U	02/26/08 13:57
7439-95-4	Magnesium, Dissolved	21000	ug/L	1	500	38		02/26/08 13:57
7440-09-7	Potassium, Dissolved	1300	ug/L	1	200	54		02/28/08 01:35
7440-23-5	Sodium, Dissolved	8800	ug/L	1	500	84		02/26/08 19:07

02454

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

EQBK-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 14:00
Solids: 0.00
Laboratory ID: 0802204-05

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	200	ug/L	1	200	44	U	02/26/08 11:56
7440-70-2	Calcium, Total	500	ug/L	1	500	40	U	02/26/08 11:56
7439-89-6	Iron, Total	20	ug/L	1	20	5.7	U	02/26/08 11:56
7439-95-4	Magnesium, Total	500	ug/L	1	500	38	U	02/26/08 11:56
7440-09-7	Potassium, Total	200	ug/L	1	200	54	U	02/28/08 04:39
7440-23-5	Sodium, Total	500	ug/L	1	500	84	U	02/26/08 16:53

02455

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 12:50
Solids: 0.00
Laboratory ID: 0802207-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	82	ug/L	1	200	44	J	02/26/08 11:59
7440-70-2	Calcium, Total	92000	ug/L	1	500	40		02/26/08 11:59
7439-89-6	Iron, Total	380	ug/L	1	20	5.7		02/26/08 11:59
7439-95-4	Magnesium, Total	29000	ug/L	1	500	38		02/26/08 11:59
7440-09-7	Potassium, Total	730	ug/L	1	200	54		02/28/08 04:44
7440-23-5	Sodium, Total	65000	ug/L	1	500	84		02/26/08 16:58

021456

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 12:50
Solids: 0.00
Laboratory ID: 0802207-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/20/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801814

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 14:15
7440-70-2	Calcium, Dissolved	91000	ug/L	1	500	40		02/26/08 14:15
7439-89-6	Iron, Dissolved	11	ug/L	1	20	5.7	J	02/26/08 14:15
7439-95-4	Magnesium, Dissolved	28000	ug/L	1	500	38		02/26/08 14:15
7440-09-7	Potassium, Dissolved	570	ug/L	1	200	54		02/28/08 01:59
7440-23-5	Sodium, Dissolved	65000	ug/L	1	500	84		02/26/08 19:31

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 15:30
Solids: 0.00
Laboratory ID: 0802207-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	17000	ug/L	1	200	44		02/26/08 12:03
7440-70-2	Calcium, Total	240000	ug/L	1	500	40		02/26/08 12:03
7439-89-6	Iron, Total	24000	ug/L	1	20	5.7		02/26/08 12:03
7439-95-4	Magnesium, Total	130000	ug/L	1	500	38		02/26/08 12:03
7440-09-7	Potassium, Total	9700	ug/L	1	200	54		02/28/08 04:49
7440-23-5	Sodium, Total	56000	ug/L	1	500	84		02/26/08 17:03

02458

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 15:30
Solids: 0.00
Laboratory ID: 0802207-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/20/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801814

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 19:45
7440-70-2	Calcium, Dissolved	160000	ug/L	1	500	40		02/26/08 14:25
7439-89-6	Iron, Dissolved	31	ug/L	1	20	5.7		02/26/08 14:25
7439-95-4	Magnesium, Dissolved	89000	ug/L	1	500	38		02/26/08 14:25
7440-09-7	Potassium, Dissolved	5100	ug/L	1	200	54		02/28/08 02:04
7440-23-5	Sodium, Dissolved	54000	ug/L	1	500	84		02/26/08 19:45

02459

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 09:45
Solids: 0.00
Laboratory ID: 0802208-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	180	ug/L	1	200	44	J	02/26/08 12:06
7440-70-2	Calcium, Total	260000	ug/L	1	500	40		02/26/08 12:06
7439-89-6	Iron, Total	320	ug/L	1	20	5.7		02/26/08 12:06
7439-95-4	Magnesium, Total	48000	ug/L	1	500	38		02/26/08 12:06
7440-09-7	Potassium, Total	1100	ug/L	1	200	54		02/28/08 04:53
7440-23-5	Sodium, Total	110000	ug/L	1	500	84		02/26/08 17:07

02460

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

37MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 09:45
Solids: 0.00
Laboratory ID: 0802208-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/20/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801814

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 19:50
7440-70-2	Calcium, Dissolved	260000	ug/L	1	500	40		02/26/08 14:28
7439-89-6	Iron, Dissolved	20	ug/L	1	20	5.7	U	02/26/08 14:28
7439-95-4	Magnesium, Dissolved	47000	ug/L	1	500	38		02/26/08 14:28
7440-09-7	Potassium, Dissolved	1100	ug/L	1	200	54		02/28/08 02:09
7440-23-5	Sodium, Dissolved	110000	ug/L	1	500	84		02/26/08 19:50

02461

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 11:40
Solids: 0.00
Laboratory ID: 0802208-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	120	ug/L	1	200	44	J	02/26/08 12:10
7440-70-2	Calcium, Total	150000	ug/L	1	500	40		02/26/08 12:10
7439-89-6	Iron, Total	340	ug/L	1	20	5.7		02/26/08 12:10
7439-95-4	Magnesium, Total	48000	ug/L	1	500	38		02/26/08 12:10
7440-09-7	Potassium, Total	750	ug/L	1	200	54		02/28/08 04:58
7440-23-5	Sodium, Total	16000	ug/L	1	500	84		02/26/08 17:12

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 11:40
Solids: 0.00
Laboratory ID: 0802208-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/20/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801814

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 19:55
7440-70-2	Calcium, Dissolved	150000	ug/L	1	500	40		02/26/08 14:32
7439-89-6	Iron, Dissolved	11	ug/L	1	20	5.7	J	02/26/08 14:32
7439-95-4	Magnesium, Dissolved	51000	ug/L	1	500	38		02/26/08 14:32
7440-09-7	Potassium, Dissolved	770	ug/L	1	200	54		02/28/08 02:14
7440-23-5	Sodium, Dissolved	16000	ug/L	1	500	84		02/26/08 19:55

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 14:40
Solids: 0.00
Laboratory ID: 0802208-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	93	ug/L	1	200	44	J	02/26/08 12:13
7440-70-2	Calcium, Total	91000	ug/L	1	500	40		02/26/08 12:13
7439-89-6	Iron, Total	540	ug/L	1	20	5.7		02/26/08 12:13
7439-95-4	Magnesium, Total	23000	ug/L	1	500	38		02/26/08 12:13
7440-09-7	Potassium, Total	740	ug/L	1	200	54		02/28/08 05:03
7440-23-5	Sodium, Total	13000	ug/L	1	500	84		02/26/08 17:17

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 14:40
Solids: 0.00
Laboratory ID: 0802208-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/20/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801814

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 20:00
7440-70-2	Calcium, Dissolved	89000	ug/L	1	500	40		02/26/08 14:35
7439-89-6	Iron, Dissolved	9.7	ug/L	1	20	5.7	J	02/26/08 14:35
7439-95-4	Magnesium, Dissolved	22000	ug/L	1	500	38		02/26/08 14:35
7440-09-7	Potassium, Dissolved	630	ug/L	1	200	54		02/28/08 02:19
7440-23-5	Sodium, Dissolved	13000	ug/L	1	500	84		02/26/08 20:00

02465

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 10:10
Solids: 0.00
Laboratory ID: 0802262-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3010A Digestion
Prepared: 02/18/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801783

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Total	1900	ug/L	1	200	44		02/26/08 12:17
7440-70-2	Calcium, Total	120000	ug/L	1	500	40		02/26/08 12:17
7439-89-6	Iron, Total	5500	ug/L	1	20	5.7		02/26/08 12:17
7439-95-4	Magnesium, Total	33000	ug/L	1	500	38		02/26/08 12:17
7440-09-7	Potassium, Total	1900	ug/L	1	200	54		02/28/08 05:07
7440-23-5	Sodium, Total	8900	ug/L	1	500	84		02/26/08 17:21

INORGANIC ANALYSIS DATA SHEET
USEPA-6010B

38MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 10:10
Solids: 0.00
Laboratory ID: 0802262-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/20/08 07:30
Initial/Final: 25 mL / 25 mL
QC Batch: 0801814

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7429-90-5	Aluminum, Dissolved	200	ug/L	1	200	44	U	02/26/08 20:05
7440-70-2	Calcium, Dissolved	120000	ug/L	1	500	40		02/26/08 14:39
7439-89-6	Iron, Dissolved	20	ug/L	1	20	5.7	U	02/26/08 14:39
7439-95-4	Magnesium, Dissolved	30000	ug/L	1	500	38		02/26/08 14:39
7440-09-7	Potassium, Dissolved	1200	ug/L	1	200	54		02/28/08 02:33
7440-23-5	Sodium, Dissolved	8800	ug/L	1	500	84		02/26/08 20:05

02467

SAMPLE ID SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-50

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Client Sample Id:	Lab Sample Id:
35MW2	0802167-01
35MW1	0802167-03
35 D-2	0802204-01
DUP-7	0802204-02
35 D-4	0802204-04
EQBK-5	0802204-05
37MW1	0802207-01
37MW2	0802207-03
37MW3	0802208-01
38MW1	0802208-03
38MW2	0802208-04
38MW3	0802262-01

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 13:50
Solids: 0.00
Laboratory ID: 0802167-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	0.69	ug/L	1	3.0	0.44	J	02/21/08 13:25
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	02/21/08 13:25
7440-39-3	Barium, Total	48	ug/L	1	2.0	0.52		02/21/08 13:25
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/21/08 13:25
7440-43-9	Cadmium, Total	0.064	ug/L	1	0.20	0.062	J	02/21/08 13:25
7440-47-3	Chromium, Total	5.2	ug/L	1	2.0	0.31		02/22/08 18:37
7440-48-4	Cobalt, Total	1.9	ug/L	1	1.0	0.096		02/21/08 13:25
7440-50-8	Copper, Total	2.0	ug/L	1	1.0	0.33		02/21/08 13:25
7439-92-1	Lead, Total	0.41	ug/L	1	1.0	0.33	J	02/21/08 13:25
7439-96-5	Manganese, Total	21	ug/L	1	3.0	0.43		02/21/08 13:25
7440-02-0	Nickel, Total	3.1	ug/L	1	2.0	0.28		02/21/08 13:25
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 13:25
7440-22-4	Silver, Total	0.12	ug/L	1	0.50	0.12	J	02/21/08 13:25
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 13:25
7440-62-2	Vanadium, Total	1.1	ug/L	1	5.0	0.83	J	02/22/08 18:37
7440-66-6	Zinc, Total	15	ug/L	1	10	0.84		02/21/08 13:25

B, 0

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 13:50
Solids: 0.00
Laboratory ID: 0802167-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/18/08 13:38
Initial/Final: 25 mL / 125 mL
QC Batch: 0801815

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Dissolved	3.0	ug/L	1	3.0	0.44	U	02/22/08 11:12
7440-38-2	Arsenic, Dissolved	3.0	ug/L	1	3.0	0.74	U	02/21/08 16:05
7440-39-3	Barium, Dissolved	43	ug/L	1	2.0	0.52		02/21/08 16:05
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/22/08 11:12
7440-43-9	Cadmium, Dissolved	0.20	ug/L	1	0.20	0.062	U	02/21/08 16:05
7440-47-3	Chromium, Dissolved	1.5	ug/L	1	2.0	0.31	J	02/22/08 19:34 B,P
7440-48-4	Cobalt, Dissolved	0.72	ug/L	1	1.0	0.096	J	02/21/08 16:05
7440-50-8	Copper, Dissolved	1.2	ug/L	1	1.0	0.33		02/22/08 11:12
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/21/08 16:05
7439-96-5	Manganese, Dissolved	16	ug/L	1	3.0	0.43		02/22/08 11:12
7440-02-0	Nickel, Dissolved	2.4	ug/L	1	2.0	0.28		02/21/08 16:05 B,P
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 16:05
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 16:05
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/21/08 16:05
7440-62-2	Vanadium, Dissolved	1.1	ug/L	1	5.0	0.83	J	02/22/08 11:12

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 13:50
Solids: 0.00
Laboratory ID: 0802167-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/25/08 16:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0802168

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-66-6	Zinc, Dissolved	9.2	ug/L	1	10	0.84	J	02/27/08 11:03

B, P

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 16:20
Solids: 0.00
Laboratory ID: 0802167-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/21/08 13:38	
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	02/21/08 13:38	
7440-39-3	Barium, Total	100	ug/L	1	2.0	0.52		02/21/08 13:38	
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/21/08 13:38	
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	02/21/08 13:38	
7440-47-3	Chromium, Total	4.9	ug/L	1	2.0	0.31		02/22/08 18:39	
7440-48-4	Cobalt, Total	2.2	ug/L	1	1.0	0.096		02/21/08 13:38	
7440-50-8	Copper, Total	0.85	ug/L	1	1.0	0.33	J	02/21/08 13:38	
7439-92-1	Lead, Total	0.33	ug/L	1	1.0	0.33	J	02/21/08 13:38	
7439-96-5	Manganese, Total	81	ug/L	1	3.0	0.43		02/21/08 13:38	
7440-02-0	Nickel, Total	3.3	ug/L	1	2.0	0.28		02/21/08 13:38	
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 13:38	
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 13:38	
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 13:38	
7440-62-2	Vanadium, Total	1.4	ug/L	1	5.0	0.83	J	02/22/08 18:39	
7440-66-6	Zinc, Total	9.8	ug/L	1	10	0.84	J	02/21/08 13:38	B,P

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 16:20
Solids: 0.00
Laboratory ID: 0802167-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/18/08 13:38
Initial/Final: 25 mL / 125 mL
QC Batch: 0801815

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Dissolved	3.0	ug/L	1	3.0	0.44	U	02/22/08 11:24	
7440-38-2	Arsenic, Dissolved	3.0	ug/L	1	3.0	0.74	U	02/21/08 16:17	
7440-39-3	Barium, Dissolved	95	ug/L	1	2.0	0.52		02/21/08 16:17	
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/22/08 11:24	
7440-43-9	Cadmium, Dissolved	0.20	ug/L	1	0.20	0.062	U	02/21/08 16:17	
7440-47-3	Chromium, Dissolved	1.2	ug/L	1	2.0	0.31	J	02/22/08 19:37	B1P
7440-48-4	Cobalt, Dissolved	1.4	ug/L	1	1.0	0.096		02/21/08 16:17	
7440-50-8	Copper, Dissolved	0.52	ug/L	1	1.0	0.33	J	02/22/08 11:24	
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/21/08 16:17	
7439-96-5	Manganese, Dissolved	91	ug/L	1	3.0	0.43		02/22/08 11:24	
7440-02-0	Nickel, Dissolved	2.4	ug/L	1	2.0	0.28		02/21/08 16:17	B1P
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 16:17	
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 16:17	
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/21/08 16:17	
7440-62-2	Vanadium, Dissolved	1.1	ug/L	1	5.0	0.83	J	02/22/08 11:24	

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 16:20
Solids: 0.00
Laboratory ID: 0802167-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/25/08 16:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0802168

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-66-6	Zinc, Dissolved	8.8	ug/L	1	10	0.84	J	02/27/08 11:05

B 1P

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35 D-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 09:45
Solids: 0.00
Laboratory ID: 0802204-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/21/08 13:42	
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	02/21/08 13:42	
7440-39-3	Barium, Total	130	ug/L	1	2.0	0.52		02/21/08 13:42	
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/21/08 13:42	
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	02/21/08 13:42	
7440-47-3	Chromium, Total	1.6	ug/L	1	2.0	0.31	J	02/22/08 18:41	B, X
7440-48-4	Cobalt, Total	0.63	ug/L	1	1.0	0.096	J	02/21/08 13:42	
7440-50-8	Copper, Total	0.71	ug/L	1	1.0	0.33	J	02/21/08 13:42	
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	02/21/08 13:42	
7439-96-5	Manganese, Total	150	ug/L	1	3.0	0.43		02/21/08 13:42	
7440-02-0	Nickel, Total	1.6	ug/L	1	2.0	0.28	J	02/21/08 13:42	B, X
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 13:42	
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 13:42	
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 13:42	
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	02/22/08 18:41	
7440-66-6	Zinc, Total	15	ug/L	1	10	0.84		02/21/08 13:42	

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35 D-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 09:45
Solids: 0.00
Laboratory ID: 0802204-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/18/08 13:38
Initial/Final: 25 mL / 125 mL
QC Batch: 0801815

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Dissolved	3.0	ug/L	1	3.0	0.44	U	02/22/08 11:28	
7440-38-2	Arsenic, Dissolved	3.0	ug/L	1	3.0	0.74	U	02/21/08 16:21	
7440-39-3	Barium, Dissolved	120	ug/L	1	2.0	0.52		02/21/08 16:21	
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/22/08 11:28	
7440-43-9	Cadmium, Dissolved	0.20	ug/L	1	0.20	0.062	U	02/21/08 16:21	
7440-47-3	Chromium, Dissolved	1.6	ug/L	1	2.0	0.31	J	02/22/08 19:39	B,P
7440-48-4	Cobalt, Dissolved	0.76	ug/L	1	1.0	0.096	J	02/21/08 16:21	
7440-50-8	Copper, Dissolved	1.1	ug/L	1	1.0	0.33		02/22/08 11:28	
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/21/08 16:21	
7439-96-5	Manganese, Dissolved	160	ug/L	1	3.0	0.43		02/22/08 11:28	
7440-02-0	Nickel, Dissolved	1.6	ug/L	1	2.0	0.28	J	02/21/08 16:21	B,P
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 16:21	
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 16:21	
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/21/08 16:21	
7440-62-2	Vanadium, Dissolved	5.0	ug/L	1	5.0	0.83	U	02/22/08 11:28	

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35 D-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 09:45
Solids: 0.00
Laboratory ID: 0802204-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/25/08 16:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0802168

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-66-6	Zinc, Dissolved	24	ug/L	1	10	0.84		02/27/08 11:07

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 00:00
Solids: 0.00
Laboratory ID: 0802204-02

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/21/08 13:46	
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	02/21/08 13:46	
7440-39-3	Barium, Total	130	ug/L	1	2.0	0.52		02/21/08 13:46	
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/21/08 13:46	
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	02/21/08 13:46	
7440-47-3	Chromium, Total	1.5	ug/L	1	2.0	0.31	J	02/22/08 18:44	B3X
7440-48-4	Cobalt, Total	0.63	ug/L	1	1.0	0.096	J	02/21/08 13:46	
7440-50-8	Copper, Total	1.1	ug/L	1	1.0	0.33		02/21/08 13:46	
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	02/21/08 13:46	
7439-96-5	Manganese, Total	150	ug/L	1	3.0	0.43		02/21/08 13:46	
7440-02-0	Nickel, Total	1.5	ug/L	1	2.0	0.28	J	02/21/08 13:46	B3X
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 13:46	
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 13:46	
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 13:46	
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	02/22/08 18:44	
7440-66-6	Zinc, Total	12	ug/L	1	10	0.84		02/21/08 13:46	B1P

02963

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 00:00
Solids: 0.00
Laboratory ID: 0802204-02

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/18/08 13:38
Initial/Final: 25 mL / 125 mL
QC Batch: 0801815

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Dissolved	3.0	ug/L	1	3.0	0.44	U	02/22/08 11:31	
7440-38-2	Arsenic, Dissolved	3.0	ug/L	1	3.0	0.74	U	02/21/08 16:26	
7440-39-3	Barium, Dissolved	120	ug/L	1	2.0	0.52		02/21/08 16:26	
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/22/08 11:31	
7440-43-9	Cadmium, Dissolved	0.20	ug/L	1	0.20	0.062	U	02/21/08 16:26	
7440-47-3	Chromium, Dissolved	0.89	ug/L	1	2.0	0.31	J	02/22/08 19:41	B P
7440-48-4	Cobalt, Dissolved	0.54	ug/L	1	1.0	0.096	J	02/21/08 16:26	
7440-50-8	Copper, Dissolved	2.7	ug/L	1	1.0	0.33		02/22/08 11:31	
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/21/08 16:26	
7439-96-5	Manganese, Dissolved	160	ug/L	1	3.0	0.43		02/22/08 11:31	
7440-02-0	Nickel, Dissolved	1.4	ug/L	1	2.0	0.28	J	02/21/08 16:26	B P
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 16:26	
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 16:26	
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/21/08 16:26	
7440-62-2	Vanadium, Dissolved	5.0	ug/L	1	5.0	0.83	U	02/22/08 11:31	

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 00:00
Solids: 0.00
Laboratory ID: 0802204-02

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/25/08 16:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0802168

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-66-6	Zinc, Dissolved	13	ug/L	1	10	0.84		02/27/08 11:14

B P

02965

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35 D-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 12:00
Solids: 0.00
Laboratory ID: 0802204-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/21/08 13:51	
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	02/21/08 13:51	
7440-39-3	Barium, Total	120	ug/L	1	2.0	0.52		02/21/08 13:51	
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/21/08 13:51	
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	02/21/08 13:51	
7440-47-3	Chromium, Total	3.8	ug/L	1	2.0	0.31		02/22/08 18:46	
7440-48-4	Cobalt, Total	0.66	ug/L	1	1.0	0.096	J	02/21/08 13:51	
7440-50-8	Copper, Total	0.74	ug/L	1	1.0	0.33	J	02/21/08 13:51	
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	02/21/08 13:51	
7439-96-5	Manganese, Total	1.5	ug/L	1	3.0	0.43	J	02/21/08 13:51	
7440-02-0	Nickel, Total	1.7	ug/L	1	2.0	0.28	J	02/21/08 13:51	B,X
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 13:51	
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 13:51	
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 13:51	
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	02/22/08 18:46	
7440-66-6	Zinc, Total	8.7	ug/L	1	10	0.84	J	02/21/08 13:51	B,P

02966

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35 D-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 12:00
Solids: 0.00
Laboratory ID: 0802204-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/18/08 13:38
Initial/Final: 25 mL / 125 mL
QC Batch: 0801815

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Dissolved	3.0	ug/L	1	3.0	0.44	U	02/22/08 11:35
7440-38-2	Arsenic, Dissolved	3.0	ug/L	1	3.0	0.74	U	02/21/08 16:30
7440-39-3	Barium, Dissolved	110	ug/L	1	2.0	0.52		02/21/08 16:30
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/22/08 11:35
7440-43-9	Cadmium, Dissolved	0.12	ug/L	1	0.20	0.062	J	02/21/08 16:30
7440-47-3	Chromium, Dissolved	2.9	ug/L	1	2.0	0.31		02/22/08 19:43
7440-48-4	Cobalt, Dissolved	0.68	ug/L	1	1.0	0.096	J	02/21/08 16:30
7440-50-8	Copper, Dissolved	1.8	ug/L	1	1.0	0.33		02/22/08 11:35
7439-92-1	Lead, Dissolved	0.94	ug/L	1	1.0	0.33	J	02/21/08 16:30
7439-96-5	Manganese, Dissolved	0.87	ug/L	1	3.0	0.43	J	02/22/08 11:35
7440-02-0	Nickel, Dissolved	1.3	ug/L	1	2.0	0.28	J	02/21/08 16:30
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 16:30
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 16:30
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/21/08 16:30
7440-62-2	Vanadium, Dissolved	5.0	ug/L	1	5.0	0.83	U	02/22/08 11:35

B|P

02967

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

35 D-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 12:00
Solids: 0.00
Laboratory ID: 0802204-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/25/08 16:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0802168

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-66-6	Zinc, Dissolved	7.8	ug/L	1	10	0.84	J	02/27/08 11:16

B,P

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

EQBK-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 14:00
Solids: 0.00
Laboratory ID: 0802204-05

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Total	0.84	ug/L	1	3.0	0.44	J	02/21/08 14:45	B,O
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	02/21/08 14:45	
7440-39-3	Barium, Total	2.0	ug/L	1	2.0	0.52	U	02/21/08 14:45	
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/21/08 14:45	
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	02/21/08 14:45	
7440-47-3	Chromium, Total	0.61	ug/L	1	2.0	0.31	J	02/22/08 19:09	
7440-48-4	Cobalt, Total	1.0	ug/L	1	1.0	0.096	U	02/21/08 14:45	
7440-50-8	Copper, Total	1.0	ug/L	1	1.0	0.33	U	02/21/08 14:45	
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	02/21/08 14:45	
7439-96-5	Manganese, Total	3.0	ug/L	1	3.0	0.43	U	02/21/08 14:45	
7440-02-0	Nickel, Total	0.41	ug/L	1	2.0	0.28	J	02/21/08 14:45	
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 14:45	
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 14:45	
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 14:45	
7440-62-2	Vanadium, Total	5.0	ug/L	1	5.0	0.83	U	02/22/08 19:09	
7440-66-6	Zinc, Total	4.0	ug/L	1	10	0.84	J	02/21/08 14:45	B,P

02969

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 12:50
Solids: 0.00
Laboratory ID: 0802207-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/21/08 14:57
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	02/21/08 14:57
7440-39-3	Barium, Total	42	ug/L	1	2.0	0.52		02/21/08 14:57
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/21/08 14:57
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	02/21/08 14:57
7440-47-3	Chromium, Total	8.1	ug/L	1	2.0	0.31		02/22/08 19:11
7440-48-4	Cobalt, Total	2.2	ug/L	1	1.0	0.096		02/21/08 14:57
7440-50-8	Copper, Total	1.3	ug/L	1	1.0	0.33		02/21/08 14:57
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	02/21/08 14:57
7439-96-5	Manganese, Total	52	ug/L	1	3.0	0.43		02/21/08 14:57
7440-02-0	Nickel, Total	2.4	ug/L	1	2.0	0.28		02/21/08 14:57
7782-49-2	Selenium, Total	1.6	ug/L	1	3.0	0.92	J	02/21/08 14:57
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 14:57
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 14:57
7440-62-2	Vanadium, Total	0.85	ug/L	1	5.0	0.83	J	02/22/08 19:11
7440-66-6	Zinc, Total	9.1	ug/L	1	10	0.84	J	02/21/08 14:57

B | P

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 12:50
Solids: 0.00
Laboratory ID: 0802207-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/18/08 13:38
Initial/Final: 25 mL / 125 mL
QC Batch: 0801815

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Dissolved	3.0	ug/L	1	3.0	0.44	U	02/22/08 12:26
7440-38-2	Arsenic, Dissolved	3.0	ug/L	1	3.0	0.74	U	02/21/08 17:00
7440-39-3	Barium, Dissolved	35	ug/L	1	2.0	0.52		02/21/08 17:00
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/22/08 12:26
7440-43-9	Cadmium, Dissolved	0.20	ug/L	1	0.20	0.062	U	02/21/08 17:00
7440-47-3	Chromium, Dissolved	5.9	ug/L	1	2.0	0.31		02/22/08 19:55
7440-48-4	Cobalt, Dissolved	0.97	ug/L	1	1.0	0.096	J	02/21/08 17:00
7440-50-8	Copper, Dissolved	1.0	ug/L	1	1.0	0.33		02/22/08 12:26
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/21/08 17:00
7439-96-5	Manganese, Dissolved	2.3	ug/L	1	3.0	0.43	J	02/22/08 12:26
7440-02-0	Nickel, Dissolved	1.3	ug/L	1	2.0	0.28	J	02/21/08 17:00
7782-49-2	Selenium, Dissolved	1.2	ug/L	1	3.0	0.92	J	02/21/08 17:00
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 17:00
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/21/08 17:00
7440-62-2	Vanadium, Dissolved	5.0	ug/L	1	5.0	0.83	U	02/22/08 12:26

B, P

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 12:50
Solids: 0.00
Laboratory ID: 0802207-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/25/08 16:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0802168

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-66-6	Zinc, Dissolved	15	ug/L	1	10	0.84		02/27/08 11:27

B IP

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 15:30
Solids: 0.00
Laboratory ID: 0802207-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/21/08 15:02
7440-38-2	Arsenic, Total	3.9	ug/L	1	3.0	0.74		02/21/08 15:02
7440-39-3	Barium, Total	1300	ug/L	5	10	2.6		02/22/08 15:21
7440-41-7	Beryllium, Total	0.73	ug/L	1	2.0	0.31	J	02/21/08 15:02
7440-43-9	Cadmium, Total	0.097	ug/L	1	0.20	0.062	J	02/21/08 15:02
7440-47-3	Chromium, Total	80	ug/L	1	2.0	0.31		02/22/08 19:13
7440-48-4	Cobalt, Total	12	ug/L	1	1.0	0.096		02/21/08 15:02
7440-50-8	Copper, Total	8.4	ug/L	1	1.0	0.33		02/21/08 15:02
7439-92-1	Lead, Total	5.4	ug/L	1	1.0	0.33		02/21/08 15:02
7439-96-5	Manganese, Total	710	ug/L	2	6.0	0.86		02/22/08 15:25
7440-02-0	Nickel, Total	62	ug/L	1	2.0	0.28		02/21/08 15:02
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 15:02
7440-22-4	Silver, Total	0.32	ug/L	1	0.50	0.12	J	02/21/08 15:02
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 15:02
7440-62-2	Vanadium, Total	24	ug/L	1	5.0	0.83		02/22/08 19:13
7440-66-6	Zinc, Total	36	ug/L	1	10	0.84		02/21/08 15:02

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 15:30
Solids: 0.00
Laboratory ID: 0802207-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/18/08 13:38
Initial/Final: 25 mL / 125 mL
QC Batch: 0801815

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Dissolved	0.54	ug/L	1	3.0	0.44	J	02/22/08 12:38	B,O
7440-38-2	Arsenic, Dissolved	3.0	ug/L	1	3.0	0.74	U	02/21/08 17:37	
7440-39-3	Barium, Dissolved	28	ug/L	1	2.0	0.52		02/21/08 17:37	
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/22/08 12:38	
7440-43-9	Cadmium, Dissolved	0.20	ug/L	1	0.20	0.062	U	02/21/08 17:37	
7440-47-3	Chromium, Dissolved	2.4	ug/L	1	2.0	0.31		02/22/08 20:02	B,P
7440-48-4	Cobalt, Dissolved	8.9	ug/L	1	1.0	0.096		02/21/08 17:37	
7440-50-8	Copper, Dissolved	1.3	ug/L	1	1.0	0.33		02/22/08 12:38	
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/21/08 17:37	
7439-96-5	Manganese, Dissolved	260	ug/L	1	3.0	0.43		02/22/08 12:38	
7440-02-0	Nickel, Dissolved	28	ug/L	1	2.0	0.28		02/21/08 17:37	
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 17:37	
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 17:37	
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/21/08 17:37	
7440-62-2	Vanadium, Dissolved	1.7	ug/L	1	5.0	0.83	J	02/22/08 12:38	

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 15:30
Solids: 0.00
Laboratory ID: 0802207-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/25/08 16:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0802168

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-66-6	Zinc, Dissolved	20	ug/L	1	10	0.84		02/27/08 11:29

BP

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 09:45
Solids: 0.00
Laboratory ID: 0802208-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/21/08 15:06	
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	02/21/08 15:06	
7440-39-3	Barium, Total	16	ug/L	1	2.0	0.52		02/21/08 15:06	
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/21/08 15:06	
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	02/21/08 15:06	
7440-47-3	Chromium, Total	2.7	ug/L	1	2.0	0.31		02/22/08 19:16	B,X
7440-48-4	Cobalt, Total	1.6	ug/L	1	1.0	0.096		02/21/08 15:06	
7440-50-8	Copper, Total	2.3	ug/L	1	1.0	0.33		02/21/08 15:06	
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	02/21/08 15:06	
7439-96-5	Manganese, Total	22	ug/L	1	3.0	0.43		02/21/08 15:06	
7440-02-0	Nickel, Total	3.7	ug/L	1	2.0	0.28		02/21/08 15:06	
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 15:06	
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 15:06	
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 15:06	
7440-62-2	Vanadium, Total	0.98	ug/L	1	5.0	0.83	J	02/22/08 19:16	
7440-66-6	Zinc, Total	7.9	ug/L	1	10	0.84	J	02/21/08 15:06	B,P

02976

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 09:45
Solids: 0.00
Laboratory ID: 0802208-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/18/08 13:38
Initial/Final: 25 mL / 125 mL
QC Batch: 0801815

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Dissolved	3.0	ug/L	1	3.0	0.44	U	02/22/08 12:42
7440-38-2	Arsenic, Dissolved	3.0	ug/L	1	3.0	0.74	U	02/21/08 17:41
7440-39-3	Barium, Dissolved	12	ug/L	1	2.0	0.52		02/21/08 17:41
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/22/08 12:42
7440-43-9	Cadmium, Dissolved	0.20	ug/L	1	0.20	0.062	U	02/21/08 17:41
7440-47-3	Chromium, Dissolved	1.5	ug/L	1	2.0	0.31	J	02/22/08 20:04 B I P
7440-48-4	Cobalt, Dissolved	1.4	ug/L	1	1.0	0.096		02/21/08 17:41
7440-50-8	Copper, Dissolved	1.6	ug/L	1	1.0	0.33		02/22/08 12:42
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/22/08 12:42
7439-96-5	Manganese, Dissolved	3.7	ug/L	1	3.0	0.43		02/22/08 12:42
7440-02-0	Nickel, Dissolved	3.7	ug/L	1	2.0	0.28		02/21/08 17:41
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 17:41
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 17:41
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/22/08 12:42
7440-62-2	Vanadium, Dissolved	5.0	ug/L	1	5.0	0.83	U	02/22/08 12:42

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

37MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 09:45
Solids: 0.00
Laboratory ID: 0802208-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/25/08 16:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0802168

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-66-6	Zinc, Dissolved	7.4	ug/L	1	10	0.84	J	02/27/08 11:32

B1P

02978

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 11:40
Solids: 0.00
Laboratory ID: 0802208-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/21/08 15:10
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	02/21/08 15:10
7440-39-3	Barium, Total	51	ug/L	1	2.0	0.52		02/21/08 15:10
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/21/08 15:10
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	02/21/08 15:10
7440-47-3	Chromium, Total	3.3	ug/L	1	2.0	0.31		02/22/08 19:18
7440-48-4	Cobalt, Total	1.8	ug/L	1	1.0	0.096		02/21/08 15:10
7440-50-8	Copper, Total	1.0	ug/L	1	1.0	0.33		02/21/08 15:10
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	02/21/08 15:10
7439-96-5	Manganese, Total	50	ug/L	1	3.0	0.43		02/21/08 15:10
7440-02-0	Nickel, Total	2.6	ug/L	1	2.0	0.28		02/21/08 15:10
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 15:10
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 15:10
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 15:10
7440-62-2	Vanadium, Total	0.86	ug/L	1	5.0	0.83	J	02/22/08 19:18
7440-66-6	Zinc, Total	6.8	ug/L	1	10	0.84	J	02/21/08 15:10

BP

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 11:40
Solids: 0.00
Laboratory ID: 0802208-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/18/08 13:38
Initial/Final: 25 mL / 125 mL
QC Batch: 0801815

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Dissolved	3.0	ug/L	1	3.0	0.44	U	02/22/08 12:46
7440-38-2	Arsenic, Dissolved	3.0	ug/L	1	3.0	0.74	U	02/21/08 17:46
7440-39-3	Barium, Dissolved	47	ug/L	1	2.0	0.52		02/21/08 17:46
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/22/08 12:46
7440-43-9	Cadmium, Dissolved	0.20	ug/L	1	0.20	0.062	U	02/21/08 17:46
7440-47-3	Chromium, Dissolved	1.6	ug/L	1	2.0	0.31	J	02/22/08 20:06 B,P
7440-48-4	Cobalt, Dissolved	2.2	ug/L	1	1.0	0.096		02/21/08 17:46
7440-50-8	Copper, Dissolved	1.1	ug/L	1	1.0	0.33		02/22/08 12:46
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/21/08 17:46
7439-96-5	Manganese, Dissolved	36	ug/L	1	3.0	0.43		02/22/08 12:46
7440-02-0	Nickel, Dissolved	3.0	ug/L	1	2.0	0.28		02/21/08 17:46
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 17:46
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 17:46
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/21/08 17:46
7440-62-2	Vanadium, Dissolved	5.0	ug/L	1	5.0	0.83	U	02/22/08 12:46

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 11:40
Solids: 0.00
Laboratory ID: 0802208-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/25/08 16:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0802168

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-66-6	Zinc, Dissolved	12	ug/L	1	10	0.84		02/27/08 11:35	B|P

02981

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 14:40
Solids: 0.00
Laboratory ID: 0802208-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/21/08 15:15	
7440-38-2	Arsenic, Total	3.0	ug/L	1	3.0	0.74	U	02/21/08 15:15	
7440-39-3	Barium, Total	37	ug/L	1	2.0	0.52		02/21/08 15:15	
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/21/08 15:15	
7440-43-9	Cadmium, Total	0.20	ug/L	1	0.20	0.062	U	02/21/08 15:15	
7440-47-3	Chromium, Total	1.9	ug/L	1	2.0	0.31	J	02/22/08 19:20	B,X
7440-48-4	Cobalt, Total	1.2	ug/L	1	1.0	0.096		02/21/08 15:15	
7440-50-8	Copper, Total	1.2	ug/L	1	1.0	0.33		02/21/08 15:15	
7439-92-1	Lead, Total	1.0	ug/L	1	1.0	0.33	U	02/21/08 15:15	
7439-96-5	Manganese, Total	26	ug/L	1	3.0	0.43		02/21/08 15:15	
7440-02-0	Nickel, Total	1.2	ug/L	1	2.0	0.28	J	02/21/08 15:15	B,X
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 15:15	
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 15:15	
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 15:15	
7440-62-2	Vanadium, Total	0.86	ug/L	1	5.0	0.83	J	02/22/08 19:20	
7440-66-6	Zinc, Total	6.6	ug/L	1	10	0.84	J	02/21/08 15:15	B,P

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 14:40
Solids: 0.00
Laboratory ID: 0802208-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/18/08 13:38
Initial/Final: 25 mL / 125 mL
QC Batch: 0801815

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed	
7440-36-0	Antimony, Dissolved	3.0	ug/L	1	3.0	0.44	U	02/22/08 12:49	
7440-38-2	Arsenic, Dissolved	3.0	ug/L	1	3.0	0.74	U	02/21/08 17:50	
7440-39-3	Barium, Dissolved	35	ug/L	1	2.0	0.52		02/21/08 17:50	
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/22/08 12:49	
7440-43-9	Cadmium, Dissolved	0.20	ug/L	1	0.20	0.062	U	02/21/08 17:50	
7440-47-3	Chromium, Dissolved	1.4	ug/L	1	2.0	0.31	J	02/22/08 20:09	B,P
7440-48-4	Cobalt, Dissolved	0.90	ug/L	1	1.0	0.096	J	02/21/08 17:50	
7440-50-8	Copper, Dissolved	0.99	ug/L	1	1.0	0.33	J	02/22/08 12:49	
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/21/08 17:50	
7439-96-5	Manganese, Dissolved	4.7	ug/L	1	3.0	0.43		02/22/08 12:49	
7440-02-0	Nickel, Dissolved	1.0	ug/L	1	2.0	0.28	J	02/21/08 17:50	B,P
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 17:50	
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 17:50	
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/21/08 17:50	
7440-62-2	Vanadium, Dissolved	5.0	ug/L	1	5.0	0.83	U	02/22/08 12:49	

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 14:40
Solids: 0.00
Laboratory ID: 0802208-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/25/08 16:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0802168

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-66-6	Zinc, Dissolved	6.9	ug/L	1	10	0.84	J	02/27/08 11:41

B1P

02984

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 10:10
Solids: 0.00
Laboratory ID: 0802262-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 02/18/08 07:35
Initial/Final: 25 mL / 125 mL
QC Batch: 0801785

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Total	3.0	ug/L	1	3.0	0.44	U	02/21/08 15:19
7440-38-2	Arsenic, Total	0.99	ug/L	1	3.0	0.74	J	02/21/08 15:19
7440-39-3	Barium, Total	100	ug/L	1	2.0	0.52		02/21/08 15:19
7440-41-7	Beryllium, Total	2.0	ug/L	1	2.0	0.31	U	02/27/08 10:21
7440-43-9	Cadmium, Total	0.12	ug/L	1	0.20	0.062	J	02/21/08 15:19
7440-47-3	Chromium, Total	9.2	ug/L	1	2.0	0.31		02/22/08 19:23
7440-48-4	Cobalt, Total	4.6	ug/L	1	1.0	0.096		02/21/08 15:19
7440-50-8	Copper, Total	4.4	ug/L	1	1.0	0.33		02/21/08 15:19
7439-92-1	Lead, Total	1.9	ug/L	1	1.0	0.33		02/21/08 15:19
7439-96-5	Manganese, Total	2600	ug/L	10	30	4.3		02/22/08 15:28
7440-02-0	Nickel, Total	11	ug/L	1	2.0	0.28		02/21/08 15:19
7782-49-2	Selenium, Total	3.0	ug/L	1	3.0	0.92	U	02/21/08 15:19
7440-22-4	Silver, Total	0.50	ug/L	1	0.50	0.12	U	02/21/08 15:19
7440-28-0	Thallium, Total	1.0	ug/L	1	1.0	0.17	U	02/21/08 15:19
7440-62-2	Vanadium, Total	5.8	ug/L	1	5.0	0.83		02/22/08 19:23
7440-66-6	Zinc, Total	18	ug/L	1	10	0.84		02/21/08 15:19

02985

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 10:10
Solids: 0.00
Laboratory ID: 0802262-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/18/08 13:38
Initial/Final: 25 mL / 125 mL
QC Batch: 0801815

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-36-0	Antimony, Dissolved	3.0	ug/L	1	3.0	0.44	U	02/22/08 12:53
7440-38-2	Arsenic, Dissolved	3.0	ug/L	1	3.0	0.74	U	02/21/08 17:54
7440-39-3	Barium, Dissolved	77	ug/L	1	2.0	0.52		02/21/08 17:54
7440-41-7	Beryllium, Dissolved	2.0	ug/L	1	2.0	0.31	U	02/22/08 12:53
7440-43-9	Cadmium, Dissolved	0.20	ug/L	1	0.20	0.062	U	02/21/08 17:54
7440-47-3	Chromium, Dissolved	1.4	ug/L	1	2.0	0.31	J	02/22/08 20:11 B1P
7440-48-4	Cobalt, Dissolved	2.2	ug/L	1	1.0	0.096		02/21/08 17:54
7440-50-8	Copper, Dissolved	1.0	ug/L	1	1.0	0.33		02/22/08 12:53
7439-92-1	Lead, Dissolved	1.0	ug/L	1	1.0	0.33	U	02/21/08 17:54
7439-96-5	Manganese, Dissolved	2400	ug/L	10	30	4.3		02/22/08 15:32
7440-02-0	Nickel, Dissolved	4.7	ug/L	1	2.0	0.28		02/21/08 17:54
7782-49-2	Selenium, Dissolved	3.0	ug/L	1	3.0	0.92	U	02/21/08 17:54
7440-22-4	Silver, Dissolved	0.50	ug/L	1	0.50	0.12	U	02/21/08 17:54
7440-28-0	Thallium, Dissolved	1.0	ug/L	1	1.0	0.17	U	02/21/08 17:54
7440-62-2	Vanadium, Dissolved	5.0	ug/L	1	5.0	0.83	U	02/22/08 12:53

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 10:10
Solids: 0.00
Laboratory ID: 0802262-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 02/25/08 16:30
Initial/Final: 25 mL / 125 mL
QC Batch: 0802168

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7440-66-6	Zinc, Dissolved	15	ug/L	1	10	0.84		02/27/08 11:43

B|P

02987

SAMPLE ID SUMMARY

USEPA-7470A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-50

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Client Sample Id:	Lab Sample Id:
35MW2	0802167-01
35MW1	0802167-03
35 D-2	0802204-01
DUP-7	0802204-02
35 D-4	0802204-04
EQBK-5	0802204-05
37MW1	0802207-01
37MW2	0802207-03
37MW3	0802208-01
38MW1	0802208-03
38MW2	0802208-04
38MW3	0802262-01

03637

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

35MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 13:50
Solids: 0.00
Laboratory ID: 0802167-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 10:48

03638

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

35MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 13:50
Solids: 0.00
Laboratory ID: 0802167-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Dissolved
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801948

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/21/08 12:23

03639

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

35MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 16:20
Solids: 0.00
Laboratory ID: 0802167-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 10:53

03640

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

35MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/07/08 16:20
Solids: 0.00
Laboratory ID: 0802167-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Dissolved
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801948

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/21/08 12:38

03641

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

35 D-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 09:45
Solids: 0.00
Laboratory ID: 0802204-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 10:58

03642

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

35 D-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 09:45
Solids: 0.00
Laboratory ID: 0802204-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Dissolved
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801948

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/21/08 12:43

03643

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 00:00
Solids: 0.00
Laboratory ID: 0802204-02

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 11:03

03644

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

DUP-7

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 00:00
Solids: 0.00
Laboratory ID: 0802204-02

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Dissolved
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801948

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/21/08 12:48

03645

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

35 D-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 12:00
Solids: 0.00
Laboratory ID: 0802204-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 11:08

03646

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

35 D-4

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 12:00
Solids: 0.00
Laboratory ID: 0802204-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Dissolved
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801948

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/21/08 12:53

03647

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

EQBK-5

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/08/08 14:00
Solids: 0.00
Laboratory ID: 0802204-05

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 11:23

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

37MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 12:50
Solids: 0.00
Laboratory ID: 0802207-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 11:38

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

37MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 12:50
Solids: 0.00
Laboratory ID: 0802207-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Dissolved
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801948

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/21/08 13:08

03650

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

37MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 15:30
Solids: 0.00
Laboratory ID: 0802207-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 11:43

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

37MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 15:30
Solids: 0.00
Laboratory ID: 0802207-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Dissolved
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801948

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/21/08 13:14

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

37MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 09:45
Solids: 0.00
Laboratory ID: 0802208-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 11:48

03653

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

37MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 09:45
Solids: 0.00
Laboratory ID: 0802208-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Dissolved
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801948

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/21/08 13:19

03654

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

38MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 11:40
Solids: 0.00
Laboratory ID: 0802208-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 11:53

03655

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

38MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 11:40
Solids: 0.00
Laboratory ID: 0802208-03

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Dissolved
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801948

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/21/08 13:24

03656

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

38MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 14:40
Solids: 0.00
Laboratory ID: 0802208-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 11:58

03657

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

38MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 14:40
Solids: 0.00
Laboratory ID: 0802208-04

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Dissolved
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801948

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/21/08 13:39

03658

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

38MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 10:10
Solids: 0.00
Laboratory ID: 0802262-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Total
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801947

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Total	0.20	ug/L	1	0.20	0.046	U	02/21/08 12:03

03659

INORGANIC ANALYSIS DATA SHEET
USEPA-7470A

38MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 10:10
Solids: 0.00
Laboratory ID: 0802262-01

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 7470A Digestion - Dissolved
Prepared: 02/20/08 16:00
Initial/Final: 30 mL / 30 mL
QC Batch: 0801948

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-97-6	Mercury, Dissolved	0.20	ug/L	1	0.20	0.046	U	02/21/08 13:44

03660

SDG CASE NARRATIVE

URS Corporation
RFAAP RAAP 10 RFI/CMS, WO 001

SDG Executive Summary

This case narrative applies to samples received on February 08, 2008 through February 15, 2008. All samples were scheduled for analysis in accordance with parameters outlined on the field chain of custody record, the TriMatrix bid form, and/or oral and written correspondence between URS Corporation and TriMatrix Laboratories, Inc..

Each sample receipt event was assigned a unique TriMatrix work order number. Sample receipt documentation is included in section A of this data package.

Project Technical Issues/Problems

Project-related data qualification designations and reporting conventions are included in Attachment 1 - *Project Technical Narrative*.

QA/QC Data Qualifications/Narrations

Quality assurance issues and/or quality control data qualifications and narrations related to the analysis and reporting of this SDG are presented in Attachment 2 - *Statement of Data Qualifications*. The absence of a statement page for a particular analyte group (*e.g.* Percent Solids) implies that no qualifying statements were generated for that analyte.

Data Review and Approval

All data was peer-reviewed by a second analyst, and then by appropriate data management staff against laboratory quality control requirements and project specifications. It was then reviewed and approved by the group supervisor/manager prior to further review by the project chemist.

Data Deliverables

The data deliverables, both hardcopy and/or electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. The EDD, if requested, will be issued separately from this hardcopy report. Hold time reports for each test procedure are presented following the CLP-like forms section of this report.

This report relates only to the sample(s) as received. Test results are in compliance with the requirements of the National Environmental Laboratory Accreditation Conference (NELAC). Estimates of analytical uncertainties for the test results contained within the report are available upon request.

Walter J. Roudebush, Project Chemist

3/13/08
Date

SDG CASE NARRATIVE

Attachment 1
Project Technical Narrative

Sample Result Reporting Convention

Sample results are reported as RL 'U' (e.g., 0.001 U) if the target analyte was not detected above the MDL. If a sample for an organic parameter is reanalyzed and also reported, the second analysis includes the suffix 'REn' where n = the first, second, etc. reanalysis. If a sample is reanalyzed for confirmation purposes, is confirmed and also reported, the second analysis includes the suffix 'RE1'. If the confirmation was not performed simultaneously, the second set of sample results is reported on a second Form 1 since that confirmation analysis did not occur at the same time and/or date.

Method Detection Limits, Target Analytes, and Reporting Limits

All method detection limits (MDL) for analytes in this report are compliant with the DoD QSM specification that each reporting limit (RL) employed is to be at least three times the MDL. In addition, no RL is less than the equivalent concentration of the lowest instrument calibration standard.

Quality Control Limits

Quality control limits specified in the DoD QSM were employed. For cases in which the analyte is not listed in the QSM, internal laboratory control limits were used.

Data Qualifier Designation

If applicable, a sample result is qualified with:

- a "U" flag if the analyte was not detected at a concentration greater than the MDL,
- a "B", "J", and/or an "E" flag as defined in the Variance section,
- a LIMS-generated statement of qualification. Qualifying statements, if any, will be found in Attachment 2 to this narrative.

QC Batch and Analytical Batch Designation

A Quality Control (QC) Batch is a seven digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation). Quality Control batches are limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.). Some batches may contain multiple sets of method blanks (BLK) and laboratory control samples (BS), where a set of method quality control analyses were prepared in concert with each set of samples on a given day.

An Analytical Batch (or Sequence) is a seven digit number that associates all samples analyzed as a set under one analytical sequence.

Variances

Data Qualifier Flags

Data qualifier flags other than those listed in the DoD QSM were employed or the definition of an existing flag was modified.

J – Estimated: the analyte was detected at a concentration greater than the limit of detection (i.e., MDL) but less than the reporting limit (i.e., MRL).

B – Blank contamination: The analyte was detected above one-half the reporting limit in an associated method blank. The same analyte in the sample was detected at less than five times the method blank concentration. (If a common laboratory contaminant is present in the method blank at a concentration greater than one-half the reporting limit but less than or equal to that reporting limit, any associated sample results are flagged but corrective action is not necessarily taken. A text qualifier is also associated with such a result.)

E – Exceeds calibration range: The analyte response exceeded the calibrated range of the instrument. (With the exception of metals for which only the final non-qualified result is reported, both the initial E-qualified result and final non-qualified result from reanalysis-at-dilution are reported.)

Text Qualifier

A LIMS-generated text qualifier is substituted for many instances in which the DoD QSM "Q" flag would otherwise apply. The text qualifiers are listed in a summary format by parameter with applicable samples identified.

Methods 6010B and 6020A

The acceptance criterion of < 2 x RL is substituted for < 2 x MDL for interference check solution ICS-A.

Project Correspondence

Any correspondence with the Client, and potentially any third parties also involved in the project, regarding sample receipt and/or analysis follows.

SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 0802167

TriMatrix Laboratories received the cooler(s) for this work order on February 08, 2008, at 09:00am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
35MW2	0802167-01	Ground Water	2/7/2008
Trip Blank	0802167-02	Water	2/7/2008
35MW1	0802167-03	Ground Water	2/7/2008

No administrative issues were encountered during the receipt and analysis of this work order.

SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 0802204

TriMatrix Laboratories received the cooler(s) for this work order on February 09, 2008, at 10:25am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
35 D-2	0802204-01	Ground Water	2/8/2008
DUP-7	0802204-02	Ground Water	2/8/2008
Trip Blank	0802204-03	Water	2/8/2008
35 D-4	0802204-04	Ground Water	2/8/2008
EQBK-5	0802204-05	Ground Water	2/8/2008

No administrative issues were encountered during the receipt and analysis of this work order.

SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 0802207

TriMatrix Laboratories received the cooler(s) for this work order on February 12, 2008, at 09:20am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
37MW1	0802207-01	Ground Water	2/11/2008
Trip Blank	0802207-02	Water	2/11/2008
37MW2	0802207-03	Ground Water	2/11/2008

No administrative issues were encountered during the receipt and analysis of this work order.

SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 0802208

TriMatrix Laboratories received the cooler(s) for this work order on February 13, 2008, at 09:30am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
37MW3	0802208-01	Ground Water	2/12/2008
Trip Blank	0802208-02	Water	2/12/2008
38MW1	0802208-03	Ground Water	2/12/2008
38MW2	0802208-04	Ground Water	2/12/2008

No administrative issues were encountered during the receipt and analysis of this work order.

SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 0802262

TriMatrix Laboratories received the cooler(s) for this work order on February 15, 2008, at 09:40am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
38MW3	0802262-01	Ground Water	2/13/2008

No administrative issues were encountered during the receipt and analysis of this work order.

DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: RA
Date: 3/14/08
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: RAAP 10
Project Number: 11165 6351
Laboratory: TriMatrix
SDG No.: 3CM40-50
Test Name: VOC
Method No.: 8260B

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?		✓	
	If the temperature of the cooler was elevated (> 10 °C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.			✓

Notes: It was noted by the lab that temps 10 °C for 35MW2, Trip Blank (2/7/08) and 35MW1 during storage. Pos L/h, NDs → UL/h, unless flagged for MB contamination

2.0 Holding Times		Yes	No	NA
2.1	Were samples preserved on ice for soils and on ice with HCL for aqueous samples?	✓		
2.2	Have any technical holding times (14 days), determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (every 12 hour period per GCMS, matrix, and level)?	✓		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample]≤ 5X[associated blank]. (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone)	✓		
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.	✓		
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	✓		

Notes: MB ⇒ acetone 249/L, toluene 0.084 g/L ≤ 10x, and ≤ 5x → B, Z
Trip blank ⇒ Chloromethane 0.27 ug/L, ~~toluene 0.29~~ and results ND, No action

URS

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?Are at least five standards included in the calibration curve?	✓		
4.2	Was an initial calibration analyzed at the beginning of each analysis?	✓		
4.3	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.4	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	✓		
4.5	Are all calibration standard %RSDs, correlation coefficient, or % drift within the control limits (%RSD <15%, r>0.995 or r^2>0.99; for 2° source: %D<+20%; and for CCC, %D < 20%)?		✓	
For initial calibration: %RSD > 15%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>20% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.6	Are any CCCs (chloroform, 1,1-DCE, 1,2-DCPA, ethylbenzene, toluene, and vinyl chloride) displaying an RSD greater than 30%? If yes, L(+)/R(-) all associated results.		✓	
4.7	Do any SPCC have an RRF low? (<0.10 for chloromethane, 1,1-dichloroethane, and bromoform or <0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane) If yes, L(+)/R(-) all associated results.		✓	

Notes: see cover memo

several %D's > 20% with a pos bias

all NDs, no action.

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	✓		
5.2	Have all samples been analyzed within twelve hours of the BFB tune? If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".	✓		
5.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag "R".	✓		

Notes:

URS

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			✓
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm			
6.3	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/			✓
	1 or more <10% / 1 high/low / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / J / L / K Non-detects: R / UJ / UJ / UJ / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are %R for LCS/LCSD recoveries outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).	✓		
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.		✓	

Notes: LCS for ~~batch 802077~~ QC for cyclohexane 129%, methylcyclohexane 134%.

↓ Sequence 8022253 all NDs, NO action

URS

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within +100% or -50% of the mid point calibration standard? If not, J(+)/UJ(-).	✓		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	✓		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	✓		
	For sample results > 5 x RL, use 50% RPD. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 x RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV	✓		

Notes: 35 D-2 and DUP-7 all NDs ✓

11.0 Detection Limit Verification		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	✓		
11.2	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated			✓

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
12.1.1	Number of samples:			
12.1.2	Number of target compounds in each analysis:			
12.1.3	Number of results rejected and not reported:			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = 100%			

Notes:

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Volatile Organic Compounds by EPA Method 8260B

Qualification: The LCS recovery exceeded the control limit but it was within the marginal exceedance for a compound that is not a project-specific analyte of concern. The result for this analyte in any sample from the associated QC batch is not considered qualified.

Analysis: USEPA-8260B

Sample/Analyte:		
	0802167-01	35MW2	Cyclohexane
	0802167-01	35MW2	Methylcyclohexane
	0802167-02	Trip Blank	Cyclohexane
	0802167-02	Trip Blank	Methylcyclohexane
	0802167-03	35MW1	Cyclohexane
	0802167-03	35MW1	Methylcyclohexane
	0802204-01	35 D-2	Cyclohexane
	0802204-01	35 D-2	Methylcyclohexane
	0802204-02	DUP-7	Cyclohexane
	0802204-02	DUP-7	Methylcyclohexane
	0802204-03	Trip Blank	Cyclohexane
	0802204-03	Trip Blank	Methylcyclohexane
	0802204-04	35 D-4	Cyclohexane
	0802204-04	35 D-4	Methylcyclohexane
	0802204-05	EQBK-5	Cyclohexane
	0802204-05	EQBK-5	Methylcyclohexane

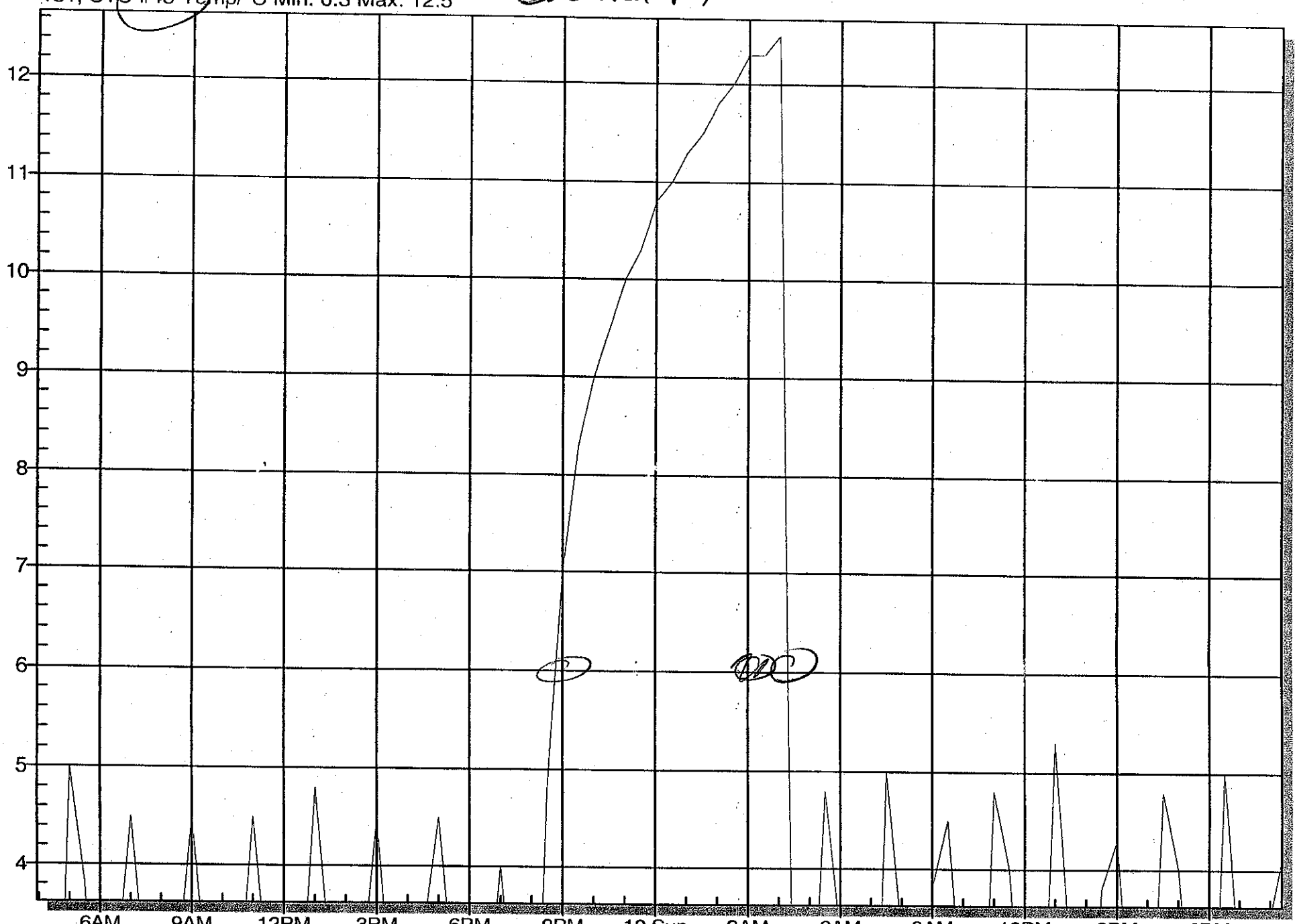
Qualification: During storage and/or incubation the sample temperature exceeded the method specified requirements. All positive results and non-detects must be considered qualified.

Analysis: USEPA-8260B

Sample/Analyte:		
	0802167-01	35MW2
	0802167-02	Trip Blank
	0802167-03	35MW1

Downloaded Data - Monday, February 11, 2008

131, CTJ #43-Temp/°C Min: 0.3 Max: 12.5 QUALIFY



1 of 1

QC BATCH SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

QC Batch: 0802071 QC Batch Matrix: Water Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	0802071-BLK1	02/20/08 08:00	
Blank	0802071-BLK2	02/21/08 12:00	
LCS	0802071-BS1	02/20/08 08:00	
LCS	0802071-BS2	02/21/08 12:00	
35 D-4	0802071-MS1	02/20/08 08:00	
35 D-4	0802071-MSD1	02/20/08 08:00	
35MW2	0802167-01	02/20/08 08:00	
Trip Blank	0802167-02	02/20/08 08:00	
35MW1	0802167-03	02/20/08 08:00	
35 D-2	0802204-01	02/20/08 08:00	
DUP-7	0802204-02	02/20/08 08:00	
Trip Blank	0802204-03	02/20/08 08:00	
35 D-4	0802204-04	02/20/08 08:00	
EQBK-5	0802204-05	02/20/08 08:00	
37MW1	0802207-01	02/21/08 12:00	
Trip Blank	0802207-02	02/21/08 12:00	
37MW2	0802207-03	02/21/08 12:00	
37MW3	0802208-01	02/21/08 12:00	
Trip Blank	0802208-02	02/21/08 12:00	
38MW1	0802208-03	02/21/08 12:00	
38MW2	0802208-04	02/21/08 12:00	
38MW3	0802262-01	02/21/08 12:00	

01413

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-50
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Matrix: Water
Laboratory ID: 0802071-BLK1
File ID: BLK0220A.D
Prepared: 02/20/08 08:00
Preparation: 5030B Aqueous Purge &
Initial/Final: 5 mL / 5 mL
Analyzed: 02/20/08 10:41
Instrument: 224
QC Batch: 0802071
Sequence: 8022253
Calibration: 8B22006

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
67-64-1	Acetone	1.2	20	2.00	ug/L	J
71-43-2	Benzene	0.12	1.0	1.0	ug/L	U
74-97-5	Bromochloromethane	0.20	1.0	1.0	ug/L	U
75-27-4	Bromodichloromethane	0.19	1.0	1.0	ug/L	U
75-25-2	Bromoform	0.23	1.0	1.0	ug/L	U
74-83-9	Bromomethane	0.19	1.0	1.0	ug/L	U
75-15-0	Carbon Disulfide	0.28	5.0	5.0	ug/L	U
56-23-5	Carbon Tetrachloride	0.15	1.0	1.0	ug/L	U
108-90-7	Chlorobenzene	0.12	1.0	1.0	ug/L	U
75-00-3	Chloroethane	0.20	1.0	1.0	ug/L	U
67-66-3	Chloroform	0.061	1.0	1.0	ug/L	U
74-87-3	Chloromethane	0.060	1.0	1.0	ug/L	U
110-82-7	Cyclohexane	0.14	5.0	5.0	ug/L	U
96-12-8	1,2-Dibromo-3-chloropropane	0.29	5.0	5.0	ug/L	U
124-48-1	Dibromochloromethane	0.14	1.0	1.0	ug/L	U
106-93-4	1,2-Dibromoethane	0.22	1.0	1.0	ug/L	U
95-50-1	1,2-Dichlorobenzene	0.065	1.0	1.0	ug/L	U
541-73-1	1,3-Dichlorobenzene	0.12	1.0	1.0	ug/L	U
106-46-7	1,4-Dichlorobenzene	0.13	1.0	1.0	ug/L	U
75-71-8	Dichlorodifluoromethane	0.17	1.0	1.0	ug/L	U
75-34-3	1,1-Dichloroethane	0.076	1.0	1.0	ug/L	U
107-06-2	1,2-Dichloroethane	0.15	1.0	1.0	ug/L	U
75-35-4	1,1-Dichloroethene	0.14	1.0	1.0	ug/L	U
156-59-2	cis-1,2-Dichloroethene	0.17	1.0	1.0	ug/L	U
156-60-5	trans-1,2-Dichloroethene	0.16	1.0	1.0	ug/L	U
78-87-5	1,2-Dichloropropane	0.10	1.0	1.0	ug/L	U
10061-01-5	cis-1,3-Dichloropropene	0.14	1.0	1.0	ug/L	U
10061-02-6	trans-1,3-Dichloropropene	0.16	1.0	1.0	ug/L	U
100-41-4	Ethylbenzene	0.13	1.0	1.0	ug/L	U
591-78-6	2-Hexanone	0.42	10	10	ug/L	U

01408

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Water Laboratory ID: 0802071-BLK2 File ID: BLK0221A2.D

Prepared: 02/21/08 12:00 Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

Analyzed: 02/21/08 14:00 Instrument: 224

QC Batch: 0802071 Sequence: 8022255 Calibration: 8B22006

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
98-82-8	Isopropylbenzene	0.12	1.0	1.0	ug/L	U
79-20-9	Methyl Acetate	0.16	5.0	5.0	ug/L	U
1634-04-4	Methyl tert-Butyl Ether	0.096	1.0	1.0	ug/L	U
108-87-2	Methylcyclohexane	0.15	5.0	5.0	ug/L	U
75-09-2	Methylene Chloride	0.051	5.0	5.0	ug/L	U
78-93-3	2-Butanone (MEK)	0.33	10	10	ug/L	U
108-10-1	4-Methyl-2-pentanone (MIBK)	0.38	10	10	ug/L	U
100-42-5	Styrene	0.11	1.0	1.0	ug/L	U
79-34-5	1,1,2,2-Tetrachloroethane	0.10	1.0	1.0	ug/L	U
127-18-4	Tetrachloroethene	0.15	1.0	1.0	ug/L	U
108-88-3	Toluene	0.072	1.0	0.0800	ug/L	J
87-61-6	1,2,3-Trichlorobenzene	0.13	2.0	2.0	ug/L	U
120-82-1	1,2,4-Trichlorobenzene	0.16	2.0	2.0	ug/L	U
71-55-6	1,1,1-Trichloroethane	0.11	1.0	1.0	ug/L	U
79-00-5	1,1,2-Trichloroethane	0.21	1.0	1.0	ug/L	U
79-01-6	Trichloroethene	0.17	1.0	1.0	ug/L	U
75-69-4	Trichlorofluoromethane	0.18	1.0	1.0	ug/L	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.14	1.0	1.0	ug/L	U
75-01-4	Vinyl Chloride	0.17	1.0	1.0	ug/L	U
1330-20-7	Xylene (Total)	0.36	3.0	3.0	ug/L	U

System Monitoring Compound	Added (ug/L)	Conc. (ug/L)	% REC	QC Limits	Q
Dibromofluoromethane	40.0	40.4	101	85 - 115	
1,2-Dichloroethane-d4	40.0	42.1	105	70 - 120	
Toluene-d8	40.0	40.1	100	85 - 120	
4-Bromofluorobenzene	40.0	39.4	99	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	840234	5.15	854542	5.15	
Chlorobenzene-d5	631520	8.08	644631	8.08	
1,4-Dichlorobenzene-d4	306939	10.38	344085	10.38	

01412

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 224
Lab File ID: CCV0220A.D
Sequence: 8022253
Lab Sample ID: 8022253-CCV1

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Calibration: 8B22006
Calibration Date: 02/19/08 00:00
Injection Date: 02/20/08
Injection Time: 09:30

All LCDs

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	L	40.0	44.2	7.925503E-02	0.0814194		10.4	40
Benzene	A	40.0	42.5	1.146377	1.2193		6.4	25
Bromochloromethane	A	40.0	43.2	0.21081	0.227474		7.9	25
Bromodichloromethane	A	40.0	44.7	0.3042467	0.340152		11.8	25
Bromoform	L	40.0	39.4	0.1755171	0.216456	0.1	-1.4	25
Bromomethane	A	40.0	47.7	5.012513E-02	0.0597578		19.2	25
~~Carbon Disulfide~~	L	40.0	41.2	0.4630764	0.570454		3.0	25
Carbon Tetrachloride	A	40.0	49.3	0.2841941	0.350373		23.3	25
Chlorobenzene	A	40.0	41.5	1.069136	1.10816	0.3	3.7	25
Chloroethane	A	40.0	42.3	0.1959358	0.207582		5.9	25
Chloroform	A	40.0	42.3	0.4373145	0.46261		5.8	20
Chloromethane	A	40.0	43.7	0.3838116	0.419402	0.1	9.3	25
Cyclohexane	A	40.0	51.5	0.402865	0.518356		28.7	25 *
1,2-Dibromo-3-chloropropane	L	40.0	40.3	0.1210742	0.145467		0.6	25
Dibromochloromethane	L	40.0	40.5	0.301591	0.354045		1.2	25
1,2-Dibromoethane	A	40.0	43.7	0.2827329	0.309044		9.3	25
1,2-Dichlorobenzene	A	40.0	42.0	1.440202	1.51198		5.0	25
1,3-Dichlorobenzene	A	40.0	41.8	1.453111	1.51798		4.5	25
1,4-Dichlorobenzene	A	40.0	41.0	1.55449	1.5931		2.5	25
Dichlorodifluoromethane	A	40.0	47.4	0.2424014	0.28712		18.4	25
1,1-Dichloroethane	A	40.0	42.6	0.4635147	0.493347	0.1	6.4	25
1,2-Dichloroethane	A	40.0	42.8	0.3388555	0.362675		7.0	25
1,1-Dichloroethene	A	40.0	44.2	0.2417472	0.266803		10.4	20
cis-1,2-Dichloroethene	A	40.0	42.2	0.2942643	0.310091		5.4	25
trans-1,2-Dichloroethene	A	40.0	42.4	0.2622882	0.278259		6.1	25
1,2-Dichloropropane	A	40.0	41.6	0.2687877	0.279877		4.1	20
cis-1,3-Dichloropropene	L	40.0	41.0	0.3692269	0.431315		2.4	25
trans-1,3-Dichloropropene	L	40.0	40.0	0.2998708	0.359435		0.05	25
Ethylbenzene	A	40.0	43.2	1.66019	1.79274		8.0	20

01562

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 224
Lab File ID: CCV0220A.D
Sequence: 8022253
Lab Sample ID: 8022253-CCV1

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Calibration: 8B22006
Calibration Date: 02/19/08 00:00
Injection Date: 02/20/08
Injection Time: 09:30

All NDs

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
2-Hexanone	A	40.0	46.3	0.1948484	0.22548		15.7	40
Isopropylbenzene	A	40.0	44.2	2.847469	3.14314		10.4	25
Methyl Acetate	A	40.0	41.2	0.1889727	0.194813		3.1	25
Methyl tert-Butyl Ether	A	40.0	42.6	0.7125169	0.759804		6.6	25
Methylcyclohexane	A	40.0	53.5	0.3408784	0.456289		33.9	25 *
Methylene Chloride	L	40.0	41.0	0.3625927	0.342017		2.4	25
2-Butanone (MEK)	A	40.0	45.2	0.1225035	0.138412		13.0	40
4-Methyl-2-pentanone (MIBK)	A	40.0	47.3	0.2156593	0.2549		18.2	40
Styrene	A	40.0	43.5	1.141255	1.24089		8.7	25
1,1,2,2-Tetrachloroethane	A	40.0	44.4	0.702092	0.780086	0.3	11.1	25
Tetrachloroethene	A	40.0	44.5	0.4206695	0.467992		11.2	25
Toluene	A	40.0	42.6	1.218743	1.29677		6.4	20
1,2,3-Trichlorobenzene	A	40.0	43.3	0.7113872	0.770679		8.3	25
1,2,4-Trichlorobenzene	A	40.0	42.8	0.7687362	0.823564		7.1	25
1,1,1-Trichloroethane	A	40.0	45.8	0.351133	0.401866		14.4	25
1,1,2-Trichloroethane	A	40.0	43.4	0.1894954	0.205558		8.5	25
Trichloroethene	A	40.0	43.2	0.3098935	0.334736		8.0	25
Trichlorofluoromethane	A	40.0	46.8	0.3550524	0.415331		17.0	25
1,1,2-Trichloro-1,2,2-trifluoroethane	A	40.0	49.8	0.231265	0.287675		24.4	25
Vinyl Chloride	A	40.0	44.5	0.2903163	0.323003		11.3	20
Xylene (Total)	A	120	132	0.6757676	0.73165		8.3	25

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

01563

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 224
Lab File ID: CCV0221A2.D
Sequence: 8022255
Lab Sample ID: 8022255-CCV1

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Calibration: 8B22006
Calibration Date: 02/19/08 00:00
Injection Date: 02/21/08
Injection Time: 12:49

All VOs

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
2-Hexanone	A	40.0	42.8	0.1948484	0.208729		7.1	40
Isopropylbenzene	A	40.0	40.6	2.847469	2.89153		1.5	25
Methyl Acetate	A	40.0	40.5	0.1889727	0.191217		1.2	25
Methyl tert-Butyl Ether	A	40.0	40.4	0.7125169	0.719985		1.0	25
Methylcyclohexane	A	40.0	49.0	0.3408784	0.417461		22.5	25
Methylene Chloride	L	40.0	38.5	0.3625927	0.32173		-3.8	25
2-Butanone (MEK)	A	40.0	43.0	0.1225035	0.131631		7.5	40
4-Methyl-2-pentanone (MIBK)	A	40.0	43.2	0.2156593	0.232807		8.0	40
Styrene	A	40.0	41.4	1.141255	1.18131		3.5	25
1,1,2,2-Tetrachloroethane	A	40.0	42.2	0.702092	0.741044	0.3	5.5	25
Tetrachloroethene	A	40.0	41.4	0.4206695	0.435598		3.5	25
Toluene	A	40.0	39.5	1.218743	1.20215		-1.4	20
1,2,3-Trichlorobenzene	A	40.0	40.2	0.7113872	0.714774		0.5	25
1,2,4-Trichlorobenzene	A	40.0	40.0	0.7687362	0.769345		0.08	25
1,1,1-Trichloroethane	A	40.0	42.8	0.351133	0.375652		7.0	25
1,1,2-Trichloroethane	A	40.0	40.3	0.1894954	0.190826		0.7	25
Trichloroethene	A	40.0	40.0	0.3098935	0.309895		0.0005	25
Trichlorofluoromethane	A	40.0	45.1	0.3550524	0.399986		12.7	25
1,1,2-Trichloro-1,2,2-trifluoroetha	A	40.0	46.3	0.231265	0.267932		15.9	25
Vinyl Chloride	A	40.0	41.5	0.2903163	0.301401		3.8	20
Xylene (Total)	A	120	125	0.6757676	0.688551		1.9	25

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

01570

LCS / LCS DUPLICATE RECOVERY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

Laboratory ID: 0802071-BS1

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 5030B Aqueous Purge & Trap
Initial/Final: 5 mL / 5 mL
QC Batch: 0802071
Sequence: 8022253

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Acetone	40.0	44.2	110	40 - 140	ug/L
Benzene	40.0	42.5	106	80 - 120	ug/L
Bromochloromethane	40.0	43.2	108	65 - 130	ug/L
Bromodichloromethane	40.0	44.7	112	75 - 120	ug/L
Bromoform	40.0	39.4	99	70 - 130	ug/L
Bromomethane	40.0	47.7	119	30 - 145	ug/L
Carbon Disulfide	40.0	41.2	103	35 - 160	ug/L
Carbon Tetrachloride	40.0	49.3	123	65 - 140	ug/L
Chlorobenzene	40.0	41.5	104	80 - 120	ug/L
Chloroethane	40.0	42.3	106	60 - 135	ug/L
Chloroform	40.0	42.3	106	65 - 135	ug/L
Chloromethane	40.0	43.7	109	40 - 125	ug/L
Cyclohexane	40.0	51.5	129 *	77 - 125	ug/L
1,2-Dibromo-3-chloropropane	40.0	40.3	101	50 - 130	ug/L
Dibromochloromethane	40.0	40.5	101	60 - 135	ug/L
1,2-Dibromoethane	40.0	43.7	109	80 - 120	ug/L
1,2-Dichlorobenzene	40.0	42.0	105	70 - 120	ug/L
1,3-Dichlorobenzene	40.0	41.8	104	75 - 125	ug/L
1,4-Dichlorobenzene	40.0	41.0	102	75 - 125	ug/L
Dichlorodifluoromethane	40.0	47.4	118	30 - 155	ug/L
1,1-Dichloroethane	40.0	42.6	106	70 - 135	ug/L
1,2-Dichloroethane	40.0	42.8	107	70 - 130	ug/L
1,1-Dichloroethene	40.0	44.2	110	70 - 130	ug/L
cis-1,2-Dichloroethene	40.0	42.2	105	70 - 125	ug/L
trans-1,2-Dichloroethene	40.0	42.4	106	60 - 140	ug/L
1,2-Dichloropropane	40.0	41.6	104	75 - 125	ug/L
cis-1,3-Dichloropropene	40.0	41.0	102	70 - 130	ug/L
trans-1,3-Dichloropropene	40.0	40.0	100	55 - 140	ug/L
Ethylbenzene	40.0	43.2	108	75 - 125	ug/L

LCS / LCS DUPLICATE RECOVERY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

Laboratory ID: 0802071-BS1

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 5030B Aqueous Purge & Trap
Initial/Final: 5 mL / 5 mL
QC Batch: 0802071
Sequence: 8022253

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
2-Hexanone	40.0	46.3	116	55 - 130	ug/L
Isopropylbenzene	40.0	44.2	110	75 - 125	ug/L
Methyl Acetate	40.0	41.2	103	70 - 130	ug/L
Methyl tert-Butyl Ether	40.0	42.6	107	65 - 125	ug/L
Methylcyclohexane	40.0	53.5	134 *	70 - 130	ug/L
Methylene Chloride	40.0	41.0	102	55 - 140	ug/L
2-Butanone (MEK)	40.0	45.2	113	30 - 150	ug/L
4-Methyl-2-pentanone (MIBK)	40.0	47.3	118	60 - 135	ug/L
Styrene	40.0	43.5	109	65 - 135	ug/L
1,1,2,2-Tetrachloroethane	40.0	44.4	111	65 - 130	ug/L
Tetrachloroethene	40.0	44.5	111	45 - 150	ug/L
Toluene	40.0	42.6	106	75 - 120	ug/L
1,2,3-Trichlorobenzene	40.0	43.3	108	55 - 140	ug/L
1,2,4-Trichlorobenzene	40.0	42.8	107	65 - 135	ug/L
1,1,1-Trichloroethane	40.0	45.8	114	65 - 130	ug/L
1,1,2-Trichloroethane	40.0	43.4	108	75 - 125	ug/L
Trichloroethene	40.0	43.2	108	70 - 125	ug/L
Trichlorofluoromethane	40.0	46.8	117	60 - 145	ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	40.0	49.8	124	50 - 150	ug/L
Vinyl Chloride	40.0	44.5	111	50 - 145	ug/L
Xylene (Total)	120	132	110	75 - 130	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

01405

DATA VALIDATION WORKSHEET

Semivolatile Organic Analysis

Reviewer: RA
Date: 3/17/08
DV Level: II III IV
Review Document:
_X_ SW-846
_X_ NFG - Region III Modifications
_X_ Project QAPP/SAP

Project Name: RAAP 10
Project Number: 116563511
Laboratory: TriMatrix
SDG No.: 36440-50
Test Name: SVOC
Method No.: 8270C

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 20 °C), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.			✓

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per batch)?	✓		
3.2	Do any blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank] (or 10 times for the common phthalate contaminants).	✓		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.	✓		

Notes: One MB → acenaphthene 0.02 ug/L, isophorone 0.08 ug/L
EQBK-5 { butyl benzyl phthalate 0.26 ug/L, bis(2-ethylhexyl)p... 0.72
isophorone 0.057
naphthalene 0.047 } → <5x → B,Z in any sample.
<10x for phthalates and <5x for isophorone, B,Z unless prev. B,Z

URS

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are at least five standards included in the calibration curve?	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve?	✓		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis?	✓		
4.4	Are all calibration standard %RSD ≤15%, r>0.995, or r^2<0.99), second source ±30% or %D(≤20%) within the control limits?	✓		
For initial calibration: %RSD > 15% but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>30% J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				
4.5	Are any SPCCs RF < 0.05 and/or CCC >30%? If yes reject all associated data.		✓	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for decafluorotriphenylphosphine (DFTPP)?	✓		
5.2	Are DFTPP monitored ions within specification? If no, flag R.	✓		
5.3	Have all samples been analyzed within twelve hours of the DFTPP tune? If no, flag R.	✓		
5.4	Have ion abundance criteria for DFTPP been met for each instrument used? If no, flag R.	✓		

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			✓
6.3	If any two base/neutral or acid fraction are out of specification, or if any one base/neutral or acid extractable surrogate has a recovery of less than 10%, then there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			✓
	If No, for 2 or 3 %Rs > UCL, K(+) only; for 2 or 3 %Rs < LCL, but > 10%, L(+)/UL (-); for 2 or 3 %Rs mixed high/low, J(+)/UJ(-); for %R < 10%, L(+)/R(-).			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS/MSD results in conjunction with other QC criteria to determine the need for qualification of the data.			

Notes: MS/MSD for 35 D-4 < QC of 25% at 14% / 13% for caprolactam. Prev. flagged for LCS anomaly, No move action.

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS outside the QC limits? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).	✓		
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.		✓	

Notes: Major { LCS Sequence 802856 <25% at 10% for caprolactam
" " 802735 " " 22% " " } all NDs, RL

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard areas within +100% and -50% of the mid point initail calibration? If No, J(+)/UJ(-).	✓		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration?			
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.	✓		

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Are all analyte duplicate results within control limits (use RPD limits of matrix spikes)? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: 35D-2 and DUP-7

Both NDs ✓

11.0 Detection Limit Verification		Yes	No	NA
11.1	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture?	✓		

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
12.1.1	Number of samples: 7			
12.1.2	Number of target compounds in each analysis: 107			
12.1.3	Number of results rejected and not reported: 7			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = [redacted] 98.5%			

Notes:

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Semivolatile Organic Compounds by EPA Method 8270C

Qualification:	The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.	
Analysis:	USEPA-8270C	
Sample/Analyte:	0802204-04 35 D-4	Caprolactam
Qualification:	The LCS recovery exceeded the control limit but it was within the marginal exceedance for a compound that is not a project-specific analyte of concern. The result for this analyte in any sample from the associated QC batch is not considered qualified.	
Analysis:	USEPA-8270C	
Sample/Analyte:	0801651-BS1	Caprolactam
	0801787-BS2	Caprolactam

QC BATCH SUMMARY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-50
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001
QC Batch: 0801787
QC Batch Matrix: Water
Preparation: 3510C Liquid-Liquid Extraction

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	0801787-BLK2	02/18/08 07:49	
LCS	0801787-BS2	02/18/08 07:49	
38MW3	0802262-01	02/18/08 07:49	

01651

METHOD BLANK DATA SHEET
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-50
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Matrix: Water
Laboratory ID: 0801787-BLK2
File ID: 801787BK.D
Prepared: 02/18/08 07:49
Preparation: 3510C Liquid-Liquid Ext
Initial/Final: 1000 mL / 1 mL
Analyzed: 02/26/08 14:08
Instrument: 195
QC Batch: 0801787
Sequence: 8022735
Calibration: 8B27007

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
83-32-9	Acenaphthene	0.013	0.50	0.0200	ug/L	J
208-96-8	Acenaphthylene	0.012	0.50	0.50	ug/L	U
98-86-2	Acetophenone	0.043	5.0	5.0	ug/L	U
120-12-7	Anthracene	0.014	0.50	0.50	ug/L	U
1912-24-9	Atrazine	0.026	5.0	5.0	ug/L	U
100-52-7	Benzaldehyde	0.051	5.0	5.0	ug/L	U
56-55-3	Benzo(a)anthracene	0.037	0.50	0.50	ug/L	U
50-32-8	Benzo(a)pyrene	0.023	0.50	0.50	ug/L	U
205-99-2	Benzo(b)fluoranthene	0.040	0.50	0.50	ug/L	U
207-08-9	Benzo(k)fluoranthene	0.036	0.50	0.50	ug/L	U
191-24-2	Benzo(g,h,i)perylene	0.022	0.50	0.50	ug/L	U
92-52-4	1,1'-Biphenyl	0.015	5.0	5.0	ug/L	U
101-55-3	4-Bromophenyl Phenyl Ether	0.026	5.0	5.0	ug/L	U
85-68-7	Butyl Benzyl Phthalate	0.029	5.0	5.0	ug/L	U
105-60-2	Caprolactam	0.14	5.0	5.0	ug/L	U
86-74-8	Carbazole	0.018	5.0	5.0	ug/L	U
59-50-7	4-Chloro-3-methylphenol	0.021	5.0	5.0	ug/L	U
106-47-8	4-Chloroaniline	0.021	5.0	5.0	ug/L	U
111-91-1	Bis(2-chloroethoxy)methane	0.016	5.0	5.0	ug/L	U
111-44-4	Bis(2-chloroethyl) Ether	0.016	5.0	5.0	ug/L	U
108-60-1	Bis(2-chloroisopropyl) Ether	0.047	5.0	5.0	ug/L	U
91-58-7	2-Chloronaphthalene	0.012	5.0	5.0	ug/L	U
95-57-8	2-Chlorophenol	0.016	5.0	5.0	ug/L	U
7005-72-3	4-Chlorophenyl Phenyl Ether	0.016	5.0	5.0	ug/L	U
218-01-9	Chrysene	0.020	0.50	0.50	ug/L	U
53-70-3	Dibenz(a,h)anthracene	0.026	0.50	0.50	ug/L	U
132-64-9	Dibenzofuran	0.016	5.0	5.0	ug/L	U
84-74-2	Di-n-butyl Phthalate	0.38	5.0	5.0	ug/L	U
91-94-1	3,3´-Dichlorobenzidine	0.21	5.0	5.0	ug/L	U
120-83-2	2,4-Dichlorophenol	0.015	5.0	5.0	ug/L	U

01648

METHOD BLANK DATA SHEET
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-50

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO 001

Matrix: Water Laboratory ID: 0801787-BLK2 File ID: 801787BK.D

Prepared: 02/18/08 07:49 Preparation: 3510C Liquid-Liquid Extu Initial/Final: 1000 mL / 1 mL

Analyzed: 02/26/08 14:08 Instrument: 195

QC Batch: 0801787 Sequence: 8022735 Calibration: 8B27007

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
84-66-2	Diethyl Phthalate	0.034	5.0	5.0	ug/L	U
105-67-9	2,4-Dimethylphenol	0.33	1.0	1.0	ug/L	U
131-11-3	Dimethyl Phthalate	0.016	5.0	5.0	ug/L	U
534-52-1	4,6-Dinitro-2-methylphenol	0.12	5.0	5.0	ug/L	U
51-28-5	2,4-Dinitrophenol	1.5	5.0	5.0	ug/L	U
121-14-2	2,4-Dinitrotoluene	0.21	5.0	5.0	ug/L	U
606-20-2	2,6-Dinitrotoluene	0.050	5.0	5.0	ug/L	U
117-84-0	Di-n-octyl Phthalate	0.34	5.0	5.0	ug/L	U
117-81-7	Bis(2-ethylhexyl) Phthalate	0.41	5.0	5.0	ug/L	U
206-44-0	Fluoranthene	0.016	0.50	0.50	ug/L	U
86-73-7	Fluorene	0.011	0.50	0.50	ug/L	U
118-74-1	Hexachlorobenzene	0.019	5.0	5.0	ug/L	U
87-68-3	Hexachlorobutadiene	0.018	5.0	5.0	ug/L	U
77-47-4	Hexachlorocyclopentadiene	0.13	5.0	5.0	ug/L	U
67-72-1	Hexachloroethane	0.038	5.0	5.0	ug/L	U
193-39-5	Indeno(1,2,3-cd)pyrene	0.014	0.50	0.50	ug/L	U
78-59-1	Isophorone	0.031	5.0	0.0800	ug/L	J
91-57-6	2-Methylnaphthalene	0.015	5.0	5.0	ug/L	U
95-48-7	2-Methylphenol	0.14	5.0	5.0	ug/L	U
106-44-5	4-Methylphenol	0.16	5.0	5.0	ug/L	U
91-20-3	Naphthalene	0.023	0.50	0.50	ug/L	U
88-74-4	2-Nitroaniline	0.12	5.0	5.0	ug/L	U
99-09-2	3-Nitroaniline	0.13	5.0	5.0	ug/L	U
100-01-6	4-Nitroaniline	0.14	5.0	5.0	ug/L	U
98-95-3	Nitrobenzene	0.026	5.0	5.0	ug/L	U
100-02-7	4-Nitrophenol	1.3	5.0	5.0	ug/L	U
88-75-5	2-Nitrophenol	0.026	5.0	5.0	ug/L	U
86-30-6	N-Nitroso-diphenylamine	0.019	5.0	5.0	ug/L	U
621-64-7	N-Nitroso-di-n-propylamine	0.030	5.0	5.0	ug/L	U
87-86-5	Pentachlorophenol	0.19	5.0	5.0	ug/L	U

01649

LCS / LCS DUPLICATE RECOVERY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

Laboratory ID: 0801651-BS1

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3510C Liquid-Liquid Extraction
Initial/Final: 1000 mL / 1 mL
QC Batch: 0801651
Sequence: 8021856

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Acenaphthene	9.80	8.00	82	45 - 110	ug/L
Acenaphthylene	9.80	8.22	84	50 - 105	ug/L
Acetophenone	10.0	8.48	85	54 - 113	ug/L
Anthracene	9.80	8.56	87	55 - 110	ug/L
Atrazine	10.0	10.5	105	61 - 139	ug/L
Benzaldehyde	10.0	9.54	95	25 - 141	ug/L
Benzo(a)anthracene	9.80	8.20	84	55 - 110	ug/L
Benzo(a)pyrene	9.80	6.80	69	55 - 110	ug/L
Benzo(b)fluoranthene	9.80	7.70	79	45 - 120	ug/L
Benzo(k)fluoranthene	9.80	7.32	75	45 - 125	ug/L
Benzo(g,h,i)perylene	9.80	6.08	62	40 - 125	ug/L
1,1'-Biphenyl	10.0	7.94	79	59 - 114	ug/L
4-Bromophenyl Phenyl Ether	10.0	9.40	94	50 - 115	ug/L
Butyl Benzyl Phthalate	10.0	7.60	76	45 - 115	ug/L
Caprolactam	10.0	0.960	10 *	25 - 135	ug/L
Carbazole	19.6	18.7	95	50 - 115	ug/L
4-Chloro-3-methylphenol	10.0	6.50	65	45 - 110	ug/L
4-Chloroaniline	10.0	7.16	72	15 - 110	ug/L
Bis(2-chloroethoxy)methane	10.0	8.92	89	45 - 105	ug/L
Bis(2-chloroethyl) Ether	10.0	9.60	96	35 - 110	ug/L
Bis(2-chloroisopropyl) Ether	10.0	10.2	102	25 - 130	ug/L
2-Chloronaphthalene	10.0	8.02	80	50 - 105	ug/L
2-Chlorophenol	10.0	8.44	84	35 - 105	ug/L
4-Chlorophenyl Phenyl Ether	10.0	8.56	86	50 - 110	ug/L
Chrysene	9.80	8.56	87	55 - 110	ug/L
Dibenz(a,h)anthracene	9.80	5.90	60	40 - 125	ug/L
Dibenzofuran	10.0	8.58	86	55 - 105	ug/L
Di-n-butyl Phthalate	10.0	9.06	91	55 - 115	ug/L
3,3'-Dichlorobenzidine	20.0	16.2	81	20 - 110	ug/L

01638

LCS / LCS DUPLICATE RECOVERY
USEPA-8270C

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

Laboratory ID: 0801787-BS2

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3510C Liquid-Liquid Extraction
Initial/Final: 1000 mL / 1 mL
QC Batch: 0801787
Sequence: 8022735

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Acenaphthene	9.80	7.59	77	45 - 110	ug/L
Acenaphthylene	9.80	7.75	79	50 - 105	ug/L
Acetophenone	10.0	7.37	74	54 - 113	ug/L
Anthracene	9.80	7.68	78	55 - 110	ug/L
Atrazine	10.0	7.73	77	61 - 139	ug/L
Benzaldehyde	10.0	9.11	91	25 - 141	ug/L
Benzo(a)anthracene	9.80	8.35	85	55 - 110	ug/L
Benzo(a)pyrene	9.80	8.46	86	55 - 110	ug/L
Benzo(b)fluoranthene	9.80	8.69	89	45 - 120	ug/L
Benzo(k)fluoranthene	9.80	9.00	92	45 - 125	ug/L
Benzo(g,h,i)perylene	9.80	9.05	92	40 - 125	ug/L
1,1'-Biphenyl	10.0	7.76	78	59 - 114	ug/L
4-Bromophenyl Phenyl Ether	10.0	9.04	90	50 - 115	ug/L
Butyl Benzyl Phthalate	10.0	10.2	102	45 - 115	ug/L
Caprolactam	10.0	2.17	22 *	25 - 135	ug/L
Carbazole	9.80	8.79	90	50 - 115	ug/L
4-Chloro-3-methylphenol	10.0	7.74	77	45 - 110	ug/L
4-Chloroaniline	10.0	6.52	65	15 - 110	ug/L
Bis(2-chloroethoxy)methane	10.0	8.15	82	45 - 105	ug/L
Bis(2-chloroethyl) Ether	10.0	7.12	71	35 - 110	ug/L
Bis(2-chloroisopropyl) Ether	10.0	8.35	84	25 - 130	ug/L
2-Chloronaphthalene	10.0	7.73	77	50 - 105	ug/L
2-Chlorophenol	10.0	7.89	79	35 - 105	ug/L
4-Chlorophenyl Phenyl Ether	10.0	8.28	83	50 - 110	ug/L
Chrysene	9.80	8.51	87	55 - 110	ug/L
Dibenz(a,h)anthracene	9.80	9.16	93	40 - 125	ug/L
Dibenzofuran	10.0	8.18	82	55 - 105	ug/L
Di-n-butyl Phthalate	10.0	9.70	97	55 - 115	ug/L
3,3´-Dichlorobenzidine	20.0	12.0	60	20 - 110	ug/L

01641

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8270C

35 D-4

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-50

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Preparation: 3510C Liquid-Liquid Extraction

Initial/Final: 1060 mL / 1 mL

Laboratory ID: 0801651-MS1

QC Batch: 0801651

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Acenaphthene	9.25	ND	7.45	81	45 - 110	ug/L
Acenaphthylene	9.25	ND	7.45	81	50 - 105	ug/L
Acetophenone	9.43	ND	7.85	83	54 - 113	ug/L
Anthracene	9.25	ND	7.79	84	55 - 110	ug/L
Atrazine	9.43	ND	9.51	101	61 - 139	ug/L
Benzaldehyde	9.43	ND	9.21	98	25 - 141	ug/L
Benzo(a)anthracene	9.25	ND	7.70	83	55 - 110	ug/L
Benzo(a)pyrene	9.25	ND	6.38	69	55 - 110	ug/L
Benzo(b)fluoranthene	9.25	ND	7.30	79	45 - 120	ug/L
Benzo(k)fluoranthene	9.25	ND	6.81	74	45 - 125	ug/L
Benzo(g,h,i)perylene	9.25	ND	5.62	61	40 - 125	ug/L
1,1'-Biphenyl	9.43	ND	7.32	78	59 - 114	ug/L
4-Bromophenyl Phenyl Ether	9.43	ND	8.60	91	50 - 115	ug/L
Butyl Benzyl Phthalate	9.43	0.264	7.25	74	45 - 115	ug/L
Caprolactam	9.43	ND	1.34	14 *	25 - 135	ug/L
Carbazole	18.5	ND	16.7	91	50 - 115	ug/L
4-Chloro-3-methylphenol	9.43	ND	6.02	64	45 - 110	ug/L
4-Chloroaniline	9.43	ND	6.51	69	15 - 110	ug/L
Bis(2-chloroethoxy)methane	9.43	ND	8.11	86	45 - 105	ug/L
Bis(2-chloroethyl) Ether	9.43	ND	9.11	97	35 - 110	ug/L
Bis(2-chloroisopropyl) Ether	9.43	ND	9.55	101	25 - 130	ug/L
2-Chloronaphthalene	9.43	ND	7.28	77	50 - 105	ug/L
2-Chlorophenol	9.43	ND	7.81	83	35 - 105	ug/L
4-Chlorophenyl Phenyl Ether	9.43	ND	7.77	82	50 - 110	ug/L
Chrysene	9.25	ND	8.17	88	55 - 110	ug/L
Dibenz(a,h)anthracene	9.25	ND	5.43	59	40 - 125	ug/L
Dibenzofuran	9.43	ND	7.87	83	55 - 105	ug/L
Di-n-butyl Phthalate	9.43	0.425	8.70	88	55 - 115	ug/L
3,3'-Dichlorobenzidine	18.9	ND	15.2	80	20 - 110	ug/L
2,4-Dichlorophenol	9.43	ND	6.45	68	50 - 105	ug/L
Diethyl Phthalate	9.43	ND	8.25	87	40 - 120	ug/L
2,4-Dimethylphenol	9.43	ND	7.26	77	30 - 110	ug/L
Dimethyl Phthalate	9.43	ND	8.47	90	25 - 125	ug/L

01632

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8270C

35 D-4

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-50

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Preparation: 3510C Liquid-Liquid Extraction

Initial/Final: 1060 mL / 1 mL

Laboratory ID: 0801651-MSD1

QC Batch: 0801651

Analyte	Spike Added	MSD Conc.	MSD % Rec. #		% RPD #	QC Limits RPD	QC Limits Rec.	Units
Acenaphthene	9.25	7.89	85		6	30	45 - 110	ug/L
Acenaphthylene	9.25	8.13	88		9	30	50 - 105	ug/L
Acetophenone	9.43	7.96	84		1	30	54 - 113	ug/L
Anthracene	9.25	8.06	87		3	30	55 - 110	ug/L
Atrazine	9.43	9.66	102		2	30	61 - 139	ug/L
Benzaldehyde	9.43	9.60	102		4	30	25 - 141	ug/L
Benzo(a)anthracene	9.25	7.91	86		3	30	55 - 110	ug/L
Benzo(a)pyrene	9.25	6.85	74		7	30	55 - 110	ug/L
Benzo(b)fluoranthene	9.25	7.40	80		1	30	45 - 120	ug/L
Benzo(k)fluoranthene	9.25	7.13	77		5	30	45 - 125	ug/L
Benzo(g,h,i)perylene	9.25	5.79	63		3	30	40 - 125	ug/L
1,1'-Biphenyl	9.43	7.94	84		8	30	59 - 114	ug/L
4-Bromophenyl Phenyl Ether	9.43	8.79	93		2	30	50 - 115	ug/L
Butyl Benzyl Phthalate	9.43	7.47	76		3	30	45 - 115	ug/L
Caprolactam	9.43	1.25	13	*	7	30	25 - 135	ug/L
Carbazole	18.5	17.5	94		4	30	50 - 115	ug/L
4-Chloro-3-methylphenol	9.43	6.38	68		6	30	45 - 110	ug/L
4-Chloroaniline	9.43	6.75	72		4	30	15 - 110	ug/L
Bis(2-chloroethoxy)methane	9.43	8.66	92		7	30	45 - 105	ug/L
Bis(2-chloroethyl) Ether	9.43	9.53	101		4	30	35 - 110	ug/L
Bis(2-chloroisopropyl) Ether	9.43	9.92	105		4	30	25 - 130	ug/L
2-Chloronaphthalene	9.43	7.83	83		7	30	50 - 105	ug/L
2-Chlorophenol	9.43	8.19	87		5	30	35 - 105	ug/L
4-Chlorophenyl Phenyl Ether	9.43	8.42	89		8	30	50 - 110	ug/L
Chrysene	9.25	8.26	89		1	30	55 - 110	ug/L
Dibenz(a,h)anthracene	9.25	5.85	63		7	30	40 - 125	ug/L
Dibenzofuran	9.43	8.40	89		6	30	55 - 105	ug/L
Di-n-butyl Phthalate	9.43	8.68	88		0.2	30	55 - 115	ug/L
3,3´-Dichlorobenzidine	18.9	15.2	81		0.5	30	20 - 110	ug/L
2,4-Dichlorophenol	9.43	7.02	74		8	30	50 - 105	ug/L
Diethyl Phthalate	9.43	8.75	93		6	30	40 - 120	ug/L
2,4-Dimethylphenol	9.43	7.43	79		2	30	30 - 110	ug/L
Dimethyl Phthalate	9.43	9.06	96		7	30	25 - 125	ug/L
4,6-Dinitro-2-methylphenol	9.43	5.42	57		3	30	40 - 130	ug/L

01635

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: RA
Date: 3/14/08
DV Level: II (III) IV
Review Document:
X SW-846 - 8081/8082
X NFG - Region III Modifications
X project QAPP

Project Name: RAAP 10
Project Number: 116501351.40003
Laboratory: TTI MUTIN
SDG No.: 36440-50
Test Name: Pest/PCBs
Method No.: 8061/8082

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).			
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.			✓

Notes:

2.0 Holding Times		Yes	No	NA
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (one per 20 samples or batch and matrix)?	✓	✓	
3.2	Do any blanks have positive results? If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank].		✓	
3.3	Do any field equipment blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration

		Yes	No	NA
4.1	Are at least five standards included in the calibration curve for 1016, 1260, toxaphene, and technical chlordane; and at least one point for the other arochlors reported? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the control limits?		✓	
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

post-CC sequence 8022105 toxaphene 7 QC 42.8% neg. bias

all NDs → UJ/c

5.0 GC/ECD Instrument Performance Check

		Yes	No	NA
5.1	Has a Performance Evaluation Mixture (PEM) been analyzed at the beginning, every 12 hours, and at the end of every sequence.	✓		
5.2	Is the 4,4'-DDT breakdown </= to 20%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non detect DDT results, DDD/DDE - R(+).	✓		
5.3	Is the endrin breakdown </= to 20%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	✓		
5.4	Is the combined breakdowns less than or equal to 30%? If No, for positive DDT/endrin results, DDT/endrin-L(+), DDD/DD/endrin aldehyde/endrin ketone - NJ(+). For non-detect DDT/endrin results, DDD/DDE/endrin aldehyde/endrin ketone - R(+).	✓		

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	✓		
6.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks? Advisory limit: 60-150%.		✓	
6.3	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?		✓	
6.4	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			✓

# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
1 out	high/low	No action	No action
2 out	2 high same column	K	No action
	2 low same column	L, UL	No action
	mixed same column	J, UJ	No action
	2 high diff columns	J	Not applicable
	2 low diff columns	J, UJ	Not applicable
	mixed diff columns	Professional judgement	Not applicable
3 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	2 high, 1 low	K (2 high)	J (1 low 2nd column)
	2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
	other mixed	J, UJ	Not applicable
4 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	Mixed	J, UJ	Not applicable
	If any recovery is >0% and <10% then L(+)/R(-).		
	If any recovery is 0% then R(+/-).		

Notes: PCBs → DUP-7 tetrachloro-m-xylene <QC at 35%. for 2nd column. No action for 1 failure. 30%.

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			

Notes:

9.0 Field Duplicate

		Yes	No	NA
9.2	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: PCBs → 35 D-2 DUP-7 Both NDs ✓

Pest →

	35 D-2	DUP-7	RL
alpha-chlordane	0.0038J	0.0045J	0.05 OKV
gamma-chlordane	0.0028J	0.0030J	0.05 OKV

10.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns <40%? If No, J(+).		✓	
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		

Notes: %D>40% for several samples → J/g
alpha-chlordane in 37MW1 and alpha-BHC in 37MW2 "E" → J/g
use DF=2 results

11.0 Data Completeness

		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
11.1.1	Number of samples: Pest PCB			
11.1.2	Number of target compounds in each analysis: PEST PCB			
11.1.3	Number of results rejected and not reported: Pest PCB			
11.1.4	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = Pest 100% PCB 100%			

Notes:

URS

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Organochlorine Pesticides by EPA Method 8081A

Qualification:	The RPD between the detected values from the primary and confirmation analyses exceeded 40%. The higher concentration result has been reported.		
Analysis:	USEPA-8081A		
Sample/Analyte:	0802207-01	37MW1	alpha-Chlordane
	0802207-01	37MW1	Heptachlor Epoxide
	0802207-01RI	37MW1	alpha-Chlordane
	0802207-01RI	37MW1	delta-BHC [2C]
	0802207-01RI	37MW1	Heptachlor Epoxide
	0802207-03	37MW2	alpha-Chlordane
	0802207-03	37MW2	beta-BHC [2C]
	0802208-01	37MW3	alpha-Chlordane
	0802208-01	37MW3	Endosulfan II
	0802208-01	37MW3	gamma-Chlordane
	0802262-01	38MW3	beta-BHC [2C]
Qualification:	Concentration exceeds calibration range		
Analysis:	USEPA-8081A		
Sample/Analyte:	0802207-01	37MW1	alpha-Chlordane
	0802207-03	37MW2	alpha-BHC
	0802207-03	37MW2	alpha-BHC [2C]
Qualification:	The analyte concentration in the sample exceeded the calibrated range of the instrument. The sample result is considered estimated.		
Analysis:	USEPA-8081A		
Sample/Analyte:	0802207-01	37MW1	alpha-Chlordane
	0802207-03	37MW2	alpha-BHC
	0802207-03	37MW2	alpha-BHC [2C]

CONTINUING CALIBRATION CHECK
USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 199
Lab File ID: A66_180-0
Sequence: 8022165
Lab Sample ID: 8022165-CCV4

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Calibration: 8B21011
Calibration Date: 02/20/08 14:51
Injection Date: 02/21/08
Injection Time: 07:37

Analyte	Type	CONC. (ug/mL)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Toxaphene	Q	0.500	0.714	1044001	214291		42.8	20 *

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk
* Values outside of QC limits

nog.

01215

DUAL COLUMN CONFIRMATION CHECK

37MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 12:50
Solids: 0.00
QC Batch: 0801648
GC Column(1):

Laboratory ID: 0802207-01
Prepared: 02/14/08 07:45
Preparation: 3510C Liquid-Liquid Extr
Sequence: 8022165
GC Column(2): RTX CLP Pest2

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO
File ID: A66_167-0
Analyzed: 02/20/08 23:53
Instrument: 199

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
alpha-Chlordane	* 1	14.99	14.98833	0.0016	505671.5		0.335	41.9
	2	17.24	17.235	0.005	225315.3		0.219	
gamma-Chlordane	* 1	14.64	14.635	0.005	211866.3		0.132	9.5
	2	16.84	16.84167	0.0016	131455.1		0.120	
Heptachlor Epoxide	* 1	14.32	14.31167	0.0083	239947.5		0.151	61.5
	2	16.33	16.325	0.005	87649.99		0.0800	

* Column used for quantitation

DUAL COLUMN CONFIRMATION CHECK

37MW1

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 12:50
Solids: 0.00
QC Batch: 0801648
GC Column(1):

Laboratory ID: 0802207-01RE1
Prepared: 02/14/08 07:45
Preparation: 3510C Liquid-Liquid Extr
Sequence: 8030318
GC Column(2): RTX CLP Pest2

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO
File ID: A66_421-0
Analyzed: 02/29/08 00:30
Instrument: 199

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
alpha-Chlordane	* 1	14.93	14.93	0	175015.3		0.294	57.3
	2	17.17	17.16167	0.00833	92770.92		0.163	
delta-BHC	1	11.29	11.275	0.015	4552.54		0.00566	
	* 2	13.56	13.53333	0.0267	6920.83		0.00943	50.0
gamma-Chlordane	* 1	14.57	14.57667	0.00667	75864.13		0.122	29.5
	2	16.77	16.76333	0.00667	54795.97		0.0906	
Heptachlor Epoxide	* 1	14.25	14.25	0	89775.93		0.142	75.5
	2	16.26	16.25	0.01	39149.59		0.0642	

* Column used for quantitation

DUAL COLUMN CONFIRMATION CHECK

37MW2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/11/08 15:30
Solids: 0.00
QC Batch: 0801648
GC Column(1):

Laboratory ID: 0802207-03
Prepared: 02/14/08 07:45
Preparation: 3510C Liquid-Liquid Extr
Sequence: 8022165
GC Column(2): RTX CLP Pest2

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO
File ID: A66_166-0
Analyzed: 02/20/08 23:18
Instrument: 199

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
alpha-BHC	1	9.79	9.776667	0.0133	986971.9		0.383	
	* 2	11.5	11.49667	0.00333	954104.9		0.556	36.8
alpha-Chlordane	* 1	15.02	14.98833	0.0317	70279.62		0.0464	161.7
	2	17.23	17.235	0.005	4954.86		0.00491	
beta-BHC	1	10.86	10.85	0.01	30148.5		0.0330	
	* 2	12.75	12.75	0	33446.77		0.0521	44.9
delta-BHC	1	11.34	11.32667	0.0133	30027.45		0.0145	
	* 2	13.61	13.60167	0.00833	21453.18		0.0158	8.6
gamma-BHC (Lindane)	1	10.63	10.625	0.005	18857.56		0.00906	
	* 2	12.54	12.535	0.005	18859.55		0.0128	34.2

* Column used for quantitation

DUAL COLUMN CONFIRMATION CHECK

37MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/12/08 09:45
Solids: 0.00
QC Batch: 0801648
GC Column(1):

Laboratory ID: 0802208-01
Prepared: 02/14/08 07:45
Preparation: 3510C Liquid-Liquid Extr
Sequence: 8022165
GC Column(2): RTX CLP Pest2

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO
File ID: A66_165-0
Analyzed: 02/20/08 22:42
Instrument: 199

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
alpha-Chlordane	* 1	15.01	14.98833	0.0217	152796.3		0.101	142.4
	2	17.24	17.235	0.005	17381.71		0.0170	
Endosulfan II	* 1	17.2	17.17	0.03	14221.24		0.0130	103.2
	2	19.55	19.535	0.015	3423.71		0.00415	
gamma-Chlordane	* 1	14.66	14.635	0.025	93620.15		0.0581	147.0
	2	16.84	16.84167	0.00167	9770.59		0.00887	

* Column used for quantitation

DUAL COLUMN CONFIRMATION CHECK

38MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 02/13/08 10:10
Solids: 0.00
QC Batch: 0801825
GC Column(1):

Laboratory ID: 0802262-01
Prepared: 02/19/08 17:08
Preparation: 3510C Liquid-Liquid Extr
Sequence: 8030318
GC Column(2): RTX CLP Pest2

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO
File ID: A66_432-0
Analyzed: 02/29/08 07:01
Instrument: 199

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
beta-BHC	1	10.8	10.8	0	4024.73		0.00547	
	* 2	12.68	12.68333	0.00333	11599.22		0.0160	98.1

* Column used for quantitation

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Polychlorinated Biphenyls (PCBs) by EPA Method 8082

Qualification:	One or more surrogate recoveries for the sample exceeded the upper control limit. Positive results are considered estimated. Non-detect results are not qualified.
Analysis:	USEPA-8082
Sample/Analyte:	0801490-BLK
Qualification:	One or more of the surrogate recoveries were outside of the laboratory control limits on the confirmation column. However, since there were no positive results on the primary column, no qualification is necessary.
Analysis:	USEPA-8082
Sample/Analyte:	0802204-02 DUP-7

SURROGATE STANDARD RECOVERY AND RT SUMMARY
USEPA-8082

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 8022021
Matrix: Water

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Instrument: 144
Calibration: 8B21006

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
DUP-7 (0802204-02)		**Lab File ID: A195256-0**		**Analyzed: 02/20/08 18:35**			
Decachlorobiphenyl	14.17	14.18	-0.01	+/-1.0	107	40 - 135	
Decachlorobiphenyl [2C]	16.83	16.84	-0.01	+/-1.0	109	40 - 135	
Tetrachloro-m-xylene	3.89	3.90	-0.01	+/-1.0	37	36 - 114	
Tetrachloro-m-xylene [2C]	5.36	5.36	0.00	+/-1.0	35	36 - 114	*
35 D-4 (0802204-04)		**Lab File ID: A195257-0**		**Analyzed: 02/20/08 19:00**			
Decachlorobiphenyl	14.17	14.18	-0.01	+/-1.0	101	40 - 135	
Decachlorobiphenyl [2C]	16.83	16.84	-0.01	+/-1.0	103	40 - 135	
Tetrachloro-m-xylene	3.89	3.90	-0.01	+/-1.0	41	36 - 114	
Tetrachloro-m-xylene [2C]	5.36	5.36	0.00	+/-1.0	38	36 - 114	
EQBK-5 (0802204-05)		**Lab File ID: A195258-0**		**Analyzed: 02/20/08 19:26**			
Decachlorobiphenyl	14.17	14.18	-0.01	+/-1.0	98	40 - 135	
Decachlorobiphenyl [2C]	16.83	16.84	-0.01	+/-1.0	100	40 - 135	
Tetrachloro-m-xylene	3.89	3.90	-0.01	+/-1.0	74	36 - 114	
Tetrachloro-m-xylene [2C]	5.36	5.36	0.00	+/-1.0	66	36 - 114	
LCS (0801647-BS1)		**Lab File ID: A195259-0**		**Analyzed: 02/20/08 19:51**			
Decachlorobiphenyl	14.17	14.18	-0.01	+/-1.0	98	40 - 135	
Decachlorobiphenyl [2C]	16.83	16.84	-0.01	+/-1.0	100	40 - 135	
Tetrachloro-m-xylene	3.89	3.90	-0.01	+/-1.0	80	36 - 114	
Tetrachloro-m-xylene [2C]	5.36	5.36	0.00	+/-1.0	71	36 - 114	
Blank (0801647-BLK1)		**Lab File ID: A195260-0**		**Analyzed: 02/20/08 20:16**			
Decachlorobiphenyl	14.17	14.18	-0.01	+/-1.0	86	40 - 135	
Decachlorobiphenyl [2C]	16.83	16.84	-0.01	+/-1.0	88	40 - 135	
Tetrachloro-m-xylene	3.89	3.90	-0.01	+/-1.0	70	36 - 114	
Tetrachloro-m-xylene [2C]	5.36	5.36	0.00	+/-1.0	62	36 - 114	
Calibration Check (8022021-CCV1)		**Lab File ID: A195261-0**		**Analyzed: 02/20/08 20:41**			
Decachlorobiphenyl	14.17	14.18	-0.01	+/-1.0	114	80 - 120	
Decachlorobiphenyl [2C]	16.83	16.84	-0.01	+/-1.0	120	80 - 120	
Tetrachloro-m-xylene	3.89	3.90	-0.01	+/-1.0	108	80 - 120	
Tetrachloro-m-xylene [2C]	5.36	5.36	0.00	+/-1.0	98	80 - 120	

00212

DATA VALIDATION WORKSHEET

Explosives

Reviewer: RA
Date: 3/17/08
DV Level: II III IV

Review Document:

_X__ Region III Modified for National Functional Guidelines
_X__ SW-846
_X__ Project QAPP/SAP

Project Name: RAAP 10
Project Number: 116563.51
Laboratory: TriMatrix
SDG No.: 36440-50
Test Name: Explosives
Method No.: 8330

1.0 Laboratory Deliverables

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).			
1.4	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	

Notes:

2.0 Holding Times

		Yes	No	NA
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)

		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration

		Yes	No	NA
4.1	Are at least five standards included in the calibration curve? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 Laboratory Control Sample (LCS)

		Yes	No	NA
5.1	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.2	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
5.3	Are there any RPD for LCS/LCSD recoveries outside the QC limits? If Yes, J(+) only.			✓

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
6.2	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			✓
6.3	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			✓

	<10%	low	high
Positives	L	L	K
Non-detects	R	UL	No action

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.2	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
7.3	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	Action: No action is required based on MS/MSd failure alone. Note in the report and use professional judgement.			

Notes:

8.0 Field Duplicate		Yes	No	NA
8.1	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: 35 D-2 & DUP-7 RL
HMX 1.4 TNB 1.35 5 OK ✓

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes, is all positive identifications were confirmed in second column? Apply J flag if RPD >40% between first and second columns.	✓		
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes: 37MW3 RPD > 40% at 45.8% for 2/6-DNT → J/g

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
10.1.1	Number of samples:			
10.1.2	Number of target compounds in each analysis: 14			
10.1.3	Number of results rejected or not reported:			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%			

Notes:

SINGLE-COMPONENT IDENTIFICATION SUMMARY

EPA SAMPLE #: 37MW3 LAB SAMPLE # 0802208-01

	COLUMN 1	COLUMN 2
Inst.ID:	221	221
Column:	Acclaim E1	Acclaim E2
ID(mm):		

Compound	Column	Retention Time	RT Window From	RT Window To	Concentration (ug/L)	RPD
1,3-Dinitrobenzene	1	14.76	13.65	15.45	0.18	0.0%
	2	16.96	15.49	17.57	0.18	
2,6-Dinitrotoluene	1	23.91	22.10	25.12	0.59	45.8%
	2	28.77	26.18	30.02	0.37	
2-Amino-4,6-DNT	1	22.83	21.07	23.99	0.39	13.7%
	2	42.75	38.89	44.57	0.34	
4-Amino-2,6-DNT	1	21.43	19.89	22.45	0.49	20.2%
	2	40.89	37.17	42.47	0.40	

02178

DATA VALIDATION WORKSHEET

Nitroglycerin

Reviewer: RA
Date: 3/17/08
DV Level: II (III) IV
Review Document:
_X__ Region III Modified for National Functional Guidelines
____ NFG for organic Data review (February 1994)
____ Project QAPP/SAP

Project Name: RAAP 10
Project Number: 116563351.40003
Laboratory: TriMatrix
SDG No.: 36440-50
Test Name: Nitroglycerin, PETN
Method No.: 8332-HPLC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Are the sample preparation benchsheets present and complete with sample volume/weights, dilutions, final volumes. %	✓		
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	✓		

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	✓		
	Action: If the temperature of the cooler was elevated (> 10 ^{O}C), then flag all positive results with a "J" and all non-detects "UJ".			✓
2.2	Have any technical holding times, determined from date of sampling to date of analysis (including dilution and reanalyese, been exceeded? Action: If yes, apply J (+) and UJ (-) to all analytes in the sample. For aqueous matrix - 7 days (extraction) and 40 days (analysis) For soil matrix - 14 days (extraction) and 40 days (analysis).		✓	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, note in the DV report.		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)	✓		
3.2	Do any method blanks have positive results? Action: If Yes, positive sample results< 5 Xblank conc. in the associated should be reported and qualified "B".		✓	
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.		✓	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, note in the DV report.	✓		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	✓		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If No, apply R to all results for specific analyte(s) for all samples associated with the calibration.	✓		
4.3	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 20% and %D < ± 15%	✓		
	For initial Calibration: for %RSD > ± 20%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).	✓		
	For Continuing Calibration: displaying a negative bias: %D > + 15% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >15%, J(+).	✓		
4.4	Has a continuing calibration verification been analyzed prior to and after every 10 samples and at the end of the analysis sequence? If no, apply R to associated samples.	✓		

Notes:

5.0 Surrogate Recovery		Yes	No	NA
5.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	✓		
5.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	✓		
5.3	If No in Section 5.2, are these sample(s) or method blank(s) reanalyzed?			✓
5.4	If No in Section 5.3, is any sample DF greater than 10? No action is taken if surrogate is expected to be diluted out.			✓
	Action: If No, for any %R > UCL, apply K to all positive results of analytes; for any %R < LCL, but > 10%, L(+)/UL (-); for any %R < 10%, apply L (+) and R (-) to all results of analytes asociated with the surrogate.			

Notes:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
6.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
6.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
6.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes: MSD for 35D-4 71207. for PETN at 122%. Parent UD, No action.
✓ Pentaerythritol Tetranitrate

7.0 Laboratory Control Sample (LCS)

		Yes	No	NA
7.1	Is the LCS/LCSD recovery form present?	✓		
7.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
7.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits?		✓	
	Action: If Yes, J(+) only.			

Notes:

8.0 Field Duplicate

		Yes	No	NA
8.1	Were field duplicate prepared and analyzed at the corrected frequency (one per 20 samples, per matrix and per level)?	✓		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
8.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes: 35D-2 & DUP-7 Both NDSV

9.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes, is all positive identifications were confirmed in second column? Apply J flag if RPD >40% between first and second columns.		✓	
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	✓		

Notes:

10.0 Data Completeness

		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit 90%)	✓		
10.1.1	Number of samples:			
10.1.3	Number of results rejected and not reported:			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = 100%			
	% Completeness =			

Notes:

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8332

35 D-4

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-50

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Preparation: 8332 Extraction

Initial/Final: 770 mL / 10 mL

Laboratory ID: 0801650-MSD1

QC Batch: 0801650

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Nitroglycerin	13.0	14.9	115	0.7	20	30 - 120	ug/L
Pentaerythritol Tetranitrate	13.0	15.8	122 *	3	20	30 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Nitroglycerine by EPA Method 8332

Qualification:	The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.	
Analysis:	USEPA-8332	
Sample/Analyte:	0801650-MSD	Pentaerythritol Tetranitrate

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-50
Project No.: 11656351

Project Name: RAAP 10
Reviewer: RA
Date: 3/17/08

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓			✓			✓					
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓			✓			✓					
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓			✓			✓				
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{O}C \pm 2\ ^{O}C$)	✓			✓			✓					
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓			✓			✓					

Note: _____

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		✓			✓			✓				

Note: _____

3.0 Instrument Calibration

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	✓			✓			✓					
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	✓			✓			✓					
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.												
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	✓			✓			✓					
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	✓			✓			✓					
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	✓			✓			✓					
	ICV and CCV: Action: L(+)/R(-) L(+)/UL(-) K(+) Mercury < 65% 65% - 79% > 120% Cyanide < 65% 65% - 84% > 115% Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	✓			✓								
	<50% 50%-79% >120% 2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K												

Note: _____

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4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓			✓			✓					
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	✓			✓			✓					
4.3	Are there reported MB or ICB/CCBs values > MDL?	✓				✓			✓				
	Sample Results > MDL												
	< 5X Blank Contamination B		✓			✓			✓				
4.4	Are there negative blank results with the absolute value > MDL?		✓			✓			✓				
	Sample Results Non-detects > MDL												
	< 5X absolute Blank Contamination UL L	✓											
4.5	Are there reported field blank > ± MDL?	✓				✓			✓				
	Sample Results > MDL												
	< 5X Blank Contamination B												

Note: Method 6020 → ICB, CCB antimony, MB → Diss Cr @ 0.575 ug/L, Diss & zinc 4.68 ug/L (<5X B,O)
total zinc 2.95 ug/L, Diss Ni 0.516 ug/L <5X → B,P
Method 6020 → EQBK-5, total Cr 0.61 ug/L, total Ni 0.41 ug/L <5X → B,X

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	✓			✓								
5.2	Are the ICS AB recoveries within 80% - 120%?	✓			✓								
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	✓			✓								
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?	✓			✓								
	If not...												
	Action: Not Spiked Analytes: < -MDL L(+)/UL(-); > MDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note:

URS

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	✓			✓			✓					
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		✓			✓			✓				
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note: _____

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	✓			✓			✓					
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	✓			✓			✓					

Note: _____

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	✓			✓			✓					
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous matrices or lab limits for soil matrices?	✓			✓			✓					
	%R > 125% 30%< %R < 74% < 30%												
	Positive K L L												
	Non-detect None UL R												
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.			✓			✓			✓			

Note: _____

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	✓			✓			✓					

Note: _____

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	✓			✓								
10.2	Was a five-fold dilution performed?	✓			✓								
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	✓			✓								

Note: _____

11.0 Field Duplicate Samples

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	✓			✓			✓					
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report	✓			✓			✓					

Note: Hg → 35D-2 & DUP-7 Both NDSV
Also, see attached.

12.0 Result Verification/ Internal Standards/ Tune

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	✓			✓			✓					
12.2	Were all dilution reflected in the positive results and detection limits?	✓			✓			✓					
12.3	Were the Internal Standard recoveries within 30-120%	✓			✓								
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	✓											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	✓											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	✓											

Note:

13.0 Completeness Calculation

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)	✓			✓			✓					
13.1.1	Number of samples:												
13.1.2	Number of target compounds in each analysis:												
13.1.3	Number of results rejected and not reported:												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2) % Completeness = 100 %												

Note:

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Page ____ of ____

Job ____ Project No. ____ Sheet ____ of ____

Description ____ Computed by ____ Date ____

____ Checked by ____ Date ____

Reference

Field Dups for Method 6010B

		35D-2 (ug/L)	& DUP-7 (ug/L)	RL (ug/L)	RPD
Total	Ca	51,000	51,000	500	0% ✓
"	Fe	10 J	13 J	20	OK ✓
"	Mg	30,000	30,000	500	0% ✓
"	K	1,500	1,400	200	7% ✓
"	Na	5,900	5,800	500	2% ✓

	35D-2 (ug/L)	& DUP-7 (ug/L)	RL (ug/L)	RPD
Diss Ca	53,000	49,000	500	8% ✓
Diss Fe	13 J	ND	20	OK ✓
Diss Mg	32,000	29,000	500	10% ✓
Diss K	1,400	1,300	200	7% ✓
Diss Na	5,800	5,600	500	3% ✓

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Page ____ of ____

Job ____ Project No. ____ Sheet ____ of ____

Description ____ Computed by ____ Date ____

____ Checked by ____ Date ____

Reference

Field DUPs for Method 6020

	35D-2 ug/L	DUP-7 ug/L	RL ug/L	Y. RPD
Total Ba	130	130	2	0% Y
" Co	0.63J	0.63J	1	OK Y
" Cu	0.71J	1.1	1	OK Y
" Mn	150	150	3	0% Y
" Zn	15	12	10	OK Y

	35D-2 ug/L	DUP-7 (ug/L)	RL (ug/L)	RPD
Diss Ba	120	120	2	0% Y
Diss Co	0.76J	0.54J	1	OK Y
" Cu	1.1	2.7	1	OK Y
" Mn	160	160	3	0% Y
" Zn	24	ND	10	OK Y

BLANKS
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 8022138

SDG: 36440-50
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Instrument ID: 114
Calibration: 8B22016

Lab Sample ID	Analyte	Found	MRL	MDL	Units	C	Analyzed
8022138-ICB1	Antimony	0.170	0.60	0.089	ug/L	J	02/21/08 12:23
	Antimony	0.170	0.60	0.089	ug/L	J	02/21/08 12:23
	Arsenic	0.00205	0.60	0.15	ug/L	U	02/21/08 12:23
	Arsenic	0.00205	0.60	0.15	ug/L	U	02/21/08 12:23
	Barium	0.000135	0.40	0.10	ug/L	U	02/21/08 12:23
	Barium	0.000135	0.40	0.10	ug/L	U	02/21/08 12:23
	Beryllium	-0.00356	0.40	0.061	ug/L	U	02/21/08 12:23
	Beryllium	-0.00356	0.40	0.061	ug/L	U	02/21/08 12:23
	Cadmium	-0.00215	0.040	0.012	ug/L	U	02/21/08 12:23
	Cadmium	-0.00215	0.040	0.012	ug/L	U	02/21/08 12:23
	Cobalt	0.00151	0.20	0.019	ug/L	U	02/21/08 12:23
	Cobalt	0.00151	0.20	0.019	ug/L	U	02/21/08 12:23
	Copper	-0.00117	0.20	0.066	ug/L	U	02/21/08 12:23
	Copper	-0.00117	0.20	0.066	ug/L	U	02/21/08 12:23
	Lead	-0.00121	0.20	0.065	ug/L	U	02/21/08 12:23
	Lead	-0.00121	0.20	0.065	ug/L	U	02/21/08 12:23
	Manganese	0.00268	0.60	0.086	ug/L	U	02/21/08 12:23
	Manganese	0.00268	0.60	0.086	ug/L	U	02/21/08 12:23
	Nickel	0.00490	0.40	0.056	ug/L	U	02/21/08 12:23
	Nickel	0.00490	0.40	0.056	ug/L	U	02/21/08 12:23
	Selenium	0.0433	0.60	0.18	ug/L	U	02/21/08 12:23
	Selenium	0.0433	0.60	0.18	ug/L	U	02/21/08 12:23
	Silver	-0.00119	0.10	0.024	ug/L	U	02/21/08 12:23
	Silver	-0.00119	0.10	0.024	ug/L	U	02/21/08 12:23
	Thallium	-0.00563	0.20	0.034	ug/L	U	02/21/08 12:23
	Thallium	-0.00563	0.20	0.034	ug/L	U	02/21/08 12:23
	Zinc	0.00125	2.0	0.17	ug/L	U	02/21/08 12:23
	Zinc	0.00125	2.0	0.17	ug/L	U	02/21/08 12:23
8022138-CCB1	Antimony	0.146	0.60	0.089	ug/L	J	02/21/08 12:57
	Antimony	0.146	0.60	0.089	ug/L	J	02/21/08 12:57
	Arsenic	-0.00787	0.60	0.15	ug/L	U	02/21/08 12:57
	Arsenic	-0.00787	0.60	0.15	ug/L	U	02/21/08 12:57
	Barium	0.000888	0.40	0.10	ug/L	U	02/21/08 12:57

03023

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Dissolved Metals by EPA 6000/7000 Series Methods

Qualification: The % difference between the values of the isotopes monitored for this analyte exceeded 25%; the lower of the two results has been reported.

Analysis: USEPA-6020A

Sample/Analyte:		
0802167-01	35MW2	Nickel
0802167-03	35MW1	Nickel
0802204-01	35 D-2	Nickel
0802204-02	DUP-7	Nickel
0802204-04	35 D-4	Nickel
0802207-01	37MW1	Copper
0802207-01	37MW1	Nickel
0802208-01	37MW3	Chromium
0802208-01	37MW3	Nickel
0802208-03	38MW1	Chromium
0802208-03	38MW1	Nickel
0802208-04	38MW2	Nickel
0802262-01	38MW3	Nickel

Qualification: This analyte was not present in this sample at a concentration greater than 100 times the MDL, therefore serial dilution is not required.

Analysis: USEPA-6020A

Sample/Analyte:		
0802204-02	DUP-7	Copper
0802204-04	35 D-4	Chromium
0802204-04	35 D-4	Cobalt
0802204-04	35 D-4	Zinc

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-50
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Matrix: Water
Laboratory ID: 0801815-BLK1
File ID: 8022138-035
Prepared: 02/20/08 08:30
Preparation: General Metals Prep
Initial/Final: 25 mL / 125 mL
Analyzed: 02/21/08 15:24
Instrument: 114
QC Batch: 0801815
Sequence: 8022138
Calibration: 8B22016

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
7440-38-2	Arsenic, Dissolved	0.74	3.0	3.0	ug/L	U
7440-39-3	Barium, Dissolved	0.52	2.0	2.0	ug/L	U
7440-43-9	Cadmium, Dissolved	0.062	0.20	0.20	ug/L	U
7440-48-4	Cobalt, Dissolved	0.096	1.0	1.0	ug/L	U
7439-92-1	Lead, Dissolved	0.33	1.0	1.0	ug/L	U
7440-02-0	Nickel, Dissolved	0.28	2.0	0.516	ug/L	J
7782-49-2	Selenium, Dissolved	0.92	3.0	3.0	ug/L	U
7440-22-4	Silver, Dissolved	0.12	0.50	0.50	ug/L	U
7440-28-0	Thallium, Dissolved	0.17	1.0	1.0	ug/L	U

2.58

03049

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-50
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Matrix: Water
Laboratory ID: 0801815-BLK3
File ID: 8022299-035
Prepared: 02/20/08 08:30
Preparation: General Metals Prep
Initial/Final: 25 mL / 125 mL
Analyzed: 02/22/08 19:25
Instrument: 201
QC Batch: 0801815
Sequence: 8022299
Calibration: 8B25007

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
7440-47-3	Chromium, Dissolved	0.31	2.0	0.575	ug/L	J

2.875

03051

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-50
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Matrix: Water
Laboratory ID: 0802168-BLK1
File ID: 8022720-055
Prepared: 02/25/08 16:30
Preparation: General Metals Prep
Initial/Final: 25 mL / 125 mL
Analyzed: 02/27/08 11:50
Instrument: 114
QC Batch: 0802168
Sequence: 8022720
Calibration: 8B27016

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
7440-66-6	Zinc, Dissolved	0.84	10	4.68	ug/L	J

23.4

03052

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-50
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Matrix: Water
Laboratory ID: 0801785-BLK1
File ID: 8022138-015
Prepared: 02/18/08 07:35
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 02/21/08 13:09
Instrument: 114
QC Batch: 0801785
Sequence: 8022138
Calibration: 8B22016

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
7440-36-0	Antimony, Total	0.44	3.0	3.0	ug/L	U
7440-38-2	Arsenic, Total	0.74	3.0	3.0	ug/L	U
7440-39-3	Barium, Total	0.52	2.0	2.0	ug/L	U
7440-41-7	Beryllium, Total	0.31	2.0	2.0	ug/L	U
7440-43-9	Cadmium, Total	0.062	0.20	0.20	ug/L	U
7440-48-4	Cobalt, Total	0.096	1.0	1.0	ug/L	U
7440-50-8	Copper, Total	0.33	1.0	1.0	ug/L	U
7439-92-1	Lead, Total	0.33	1.0	1.0	ug/L	U
7439-96-5	Manganese, Total	0.43	3.0	3.0	ug/L	U
7440-02-0	Nickel, Total	0.28	2.0	2.0	ug/L	U
7782-49-2	Selenium, Total	0.92	3.0	3.0	ug/L	U
7440-22-4	Silver, Total	0.12	0.50	0.50	ug/L	U
7440-28-0	Thallium, Total	0.17	1.0	1.0	ug/L	U
7440-66-6	Zinc, Total	0.84	10	2.85	ug/L	J

14.25

(1)

TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 123182

Page 1 of 7

For Lab Use Only
Cart: 1
VOA Rack/Tray: 614 R.
Receipt Log No.: 1-11
Project Chemist: LMR
Laboratory Project No.: E-0802167

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 210
Richmond, Va. 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFAAP
RAAP 10 GW Sampling
Client Project No./P.O. No.: 11656351.40002
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: TINA DEVINE

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	D VOC's 8260B	B Metals (Filtered)	B Metals (unfiltered)	A SVOC's	A PCB/PEST	A Explosives 8330 & 8332	Total	Sample Comments
				Container Type (corresponds to Container Packing List)							1p	1p	1p	2	2	2		
				Number of Containers Submitted														
19	WG		01	1 35mw2	Tm 1886	2/7/08	1350		X	W	B	✓	✓	✓	✓	✓	13	12-Phd1-#1p
05	WQ		02	2 Trip Blank	Tm 1886	2/7/08	1350		X	W	✓						2	2
19	WG		03	3 35mw1	Tm 1886	2/7/08	1620		X	W	B						3	2-Phd1-#1p
				4														
				5														
				6														
				7														
				8														
				9														
				10														

Preservatives: A NONE pH~7 (2) B HNO_3 pH<2 (5) C H_2SO_4 pH<2 (5) D 1+1 HCl pH<2 (5) E NaOH pH>12 F ZnAc/NaOH pH>9 G MeOH H Other (note below)

Sampled By (print): MARK FISHER
Sampler's Signature:
Company: URS Corporation

How Shipped? Hand Carrier FED EX
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	2/7/08	1946						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						Kim Ziegler	2-8-08	09:00

8

Fed Ex

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(2)

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Chain of Custody Record

COC No. 123191

Page 1 of 1

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Cart: 1
VOA Rack/Tray:
Receipt Log No.: 1-11
Project Chemist: WAR
Laboratory Project No.: E-08021107

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 210
Richmond, VA. 23230
Phone: (804) 965-9000
Fax: (804) 965-9764

Project Name: RFAAP RAAP 10 GW Sampling
Client Project No./P.O. No.: 11656351.40002
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: TINA DEVINE

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals (filtered) B	Metals (unfiltered) B	SVOCs A	PCB/PEST A	Explosives 8330 + 8332 A						Total	Sample Comments
										Container Type (corresponds to Container Packing List)											
										Number of Containers Submitted											
See COC		123182	1 35MW1	TMPK	2/7/08	1620		X	W	6	15	2								10	
			2																		
			3																		
			4																		
			5																		
			6																		
			7																		
			8																		
			9																		
			10																		

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): MARK FISHER
Sampler's Signature:
Company: URS Corporation

How Shipped? Hand Carrier FED EX
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	2/7/08	1746						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						Kim Ziegler	2-8-08	9:00

8 FedE

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COC No. 123180 (1)

Page 1 of 1

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Cart: 4
VOA Rack/Tray: 248 WR
Receipt Log No.: 53
Project Chemist: WR
Laboratory Project No.: E 0802204

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 210
Richmond, VA 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFAAP
RAAP IO GW sampling
Client Project No./P.O. No.: 11656351
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: TINA DEVINE

Analyses Requested

D	B	B	A	A	A				
VOC's 8260B	Metals (6 Metals)	Metals (Vanadium)	SVOC's	PCB / PEST	Explosives 8330 / 8321				

Container Type (corresponds to Container Packing List)

1p	6	15	2	→						

Number of Containers Submitted

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Total	Sample Comments
19	WG	01	1	35 D-2	TMO 0633	2/8/08	0945		X	W	13	2-#1p's-Phd1
20	WG	02	2	DUP - 7		2/8/08	—		X	W	3	↓
05	WQ	03	3	Trip Blank	TM 0633	2/8/08	0945		X	W	3	2 Trip Blanks Rec'd
21	WG	04	4	35 D-4 MS/MSD		2/8/08	1200		X	W	7	6-#1p's-Phd1
22	CQ	05	5	EQBK-5		2/8/08	1400		X	W	2	
			6									
			7									
			8									
			9									
			10									

Sampled By (print): MARK FISHER
Sampler's Signature: [signature]
Company: URS Corp.

How Shipped? Hand Carrier: Fed Ex
Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
MARK FISHER	2/8/08	1530						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						[signature]	2-9-08	10:35AM

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Chain of Custody Record

COC No. 123179 (2)

Page 1 of 1

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Cart:
VOA Rack/Tray:
Receipt Log No. 5-3
Project Chemist: WAR
Laboratory Project No. E

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 210
Richmond, VA 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFAAP RAAP 10 GW Sampling
Client Project No./P.O. No.: 11656357
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: TINA Devine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals (Filtered)	Metals (Unfiltered)	SVOCs	PCB/PEST	Explosives								Total	Sample Comments
										B	B	A	A	A									
										6	15	2	→										
										Number of Containers Submitted													
See COC 123180			1 DUP - 7	TMO 884	2/8/08	—		X	WW	✓	✓	✓	✓	✓								10	
			2																				
			3																				
			4																				
			5																				
			6																				
			7																				
			8																				
			9																				
			10																				

⇦ PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): MARK FISHER
Sampler's Signature:
Company: URS Corp.

How Shipped? Hand Carrier: Fed Ex
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	2/8/08	1530						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						Heather L Brady	2-9-08	10:35AM

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Chain of Custody Record

COC No. 123181

(3)

Page 1 of 1

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Cart
VOA Rack/Tray
Receipt Log No.
Project Chemist WBR
Laboratory Project No. E

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 210, Richmond, VA 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFAAP RAAP 10 GW sampling
Client Project No./P.O. No.: 11656351
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: Tina Perine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type (corresponds to Container Packing List)										Total	Sample Comments
										B	B	A	A	A							
										Number of Containers Submitted											
										Metals (6 Hered)	Metals (unfiltered)	SVOCs	PCB / PEST	Explosives							
See COC 123180			1 35 D-4 MS/MSD	TM 1870	2/8/08	1200		X	W	2	2	2	2	4						12	
			2																		
			3																		
			4																		
			5																		
			6																		
			7																		
			8																		
			9																		
			10																		

⇦ PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): MARK Fisher
Sampler's Signature: [signature]
Company: URS. Corp.

How Shipped? Hand Carrier Fed Ex
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
[signature]	2/8/08	1530						

1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						Heather L Bradley	2-9-08	10:25AM

TriMatrix Laboratories, Inc.

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Chain of Custody Record

COC No. 123188

Page 1 of 1

For Lab Use Only
Cart:
VOA Rack/Tray:
Receipt Log No.:
Project Chemist: WBR
Laboratory Project No.: E

Client Name: URS Corporation
Address: 5540 Falmouth St, Suite 210, Richmond, VA. 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFAAP RAAP 10 GW Sampling
Client Project No./P.O. No.: 11656351
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals (filtered) B	Metals (unfiltered) B	SVOC's A	PCB/PEST A	Total	Sample Comments
	W & S	SOL COC 123180	1 35 D-4 MS/MSD	TM 1427	2/6/08	1200		X	W	N	N	Y	Y	10	
			2												
			3												
			4												
			5												
			6												
			7												
			8												
			9												
			10												

Container Type (corresponds to Container Packing List): 6 15 2 →
Number of Containers Submitted

⇦ PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Mark Fisher
Sampler's Signature:
Company: URS Corp.

How Shipped? Hand Carrier Fed Ex
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	2/8/08	1530						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						Heather L Brady	2-9-08	10:25AM

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Chain of Custody Record

COC No. 123180

Page 1 of 1

For Lab Use Only
Cart:
VOA Rack/Tray:
Receipt Log No.:
Project Chemist: CSR
Laboratory Project No.: E

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 210
Richmond, VA. 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFAAP
RAAP 10 GW sampling
Client Project No./P.O. No.: 11656351
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	B metals	A SVOCs	A PCB/PEST	A Explosives	Total	Sample Comments
		See COC 123180	1 EQBK-5	TM 0005	2/8/08	1400		X	W	6	2	2	4	9	
			2												
			3												
			4												
			5												
			6												
			7												
			8												
			9												
			10												

Container Type (corresponds to Container Packing List)
Number of Containers Submitted

PRESERVATIVES
A NONE pH>2
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Mark Fisher
Sampler's Signature: MTF
Company: URS Corp.

How Shipped? Hand Carrier: Fed Ex
Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
MTF	2/8/08	1530						

1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						Nadine L Brady	2-9-08	10:25 AM

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Chain of Custody Record

COC No. 123183

Page 1 of

For Lab Use Only
Cart: 8
VOA Rack/Tray: 4513
Receipt Log No: 98
Project Chemist: MDR
Laboratory Project No: E 0802207

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 201
Richmond, VA 23230
Phone (804) 965-9002
Fax (804) 965-9764

Project Name: RFAAP
RAAP 10 GW Sampling
Client Project No./P.O. No.: 11656351
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

	Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type (corresponds to Container Packing List)										Total	Sample Commer
											VOCs 8260B	Metals (filtered)	Metals (unfiltered)	PEST / PCB's	Explosives 8330 / 6332							
											Number of Containers Submitted											
1	23	W	01	37MW1	TM 1713	2/11/08	1250		X	W	B	V	V	B	W						11	
2	05	W	02	Trip Blank	TM 1713	2/11/08	1250		Y	W	D										2	
3	23	W	03	37MW2	TM 1713	2/11/08	1530		X	W	B										3	
4																						
5																						
6																						
7																						
8																						
9																						
10																						

Preservatives: A NONE pH~7; B HNO_3 pH<2; C H_2SO_4 pH<2; D 1+1 HCl pH<; E NaOH pH>12; F ZnAc/NaOH pH; G MeOH; H Other (note bel

Sampled By (print): MARK FISHER
Sampler's Signature: [signature]
Company: URS Corporation

How Shipped? Hand Carrier Fed Ex
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
[signature]	2/11/08	1830						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						[signature]	2.12.08	09

TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 123184

Page ____ of ____

For Lab Use Only
Cart: 8
VOA Rack/Tray: 457B
Receipt Log No.: 9.8
Project Chemist: WJR
Laboratory Project No.: E 0802207

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 210
Richmond, VA 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFAAP
RAAP 10 GW Sampling
Client Project No./P.O. No.: 11656351
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

	B	B	A	A							
	metals (6 Hexed)	metals (unfiltered)	PCB/PEST	Explosives 8330 + 8332							
Container Type (corresponds to Container Packing List)											
Number of Containers Submitted	1	5	6	2	2						Total
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

⇦ PRESERVATIVE
A NONE pH>7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<
E NaOH pH>12
F ZnAc/NaOH pH
G MeOH
H Other (note belo

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Total	Sample Comment
See COC 123183			1 37MW2	1774	2/11/08	1530		X	W	8	

Sampled By (print): Mark Fisher
Sampler's Signature:
Company: URS Corp.

How Shipped? Hand Carrier: Fed Ex
Tracking No.

1. Relinquished By: Date: 2/11/08 Time: 1830
1. Received By: Date: Time:
2. Relinquished By: Date: Time:
2. Received By: Date: Time:
3. Relinquished By: Date: Time:
3. Received for Lab By: Date: 2.12.08 Time: 0

Comments

TriMatrixCOC -- COC WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

1 II

TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
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Chain of Custody Record

COC No. 123185

Page 1 of 1

For Lab Use Only
Cart: 8
VOA Rack/Tray: 452B
Receipt Log No.: 1116
Project Chemist: WSR
Laboratory Project No.: E

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 201
Richmond, VA 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFMAP
RAMP 10 GW sampling
Client Project No./P.O. No.: 11652351
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: Tina Perrine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type (corresponds to Container Packing List)										Total	Sample Comments
										D	B	B	A	A							
										VOC's 8260B	Metals (filtered)	metals (unfiltered)	PCB/PEST	Explosives 8330/8332							
										Number of Containers Submitted											
										10	15	10	2	2							
23	WG	01	1 37 MW3	TM 1865	2/12/08	0945		X	W	3	✓	✓	2	✓						11	
05	WQ	02	2 Trip Blank		2/12/08	0945		X	W	2										2	
23	WG	03	3 38 MW1		2/12/08	1140		X	W	3										3	
23	WG	04	4 38 MW2		2/12/08	1440		X	W	3										3	
			5																		
			6																		
			7																		
			8																		
			9																		
			10																		

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Mark Fisher
Sampler's Signature:
Company: URS Corp.

How Shipped? Hand Carrier: Fed Ex
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	2/12/08	1700						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
							2-13-08	0930

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TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
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www.trimatrixlabs.com

Chain of Custody Record

COC No. 123187

Page 1 of 1

For Lab Use Only
Cart: 8
VOA Rack/Tray: 452B
Receipt Log No.: 116
Project Chemist: WJR
Laboratory Project No.: E

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 201
Richmond, VA 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFAAP
RAAP 10 GW sampling
Client Project No./P.O. No.: 11656351
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals (unfiltered) B	Metals (filtered) B	PCB/PEST A	Explosives 8330/8321 A	Total	Sample Comments
			Container Type (corresponds to Container Packing List)							6	15	2	2		
			Number of Containers Submitted							4	4	2	4		
See	COC123185	1	38MW1	TM 1743	2/12/08	1140		X	W					8	
		2													
		3													
		4													
		5													
		6													
		7													
		8													
		9													
		10													

Preservatives
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): MARK FISHER
Sampler's Signature: [signature]
Company: URS Corp.

How Shipped? Hand Carrier: Fed Ex
Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
[signature]	2/12/08	1700						

1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						[signature]	2/13/08	0930

TriMatrixCOC -- COC WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

3 of 4 (VAN)

TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 123189

Page 1 of 1

For Lab Use Only
Cart: 8
VOA Rack/Tray: 452B
Receipt Log No: 11-6
Project Chemist: USR
Laboratory Project No: E

Client Name: URS Corporation
Address: 5540 Falmouth St. Suite 210
Richmond, VA 23230
Phone (804) 965-9000
Fax (804) 965-9764

Project Name: RFMAP
RAAP 10 Gw Sampling
Client Project No./P.O. No.: 11656351
Invoice No. ☐ Client ☐ Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Container Type (corresponds to Container Packing List)										Total	Sample Comments
										B	B	A	A								
										metals (filtered)	metals (unfiltered)	PCB/PEST	Explosives 8330 + 8332								
										Number of Containers Submitted											
	SW	SDG COC123185	1 38mw2	TM 1631	2/12/08	1440		X	W	1	1	2	4							8	
			2																		
			3																		
			4																		
			5																		
			6																		
			7																		
			8																		
			9																		
			10																		

Preservatives
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): MARK FISHER
Sampler's Signature: [signature]
Company: URS Corp.

How Shipped? Hand Carrier Fed Ex
Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
[signature]	2/12/08	1700						
1. Received By	**Date**	**Time**	**2. Received By**	**Date**	**Time**	**3. Received For Lab By**	**Date**	**Time**
						[signature]	2-13-08	0930

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TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 123192

Page 1 of 1

For Lab Use Only

Cart: lb

VOA Rack/Tray:

Receipt Log No.: 157

Project Chemist:

Laboratory Project No.: E-802262

Client Name: URS Corporation

Address: 5540 Falmouth St., Suite 201
Richmond, VA 23230

Phone: (804) 965-9000
Fax: (804) 965-9764

Project Name: RAAP 10 RFI

Client Project No./P.O. No.: 11656351.40006

Invoice No.: ☒ Client ☐ Other (comments)

Contact/Report To: Tina DeVine

Analyses Requested

Test Group	Matrix Code	Laboratory Sample Number	Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Metals - filtered	Metals - unfiltered	SVOCs	PCB/Pest 8270/6532 Explosives	VOCs 8260	Total	Sample Comments
										B	B	A	A	A	D	
19	GW	61	1 38MW3	TM1829	02-13-08	10:10		✓	GW	1	1	2	2	2	3	13
			2													
			3													
			4													
			5													
			6													
			7													
			8													
			9													
			10													

Container Type (corresponds to Container Packing List)

Number of Containers Submitted

PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): Jim Carter

Sampler's Signature:

Company: URS Corp

How Shipped? Hand Carrier: Fed Ex

Tracking No.:

Comments:

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
Jim Carter	2-14-08	1140						
1. Received By	Date	Time	2. Received By	Date	Time	3. Received for Lab By	Date	Time
							2.15.08	0940

TriMatrixCOC -- COC WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCS/LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	g	Laboratory duplicate imprecision
g	Tuning failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	h	Holding time violation
h	Holding time violation	h	Holding time violation	k	Cooler receipt temperature exceeds limits
i	Internal standard failure	i	Internal standard failure	l	LCS recovery failure
k	Cooler receipt temperature exceeds limits	k	Cooler receipt temperature exceeds limits	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination	n	Failed Signal to noise ratio		

DATA VALIDATION REPORT - Level III Review

SDG No.: R2842330 **Fraction:** Perchlorate

Lab: Columbia Analytical Services **Project Name:** RAAP 10 RFI

Reviewer: RA **Date:** March 5, 2008

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific Quality Assurance Project Plan (QAPP).

Major Anomalies: None.

Minor Anomalies: None.

Correctable Anomalies: None.

Comments: On the basis of this evaluation, the laboratory appears to have followed the specified method. All data are usable for their intended purpose based on the data reviewed.

Signed: Rayan

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : D-2 (SWMU35)

Date Sampled : 02/13/08 17:50 **Order #:** 1077114 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157414

ANALYTE		MDL	PQL	RESULT	UNITS
DATE EXTRACTED	: 02/21/08				
DATE ANALYZED	: 02/21/08				
ANALYTICAL DILUTION:	1.00				
PERCHLORATE		0.080	0.20	0.29	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : 37MW3

Date Sampled : 02/13/08 19:21 **Order #:** 1077117 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/21/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	2.0	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : 35MW1

Date Sampled : 02/13/08 17:30 **Order #:** 1077118 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/21/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	0.25	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : 38MW2

Date Sampled : 02/12/08 14:40 **Order #:** 1077121 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/21/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	0.32	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : D-4 (SWMU35)

Date Sampled : 02/13/08 17:55 **Order #:** 1077122 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157416

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/22/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	0.45	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : DUP-1P

Date Sampled : 02/12/08 : **Order #:** 1077123 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/22/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	0.31	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : 38MW1

Date Sampled : 02/12/08 11:40 **Order #:** 1077124 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/22/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	1.2	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : 38MW3

Date Sampled : 02/12/08 10:10 **Order #:** 1077125 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/22/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	0.44	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : 37MW1

Date Sampled : 02/13/08 19:35 **Order #:** 1077127 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/22/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	0.97	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : 37MW2

Date Sampled : 02/13/08 19:36 **Order #:** 1077129 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/22/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	2.2	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : EQBK1P

Date Sampled : 02/14/08 11:00 **Order #:** 1077130 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/22/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	0.20 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 6850
Reported: 02/28/08

URS Corp.
Project Reference: RAAP 10 RFI
Client Sample ID : 35MW2

Date Sampled : 02/13/08 17:40 **Order #:** 1077279 **Sample Matrix:** WATER
Date Received: 02/15/08 **Submission #:** R2842330 **Analytical Run** 157414

ANALYTE	MDL	PQL	RESULT	UNITS
DATE EXTRACTED : 02/21/08				
DATE ANALYZED : 02/22/08				
ANALYTICAL DILUTION: 1.00				
PERCHLORATE	0.080	0.20	0.13 J	UG/L

SDG #:RAAP10
SUBMISSION R2842330
CLIENT: URS Corp.
CLIENT REP: Michael Perry
PROJECT: RAAP 10 RFI

BATCH COMPLETE: __yes_____
DISKETTE REQUESTED: Y_X__ N____
DATE: 2/19/08
CUSTODY SEAL: PRESENT
CHAIN OF CUSTODY: PRESENT:

DATE REVISED:
DATE DUE: 3/07/08
PROTOCOL: SW846
SHIPPING No.:

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
1077114	D-2 (SWMU35)	WATER	6850-Perchlorate	2/13/2008	2/15/08			
1077117	37MW3	WATER	6850-Perchlorate	2/13/2008	2/15/08			
1077118	35MW1	WATER	6850-Perchlorate	2/13/2008	2/15/08			
1077121	38MW2	WATER	6850-Perchlorate	2/12/2008	2/15/08			
1077122	D-4 (SWMU35)	WATER	6850-Perchlorate	2/13/2008	2/15/08			
1077123	DUP-1P	WATER	6850-Perchlorate	2/12/2008	2/15/08			
1077124	38MW1	WATER	6850-Perchlorate	2/12/2008	2/15/08			
1077125	38MW3	WATER	6850-Perchlorate	2/12/2008	2/15/08			
1077127	37MW1	WATER	6850-Perchlorate	2/13/2008	2/15/08			
1077129	37MW2	WATER	6850-Perchlorate	2/13/2008	2/15/08			
1077130	EQBK1P	WATER	6850-Perchlorate	2/14/2008	2/15/08			
1077279	35MW2	WATER	6850-Perchlorate	2/13/2008	2/15/08			

C5959

DATA VALIDATION WORKSHEET

Perchlorate

Reviewer: RA
Date: 3/4/08
DV Level: II III IV
Review Document:
X NFG - Region III Modifications
X Project QAPP/SAP

Project Name: RAAP 10 RFI
Project Number: 116503351.40003
Laboratory: Columbia Analytical
SDG No.: R2842330
Test Name: Perchlorate
Method No.: 6850

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
1.5	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC?	✓		

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Do sample collection, preservation, shipping, and storage condition meet the project controlling documents?	✓		
	Action: No chemical preservation required.			✓
2.2	Have any technical holding times (28 days), determined from date of sampling to date of analysis, (including dilution or reanalysis) been exceeded? If yes, J(+)/UJ(-).		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency? If not, note in DV report.	✓		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the [sample]≤ 5X[associated blank].		✓	
3.3	Do any field equipment blanks blanks have positive results? If Yes, use same rules above.		✓	

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are five standards included in the calibration curve?If no apply R flags.	✓		
4.2	Are all initial calibration correlation coefficient within the control limits (r>0.99)?If no J(+), R (-)	✓		
4.3	Was an ICV analyzed and are %RSDs < 15%? If no J(+), UJ(-)	✓		
4.4	Has a continuing calibration verification been analyzed prior and after every 10 samples and at the end of the analysis sequence? Are %Ds < 25%. If no, R (-), J (+).	✓		

Notes:

5.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
5.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
5.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
5.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?(75-125% for water and soil)		✓	
5.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits (i.e., 15%)?		✓	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes:

6.0 Laboratory Control Sample(LCS)		Yes	No	NA
6.1	Is the LCS recovery form present?	✓		
6.2	Was LCS analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
6.3	Is the %R for LCS outside the QC limits(85-115% for water and soil)? If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).		✓	
6.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits(i.e., 15%)? If Yes, J(+) only.		✓	

Notes:

7.0 Field Duplicate		Yes	No	NA
7.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	✓		
	For sample results > 5 x RL, use 50% RPD. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 x RL for soil will be used.			
7.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV	✓		

Notes: 3 & MW2 DUP-1P PQL

Perchlorate 0.32 ug/L 0.31 ug/L 0.2 ug/L

8.0 Laboratory Duplicates		Yes	No	NA
8.1	Was a lab duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	✓		
8.2	Are all analyte duplicate results within control limits (i.e., RPD < 15%)? If no, J(+) only.	✓		

Notes:

9.0 Internal Standards		Yes	No	NA
9.1	Are internal standard areas of every sample and blank within +/-30% of the ICV or CCV? If no, J(+), UJ(-)	✓		
	If the IS area count criteria is not met, corrective action should be taken to resolve the problem and the entire batch should			
	be re-analyzed.	✓		

10.0 Detection Limit Verification		Yes	No	NA
10.1	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	✓		
10.2	Were sample concentrations above the highest standard run at a dilution? If not, note in DV report.			✓

Notes:

11.0 Data Completeness		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit 90%)	✓		
11.2	Number of samples:			
11.3	Number of target compounds in each analysis:			
11.4	Number of results rejected and not reported:			
	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = 100%			

Notes:

CASE NARRATIVE
COMPANY: URS
PROJECT:RAAP 10 RFI
SUBMISSION #: R2842330

Samples were collected on 2/12/08 – 2/14/08 and received at CAS/Rochester on 2/15/08 in good condition at a cooler temperature of 2 °C.

PERCHLORATE ANALYSIS

Twelve water samples were analyzed for Perchlorate by LC/MS method 6850 with DOD modifications from the DOD Perchlorate Handbook. Values detected between the MDL and PQL have been flagged with a "J" as estimated.

All the initial and continuing calibration criteria were met for all analytes.

Site-specific QC was not requested but was done on sample D-4 (SWMU35). The recoveries were and the RPD were within QC limits. The Blank Spike (LCS) and LODV spike recoveries were within QC limits.

The Laboratory Blank associated with these samples was free of contamination.

No other analytical or QC problems were encountered.

Columbia Analytical Services INC.
An Employee - Owned Company

ACCREDITED IN ACCORDANCE WITH nelac

2005 SEAL OF EXCELLENCE PROGRAM

ORGANIC QUALIFIERS

U - Indicates compound was analyzed for but not detected. The sample quantitation limit must be corrected for dilution and for percent moisture.

J - Indicates an estimated value. The flag is used either when estimating a concentration for tentatively identified compounds, or when the data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit and greater than the MDL. This flag is also used for DoD instead of "P" as indicated below.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search.

P - This flag is used for a pesticide/Aroclor target analyte when there is a greater than 40% (25% for CLP) difference for detected concentrations between the two GC columns. The concentration is reported on the Form I and flagged with a "P" ("J" for DoD).

Q - for DoD only – indicates a pesticide/Aroclor target is not confirmed. This flag is used when there is ≥ 100% difference for the detected concentrations between the two GC columns.

C - This flag applies to pesticide results where the identification has been confirmed by GC/MS.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor. If a sample or extract is re-analyzed at a higher dilution factor, as in the "E" flag above, the "DL" suffix is appended to the sample number on the Form I for the diluted sample, and ALL concentration values reported on that Form I are flagged with the "D" flag.

A - This flag indicates that a TIC is a suspected aldol-condensation product.

X - As specified in Case Narrative.

* - This flag identifies compounds associated with a quality control parameter which exceeds laboratory limits.

CAS/Rochester Lab ID # for State Certifications

NELAP Accredited
Delaware Accredited
Connecticut ID # PH0556
Florida ID # E87674
Illinois ID #200047
Maine ID #NY0032
Massachusetts ID # M-NY032
Navy Facilities Engineering Service Center Approved
Nebraska Accredited
New Jersey ID # NY004
New York ID # 10145
New Hampshire ID # 294100 A/B
Pennsylvania ID# 68-786
Rhode Island ID # 158
West Virginia ID # 292

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

Columbia Analytical Services, Inc.
An Employee - Owned Company
www.caslab.com

One Mustard St., Suite 250 • Rochester, NY 14609-0859 • (585) 288-5380 • 800-695-7222 x11 • FAX (585) 288-8475 PAGE 1 OF 2

SR #

CAS Contact

Project Name	Project Number
RAAP 10 RFI	11656351
Project Manager	**Report CC**
Tina Levine	

Company/Address
URS Corporation
5540 Falmouth St, Suite 201
Richmond, VA 23230

Phone #	FAX#
804-965-9000	804-965-9764
Sampler's Signature	**Sampler's Printed Name**
	Jim Carter

ANALYSIS REQUESTED *(Include Method Number and Container Preservative)*

PRESERVATIVE

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	GC/MS VOA's ☐ 8260 ☐ 624 ☐ CLP	GC/MS SVOA's ☐ 8270 ☐ 625 ☐ CLP	GC VOA's ☐ 8021 ☐ 601/602	PESTICIDES ☐ 8081 ☐ 608 ☐ CLP	PCB's ☐ 8082 ☐ 608 ☐ CLP	METALS, TOTAL (List in comments below)	METALS, DISSOLVED (List in comments below)	Perchlorate							REMARKS/ ALTERNATE DESCRIPTION
D-2 (SumU35)		2-13-08	1750	W	1								✓							3 remarks
37MW3		2-13-08	1921	W	1								✓							Samples (of 12 total)
35MW1		2-13-08	1730	W	1								✓							listed on COC
38MW2		2-12-08	1440	W	1								✓							from another lab
D-4 (SumU35)		2-13-08	1755	W	1								✓							attached to back
D4 MS/MSD		2-13-08	1755	W	1								✓							of this COC
35MW2		2-13-08	1740	W	1								✓							
DUP-1P		2-12-08	—	W	1								✓							
38MW1		2-12-08	1140	W	1								✓							
38MW3		2-13-08	1010	W	1								✓							

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

SPECIAL INSTRUCTIONS/COMMENTS
Metals

See QAPP ☐

TURNAROUND REQUIREMENTS
____ RUSH (SURCHARGES APPLY)
____ 24 hr ____ 48 hr ____ 5 day
____ STANDARD
REQUESTED FAX DATE
REQUESTED REPORT DATE

REPORT REQUIREMENTS
____ I. Results Only
____ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
____ III. Results + QC and Calibration Summaries
____ IV. Data Validation Report with Raw Data
____ V. Specialized Forms / Custom Report
Edata ____ Yes ____ No

INVOICE INFORMATION
PO#
BILL TO:
R2842350
SUBMISSION #:

SAMPLE RECEIPT: CONDITION/COOLER TEMP: 20C CUSTODY SEALS: Y N

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Jim Carter	Signature:	Signature:	Signature:	Signature:	Signature:
Printed Name: Jim Carter	Printed Name: Gregory C. Esmerian	Printed Name:	Printed Name:	Printed Name:	Printed Name:
Firm: URS	Firm: CAS	Firm:	Firm:	Firm:	Firm:
Date/Time: 2-14-08 13:05	Date/Time: 2-15-08 9:35	Date/Time:	Date/Time:	Date/Time:	Date/Time:

Distribution: White - Return to Originator; Yellow - Lab Copy; Pink - Retained by Client

SCOC-1102-08

TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 123178

For Lab Use Only

Cart:

VOA Rack/Tray

Receipt Log No.

Project Chemist

Laboratory Project No.

Client Name | Project Name

Address | Client Project No./P.O. No.

Invoice No. ☐ Client ☐ Other (comments)

Phone | Contact/Report To

Fax

Analyses Requested

Perchlorate

Container Type (corresponds to Container Packing List)

⇦ PRESERVATIVES

A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH -
H Other (note below)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Number of Containers Submitted	Total	Sample Comments
			1	37MW1 ✓		2-13-08	1935		✓	W	1		
			2	EQBK1P ✓		2-14-08	1100		✓	W	1		
			3	37MW2 ✓		2-13-08	1926		✓	W	1		
			4										
			5										
			6										
			7										
			8										
			9										
			10										

Sampled By (print)

Sampler's Signature

Company

How Shipped? Hand Carrier_____

Tracking No.

Comments

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
						[signature]	2-15-08	935

WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

DATA VALIDATION REPORT - Level III Review

SDG No.: 36440-58 **Fraction:** Pesticides, Total & Dissolved Manganese

Lab: TriMatrix **Project Name** Radford RAAP 10

Reviewer: RA **Date:** July 11, 2008

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the Region III Modifications to the USEPA National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical method employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: For the pesticides analyses, the matrix spike pair analyzed for sample 37MW2 displayed percent recoveries and/or relative percent differences outside the control limits for endosulfan I, beta-BHC, alpha-chlordane, 4,4'-DDE, and heptachlor epoxide. The associated parent sample results for beta-BHC, alpha-chlordane, and heptachlor epoxide were positive and were flagged "J,m".

The percent differences between the two analytical columns were greater than the control limit of 40% for alpha-chlordane (110.8%), beta-BHC (60.7%), endosulfan II (140.4%), and heptachlor epoxide (100.1%) in sample 37MW2. The percent differences between the two analytical columns were also greater than the control limit of 40% for alpha-chlordane (110.2%), endosulfan II (65.5%), and heptachlor epoxide (111.1%) in sample Dup-1. These results were flagged "J,g", unless previously flagged for a matrix spike anomaly. The higher results were reported by the laboratory.

For the manganese analyses, the method blank displayed a positive detection for total manganese at 0.648 ug/L. The associated field sample results were greater than five times the method blank concentration, and no data qualifying action was necessary.

The matrix spike pair analyzed for sample 38MW3 displayed percent recoveries outside the control limit (i.e., 75%-125%) for total manganese (44%, 126%) and dissolved manganese (146%). No data qualifying action was taken since the parent sample result was greater than 4 times the spike concentration.

Correctable Anomalies: None.

Comments: On the basis of this evaluation, the laboratory appears to have followed the specified method. All data are usable, as qualified, for their intended purpose based on the data reviewed. Please note that detection limits were raised for several samples due to dilutions.

Signed: Ranjan

SAMPLE ID SUMMARY

USEPA-8081A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-58

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Client Sample Id:	Lab Sample Id:
37MW2	0806514-01
Dup-1	0806514-02

000023

REVISED
JB 7/10/08

ANALYSIS DATA SHEET

37MW2

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-58

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0806514-01 File ID: A72_322-0

Sampled: 06/24/08 13:40 Prepared: 06/26/08 07:25 Analyzed: 06/27/08 23:12

Solids: Preparation: 3510C Liquid-Liquid Ex: Initial/Final: 1050 mL / 2 mL

QC Batch: 0807625 Sequence: 8063014 Calibration: 8F30003 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.062	0.050	0.0019	
319-85-7	beta-BHC	1	0.017	0.050	0.0032	J JM
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.0055	0.10	0.0023	J
5103-71-9	alpha-Chlordane	1	0.13	0.050	0.0021	JM
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.020	0.10	0.0018	J JG
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.059	0.050	0.0021	JM
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.190	0.0661	35	25 - 140	
Decachlorobiphenyl	0.190	0.172	90	30 - 135	

* Values outside of QC limits

REVISED
YB 7/10/08

ANALYSIS DATA SHEET

Dup-1

Laboratory: TriMatrix Laboratories, Inc. SDG: 36440-58

Client: URS Corporation Project: RFAAP RAAP 10 RFI/CMS, WO

Matrix: Ground Water Laboratory ID: 0806514-02 File ID: A72_323-0

Sampled: 06/24/08 00:00 Prepared: 06/26/08 07:25 Analyzed: 06/27/08 23:48

Solids: Preparation: 3510C Liquid-Liquid Ext Initial/Final: 1050 mL / 2 mL

QC Batch: 0807625 Sequence: 8063014 Calibration: 8F30003 Instrument: 199

CAS No.	Analyst	Dilution	CONC. (ug/L)	MRL	MDL	Q
319-84-6	alpha-BHC	1	0.050	0.050	0.0019	
319-85-7	beta-BHC	1	0.050	0.050	0.0032	U
58-89-9	gamma-BHC (Lindane)	1	0.050	0.050	0.0018	U
319-86-8	delta-BHC	1	0.0038	0.10	0.0023	J
5103-71-9	alpha-Chlordane	1	0.15	0.050	0.0021	J,8
5103-74-2	gamma-Chlordane	1	0.050	0.050	0.0021	U
72-54-8	4,4'-DDD	1	0.10	0.10	0.0019	U
72-55-9	4,4'-DDE	1	0.10	0.10	0.0027	U
50-29-3	4,4'-DDT	1	0.10	0.10	0.0020	U
309-00-2	Aldrin	1	0.050	0.050	0.0079	U
60-57-1	Dieldrin	1	0.050	0.050	0.0020	U
959-98-8	Endosulfan I	1	0.10	0.10	0.0023	U
33213-65-9	Endosulfan II	1	0.016	0.10	0.0018	J J,8
1031-07-8	Endosulfan Sulfate	1	0.10	0.10	0.0033	U
72-20-8	Endrin	1	0.10	0.10	0.0020	U
7421-93-4	Endrin Aldehyde	1	0.10	0.10	0.0029	U
53494-70-5	Endrin Ketone	1	0.050	0.050	0.0033	U
76-44-8	Heptachlor	1	0.050	0.050	0.0030	U
1024-57-3	Heptachlor Epoxide	1	0.058	0.050	0.0021	J,8
72-43-5	Methoxychlor	1	0.50	0.50	0.0052	U
8001-35-2	Toxaphene	1	5.0	5.0	0.10	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% Rec.	QC Limits	Q
Tetrachloro-m-xylene	0.190	0.120	63	25 - 140	
Decachlorobiphenyl	0.190	0.179	94	30 - 135	

* Values outside of QC limits

SAMPLE ID SUMMARY

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

SDG: 36440-58

Client: URS Corporation

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Client Sample Id:	Lab Sample Id:
38MW3	0806514-03
Dup-2	0806514-04

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 06/24/08 16:15
Solids: 0.00
Laboratory ID: 0806514-03

SDG: 36440-58
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 06/25/08 10:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0807615

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-96-5	Manganese, Total	980	ug/L	4	12	1.2		06/25/08 18:26

00225

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

38MW3

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 06/24/08 16:15
Solids: 0.00
Laboratory ID: 0806514-03

SDG: 36440-58
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 06/25/08 10:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0807617

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-96-5	Manganese, Dissolved	1000	ug/L	4	12	1.2		06/25/08 18:48

002238

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

Dup-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 06/24/08 00:00
Solids: 0.00
Laboratory ID: 0806514-04

SDG: 36440-58
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: 3020A Digestion
Prepared: 06/25/08 10:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0807615

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-96-5	Manganese, Total	1000	ug/L	4	12	1.2		06/25/08 18:43

002231

INORGANIC ANALYSIS DATA SHEET
USEPA-6020A

Dup-2

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 06/24/08 00:00
Solids: 0.00
Laboratory ID: 0806514-04

SDG: 36440-58
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Preparation: General Metals Prep
Prepared: 06/25/08 10:00
Initial/Final: 25 mL / 125 mL
QC Batch: 0807617

CAS No.	Analyte	Conc.	Units	Dil. Factor	MRL	MDL	Q	Analyzed
7439-96-5	Manganese, Dissolved	1100	ug/L	4	12	1.2		06/25/08 19:00

00232

DATA VALIDATION WORKSHEET

Pesticides/PCBs

Reviewer: RA
Date: 7/10/09
DV Level: II III IV

Review Document:

X SW-846 - 8081/8082
X NFG - Region III Modifications
X project QAPP

Project Name: RAAP 10
Project Number: 116563.51
Laboratory: TriMatrix
SDG No.: 36440-58
Test Name: Pest.
Method No.: 8091

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	✓		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, or special circumstances affecting the quality of the data?		✓	
1.4	Do sample preservation, collection and storage condition meet method requirement?	✓		
	If samples were received with the cooler temperature exceeding 20 °C, then flag L(+)/UL(-).	✓		
1.5	Do any soil samples contain more than 50% water? If yes, no dry weight correction is made and make notes in the DV Report.			✓

Notes:

2.0 Holding Times		Yes	No	NA
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.		✓	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/R(-) .		✓	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks prepared at the appropriate frequency (one per 20 samples or batch and matrix)?	✓		
3.2	Do any blanks have positive results? If yes, positive sample results should be reported and qualified "B", if the [sample≤5X[blank].		✓	
3.3	Do any field equipment blanks have positive results? If yes, use same rules above.			✓

Notes:

4.0 Initial and Continuing Calibration

		Yes	No	NA
4.1	Are at least five standards included in the calibration curve for 1016, 1260, toxaphene, and technical chlordane; and at least one point for the other arochlors reported? If no, flag "R".	✓		
4.2	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	✓		
4.3	Were continuing calibration standards analyzed every 12 hours or twenty samples? If no, flag "R".	✓		
4.4	Are all calibration standard %RSD (<20%, r>0.995, or r^2<0.99), second source (±15%) or %D(≤15%) within the control limits?	✓		
For initial calibration: %RSD > 20%, but < 50%, J(+), only; %RSD > 50%, but < 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).				
For second source: %D>15%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 15%, J(+), only. Negative Bias - %D>-15% but <-50%, J(+)/UJ(-) and %D>-50%, J(+)/R(-).				

Notes:

5.0 GC/ECD Instrument Performance Check

		Yes	No	NA
5.1	Has a Performance Evaluation Mixture (PEM) been analyzed at the beginning, every 12 hours, and at the end of every sequence.	✓		
5.2	Is the 4,4'-DDT breakdown </= to 20%? If No, for positive DDT results, DDT-L(+), DDD/DDE - NJ(+). For non detect DDT results, DDD/DDE - R(+).	✓		
5.3	Is the endrin breakdown </= to 20%? If No, for positive endrin results, endrin-L(+), endrin aldehyde/ketone - NJ(+). For non-detect DDT results, endrin aldehyde/ketone - R(+).	✓		
5.4	Is the combined breakdowns less than or equal to 30%? If No, for positive DDT/endrin results, DDT/endrin-L(+), DDD/DD/endrin aldehyde/endrin ketone - NJ(+). For non-detect DDT/endrin results, DDD/DDE/endrin aldehyde/endrin ketone - R(+).	✓		

Notes:

6.0 Surrogate Recovery

		Yes	No	NA
6.1	Do all surrogate retention times fall within the RT windows established during the initial calibration sequence? If No, the associated sample result should be carefully evaluated.	✓		
6.2	Are surrogate recoveries within acceptance criteria for all samples and method blanks? Advisory limit: 60-150%.	✓		
6.3	If No in Section 6.3, are these sample(s) or method blank(s) reanalyzed?			✓
6.4	If No in Section 6.4, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			✓

# of outliers	Recovery	Sample result from column with non-conformance	Sample result from column without non-conformance
1 out	high/low	No action	No action
2 out	2 high same column	K	No action
	2 low same column	L, UL	No action
	mixed same column	J, UJ	No action
	2 high diff columns	J	Not applicable
	2 low diff columns	J, UJ	Not applicable
	mixed diff columns	Professional judgement	Not applicable
3 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	2 high, 1 low	K (2 high)	J (1 low 2nd column)
	2 low, 1 high	L, UJ (2 low)	J (1 high 2nd column)
	other mixed	J, UJ	Not applicable
4 out	All high	K	Not applicable
	All low	L, UL	Not applicable
	Mixed	J, UJ	Not applicable
If any recovery is >0% and <10% then L(+)/R(-).			
If any recovery is 0% then R(+/-).			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	✓		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
7.4	Are there any RPD for matrix spike and matrix spike duplicate recoveries outside the QC limits?	✓		
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data.			

Notes: MS/MSD for 37MW2 MS (MSD
%R > QC endosulfan I (120%/152%) (119%, 149%)
MSD > QC beta-BHC 245%) RPD > QC beta-BHC 83%
RPD > QC 4,4'-DDE 32%.
%R < QC for alpha-Chlordane, heptachlor epoxide.
ass. parent results for beta-BHC, alpha-Chlordane and heptachlor epoxide were pos → J, m flagged

URS

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	✓		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	✓		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits?		✓	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			

Notes:

9.0 Field Duplicate

		Yes	No	NA
9.2	Evaluate field duplicate results? Generally, no action is taken on the basis of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	✓		

Notes:

	37MW2	DUP-1	RL		37MW2	DUP-1	RL
alpha-BHC	0.062	0.05	0.05 ✓	endosulfan II	0.02	0.016	0.10 ✓
beta-BHC	0.017	[redacted]	ND 0.05 ✓	heptachlor epoxide	0.059	0.058	0.05 ✓
delta-BHC	0.0055	0.0038	0.1 ✓				
alpha-Chlordane	0.13	0.15	0.05 ✓				

10.0 Compound Identification and Detection Limit Verification

		Yes	No	NA
10.1	Is the percent difference calculated for the positive sample results on both columns <40%? If No, J(+).		✓	
10.2	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	✓		

Notes: 37MW2 → alpha-Chlordane, beta-BHC, endosulfan II, heptachlor epoxide
DUP-1 → alpha-Chlordane, endosulfan II, heptachlor epoxide.
pos J/g unless prev. J/UJ

11.0 Data Completeness

		Yes	No	NA
11.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	✓		
11.1.1	Number of samples: Pest _____ PCB _____			
11.1.2	Number of target compounds in each analysis: PEST _____ PCB _____			
11.1.3	Number of results rejected and not reported: Pest _____ PCB _____			
11.1.4	% Completeness = (11.1.1 x 11.1.2 - 11.1.3) x 100/(11.1.1 x 11.1.2)			
	% Completeness = Pest 100% PCB _____			

Notes:

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8081A

37MW2

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

REVISED 7/10/08

SDG: 36440-58

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Preparation: 3510C Liquid-Liquid Extraction

Initial/Final: 1050 mL / 2 mL

Laboratory ID: 0807625-MS1

QC Batch: 0807625

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
alpha-BHC	0.0762	0.0621	0.148	113	60 - 130	ug/L
alpha-BHC [2C]	0.0762	0.0577	0.142	110	60 - 130	ug/L
beta-BHC	0.0762	0.00914	0.0808	94	65 - 125	ug/L
beta-BHC [2C]	0.0762	0.0171	0.0842	88	65 - 125	ug/L
gamma-BHC (Lindane)	0.0762	ND	0.0749	98	25 - 135	ug/L
gamma-BHC (Lindane) [2C]	0.0762	ND	0.0657	86	25 - 135	ug/L
delta-BHC	0.0762	0.00552	0.0766	93	45 - 135	ug/L
delta-BHC [2C]	0.0762	0.00514	0.0623	75	45 - 135	ug/L
alpha-Chlordane	0.0762	0.132	0.192	79	65 - 125	ug/L
alpha-Chlordane [2C]	0.0762	0.0379	0.0920	71	65 - 125	ug/L
gamma-Chlordane	0.0762	ND	0.0928	122	60 - 125	ug/L
gamma-Chlordane [2C]	0.0762	ND	0.0644	84	60 - 125	ug/L
4,4'-DDD	0.0762	ND	0.0657	86	25 - 150	ug/L
4,4'-DDD [2C]	0.0762	ND	0.0693	91	25 - 150	ug/L
4,4'-DDE	0.0762	ND	0.0773	102	35 - 140	ug/L
4,4'-DDE [2C]	0.0762	ND	0.0488	64	35 - 140	ug/L
4,4'-DDT	0.0762	ND	0.0718	94	45 - 140	ug/L
4,4'-DDT [2C]	0.0762	ND	0.0690	90	45 - 140	ug/L
Aldrin	0.0762	ND	0.0463	61	25 - 140	ug/L
Aldrin [2C]	0.0762	ND	0.0463	61	25 - 140	ug/L
Dieldrin	0.0762	ND	0.0808	106	60 - 130	ug/L
Dieldrin [2C]	0.0762	ND	0.0690	90	60 - 130	ug/L
Endosulfan I	0.0762	ND	0.0918	120 *	50 - 110	ug/L
Endosulfan I [2C]	0.0762	ND	0.116	152 *	50 - 110	ug/L
Endosulfan II	0.0762	0.0196	0.0655	60	30 - 130	ug/L
Endosulfan II [2C]	0.0762	0.00343	0.0585	72	30 - 130	ug/L
Endosulfan Sulfate	0.0762	ND	0.0762	100	55 - 135	ug/L
Endosulfan Sulfate [2C]	0.0762	ND	0.0669	88	55 - 135	ug/L
Endrin	0.0762	ND	0.0680	89	55 - 135	ug/L
Endrin [2C]	0.0762	ND	0.0688	90	55 - 135	ug/L
Endrin Aldehyde	0.0762	ND	0.0661	87	55 - 135	ug/L
Endrin Aldehyde [2C]	0.0762	ND	0.0640	84	55 - 135	ug/L
Endrin Ketone	0.0762	ND	0.0775	102	75 - 125	ug/L

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8081A

37MW2

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

REVISED 7/14/08

SDG: 36440-58

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Preparation: 3510C Liquid-Liquid Extraction

Initial/Final: 1050 mL / 2 mL

Laboratory ID: 0807625-MSD1

QC Batch: 0807625

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
alpha-BHC	0.0762	0.125	83	17	30	60 - 130	ug/L
alpha-BHC [2C]	0.0762	0.127	91	11	30	60 - 130	ug/L
beta-BHC	0.0762	0.0811	94	0.5	30	65 - 125	ug/L
beta-BHC [2C]	0.0762	0.204	245 *	83 *	30	65 - 125	ug/L
gamma-BHC (Lindane)	0.0762	0.0806	106	7	30	25 - 135	ug/L
gamma-BHC (Lindane) [2C]	0.0762	0.0709	93	8	30	25 - 135	ug/L
delta-BHC	0.0762	0.0758	92	1	30	45 - 135	ug/L
delta-BHC [2C]	0.0762	0.0615	74	1	30	45 - 135	ug/L
alpha-Chlordane	0.0762	0.171	51 *	12	30	65 - 125	ug/L
alpha-Chlordane [2C]	0.0762	0.0735	47 *	22	30	65 - 125	ug/L
gamma-Chlordane	0.0762	0.0861	113	7	30	60 - 125	ug/L
gamma-Chlordane [2C]	0.0762	0.0625	82	3	30	60 - 125	ug/L
4,4'-DDD	0.0762	0.0638	84	3	30	25 - 150	ug/L
4,4'-DDD [2C]	0.0762	0.0716	94	3	30	25 - 150	ug/L
4,4'-DDE	0.0762	0.0735	96	5	30	35 - 140	ug/L
4,4'-DDE [2C]	0.0762	0.0672	88	32 *	30	35 - 140	ug/L
4,4'-DDT	0.0762	0.0714	94	0.5	30	45 - 140	ug/L
4,4'-DDT [2C]	0.0762	0.0731	96	6	30	45 - 140	ug/L
Aldrin	0.0762	0.0533	70	14	30	25 - 140	ug/L
Aldrin [2C]	0.0762	0.0577	76	22	30	25 - 140	ug/L
Dieldrin	0.0762	0.0770	101	5	30	60 - 130	ug/L
Dieldrin [2C]	0.0762	0.0707	93	2	30	60 - 130	ug/L
Endosulfan I	0.0762	0.0907	119 *	1	30	50 - 110	ug/L
Endosulfan I [2C]	0.0762	0.114	149 *	2	30	50 - 110	ug/L
Endosulfan II	0.0762	0.0617	55	6	30	30 - 130	ug/L
Endosulfan II [2C]	0.0762	0.0522	64	11	30	30 - 130	ug/L
Endosulfan Sulfate	0.0762	0.0737	97	3	30	55 - 135	ug/L
Endosulfan Sulfate [2C]	0.0762	0.0691	91	3	30	55 - 135	ug/L
Endrin	0.0762	0.0657	86	3	30	55 - 135	ug/L
Endrin [2C]	0.0762	0.0716	94	4	30	55 - 135	ug/L
Endrin Aldehyde	0.0762	0.0646	85	2	30	55 - 135	ug/L
Endrin Aldehyde [2C]	0.0762	0.0577	76	10	30	55 - 135	ug/L
Endrin Ketone	0.0762	0.0747	98	4	30	75 - 125	ug/L
Endrin Ketone [2C]	0.0762	0.0756	99	5	30	75 - 125	ug/L

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8081A

37MW2

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

REVISED
JS 7/10/08

SDG: 36440-58

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Preparation: 3510C Liquid-Liquid Extraction

Initial/Final: 1050 mL / 2 mL

Laboratory ID: 0807625-MSD1

QC Batch: 0807625

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Heptachlor	0.0762	0.0680	89	10	30	40 - 130	ug/L
Heptachlor [2C]	0.0762	0.0657	86	7	30	40 - 130	ug/L
Heptachlor Epoxide	0.0762	0.101	55 *	31 *	30	60 - 130	ug/L
Heptachlor Epoxide [2C]	0.0762	0.0676	63	24	30	60 - 130	ug/L
Methoxychlor	0.0762	0.0707	93	8	30	55 - 150	ug/L
Methoxychlor [2C]	0.0762	0.0884	116	4	30	55 - 150	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

DUAL COLUMN CONFIRMATION CHECK

37MW2

REVISED

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 06/24/08 13:40
Solids: 0.00
QC Batch: 0807625
GC Column(1):

Laboratory ID: 0806514-01
Prepared: 06/26/08 07:25
Preparation: 3510C Liquid-Liquid Extr
Sequence: 8063014
GC Column(2): RTX CLP Pest2

SDG: 36440-58
Project: RFAAP RAAP 10 RFI/CMS, WO
File ID: A72_322-0
Analyzed: 06/27/08 23:12
Instrument: 199

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
alpha-BHC	* 1	9.57	9.573333	0.00333	170302.7		0.0621	7.3
	2	11.73	11.72333	0.00667	125000.8		0.0577	
alpha-Chlordane	* 1	14.76	14.73	0.03	228774		0.132	110.8
	2	17.49	17.49167	0.00167	52394.92		0.0379	
beta-BHC	1	10.63	10.62333	0.00667	9130.79		0.00914	
	* 2	12.97	12.98	0.01	14633.51		0.0171	60.7
delta-BHC	* 1	11.05	11.09333	0.0433	11548.81		0.00552	7.1
	2	13.86	13.84167	0.0183	8554.94		0.00514	
Endosulfan II	* 1	16.89	16.88333	0.00667	24882.45		0.0196	140.4
	2	19.84	19.8	0.04	3476.52		0.00343	
Heptachlor Epoxide	* 1	14.06	14.05333	0.00667	108028.7		0.0589	100.1
	2	16.58	16.57833	0.00167	29180.28		0.0196	

* Column used for quantitation

DUAL COLUMN CONFIRMATION CHECK

Dup-1

REVISED
JS 7/10/08

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Ground Water
Sampled: 06/24/08 00:00
Solids: 0.00
QC Batch: 0807625
GC Column(1):

Laboratory ID: 0806514-02
Prepared: 06/26/08 07:25
Preparation: 3510C Liquid-Liquid Extr
Sequence: 8063014
GC Column(2): RTX CLP Pest2

SDG: 36440-58
Project: RFAAP RAAP 10 RFI/CMS, WO
File ID: A72_323-0
Analyzed: 06/27/08 23:48
Instrument: 199

Analyte	Col.	RT	EXP RT	Diff.	Area	Amount	Conc.	RPD
alpha-BHC	* 1	9.57	9.573333	0.00333	137804.5		0.0503	13.8
	2	11.73	11.72333	0.00667	94848.38		0.0438	
alpha-Chlordane	* 1	14.75	14.73	0.02	263140		0.152	110.2
	2	17.49	17.49167	0.00167	60768.86		0.0440	
delta-BHC	* 1	11.09	11.09333	0.00333	7930.63		0.00381	22.2
	2	13.86	13.84167	0.0183	7802.07		0.00476	
Endosulfan II	1	16.88	16.88333	0.00333	10056.04		0.00800	
	* 2	19.91	19.8	0.11	16467.25		0.0158	65.5
Heptachlor Epoxide	* 1	14.06	14.05333	0.00667	106811.3		0.0581	111.1
	2	16.58	16.57833	0.00167	24454.39		0.0166	

* Column used for quantitation

STATEMENT OF DATA QUALIFICATIONS

Organochlorine Pesticides by EPA Method 8081A

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8081A

Sample/Analyte:	
0806514-01 37MW2	alpha-Chlordane
0806514-01 37MW2	alpha-Chlordane [2C]
0806514-01 37MW2	beta-BHC [2C]
0806514-01 37MW2	Endosulfan I
0806514-01 37MW2	Endosulfan I [2C]
0806514-01 37MW2	Heptachlor Epoxide

Qualification: The RPD between the MS and MSD results exceeded the control limit. The non-spiked sample concentration for the same analyte was less than 4 times the spiked amount; the non-spiked sample result is considered estimated.

Analysis: USEPA-8081A

Sample/Analyte:	
0806514-01 37MW2	4,4'-DDE [2C]
0806514-01 37MW2	beta-BHC [2C]
0806514-01 37MW2	Heptachlor Epoxide

Qualification: The RPD between the detected values from the primary and confirmation analyses exceeded 40%. The higher concentration result has been reported.

Analysis: USEPA-8081A

Sample/Analyte:	
0806514-01 37MW2	alpha-Chlordane
0806514-01 37MW2	beta-BHC [2C]
0806514-01 37MW2	Endosulfan II
0806514-01 37MW2	Heptachlor Epoxide
0806514-02 Dup-1	alpha-Chlordane
0806514-02 Dup-1	Endosulfan II [2C]
0806514-02 Dup-1	Heptachlor Epoxide

DATA VALIDATION WORKSHEET
INORGANIC - ICP, CVAA, AND CYANIDE
REGION III - NATIONAL FUNCTIONAL GUIDELINES

SDG No.: 36440-58
Project No.: 160563511.40003

Project Name: RAAP 10
Reviewer: KA
Date: 7/10/08

1.0 Chain of Custody/Sample Condition/Raw Data		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	✓											
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	✓											
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		✓										
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 $^{o}C \pm 2\ ^{o}C$)	✓											
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	✓											

Note: _____

2.0 Holding Time		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, CN: 14 days, other metals: 6 months) Action:L(+)/UL(-). If the holding time is grossly exceeded (twice the holding time criteria), L(+)/R(-).		✓										

Note: _____

3.0 Instrument Calibration

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP& ICPMS: blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL; CVAA: blank + five standards with one standard at the RL). If not, qualify with "R".	✓											
3.2	Are the correlation coefficients > 0.99? Action: J(+)/UJ(-).	✓											
3.3	Once per calibration, did a high and low distilled standard recovery within 85-115%? If no, follow 3.6.												
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	✓											
3.5	Was continuing calibration standard (CCS) analyzed at a minimum frequency of 10% (every 10 samples) during an analytical run and at the end of the analytical run? If not, document and flag based on professional judgement.	✓											
3.6	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? FOR ICP 90%-110%, FOR Hg 80-120%, FOR CN 85-115%.	✓											
	ICV and CCV:												
	Action: L(+)/R(-) L(+)/UL(-) K(+)												
	Mercury < 65% 65% - 79% > 120%												
	Cyanide < 65% 65% - 84% > 115%												
	Other Metals < 75% 75% - 89% > 110%												
3.7	For ICP & ICPMS, did the CRDL standard recover between 80-120%?	✓											
	<50% 50%-79% >120%												
	2xCRDL>[sample]>IDL L(+)/R(-) L(+)/UL(-) K												

Note: _____

4.0 Blanks

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	✓											
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each and every ICV and CCVs? Action: If no ICB was run, all associated data are rejected. If the frequency of the CCBs does not follow requirement, all associated data are qualified "J".	✓											
4.3	Are there reported MB or ICB/CCBs values > MDL?	✓											
	Sample Results > MDL												
	< 5X Blank Contamination B												
4.4	Are there negative blank results with the absolute value > MDL?		✓										
	Sample Results Non-detects > MDL												
	< 5X absolute Blank Contamination UL L												
4.5	Are there reported field blank > ± MDL?		✓										
	Sample Results > MDL												
	< 5X Blank Contamination B												

Note: MB → total Mn at 0.648 ug/L
Sample results > 5x blank, No action

5.0 ICP Interference Check Sample (ICS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS analyzed at beginning of each ICP run?	✓											
5.2	Are the ICS AB recoveries within 80% - 120%?	✓											
5.3	Are the results for unspiked analytes (in ICS A) < ± RL?	✓											
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			✓									
	If not...												
	Action: Not Spiked Analytes: < -MDL L(+)/UL(-); > MDL K(+). Spiked analytes (ICS AB analytes): < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); >120% K(+)												

Note:

6.0 Laboratory Control Sample (LCS)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	✓											
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		✓										
	Action: Solid: < LCL L(+)/UL(-); > UCL K(+). Aqueous: < 50% L(+)/R(-); 50% - 79% L(+)/UL(-); > 120% K(+)												

Note:

7.0 Laboratory Duplicates (MSD)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), using professional judgement, analytes not associated with duplicate results.	✓											
	For aqueous 6010B and Hg - RPD< 25%, aqueous CN - RPD < 20%, aqueous 6020 - RPD < 20%, and for soil - use laboratory generated limits for MS/MSD.												
7.2	Are all analyte duplicate results within control limits? If no, qualify all associated field samples J(+)/UJ(-) for the analyte with results that fall outside criteria.	✓											

Note:

8.0 Spike Sample Analysis -Pre-Digestion/Post-Digestion

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, batch, matrix and level)? If not, J(+) with professional judgement.	✓											
8.2	For all analytes with sample concentration > 4 x spike concentration, are spike recoveries within the control limit of 75-125% for aqueous matrices or lab limits for soil matrices?		✓										
		%R > 125%	30%< %R < 74%	< 30%									
	Positive	K	L	L									
	Non-detect	None	UL	R									
8.3	Where pre-digestion matrix spike analytes were outside the acceptable recovery limits(except Ag), was a post-digestion spike performed? Note any failures in DV report, but no data qualifying action is required.	✓											

Note: MS/MSD for 38MW3 outside QC total Mn 44% / 126%) No action since Diss Mn 140%.) Sample result > 4 x Spike

9.0 Instrument Detection Limits (IDL)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDLs/RLs equal to or less than the reporting limits specified?	✓											

Note:

10.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	✓											
10.2	Was a five-fold dilution performed?	✓											
10.3	Did the serial dilution results agree within 10% for ICP analyte concentration > 5 X the RL for 6010 or > 20 X the RL for 6020 in the original sample? If no, J(+).	✓											

Note:

11.0 Field Duplicate Samples

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	✓											
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.												
11.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report		✓										

Note: 38MW3 & DUP-2 RL RPD
total Mn 980 1000 12 2% ✓
Diss Mn 1000 1100 12 9.5%

12.0 Result Verification/ Internal Standards/ Tune

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			✓									
12.2	Were all dilution reflected in the positive results and detection limits?	✓											
12.3	Were the Internal Standard recoveries within 30-120%	✓											
12.4	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution?	✓											
12.5	Were the tune mass calibrations < 0.1 amu from the true value?	✓											
12.6	Was the resolution check peak width < 0.9 amu at 10% peak height?	✓											

Note: DL's varied due to DF = 4

13.0 Completeness Calculation

		6020			6010B			CVAA-Hg			Cyanide		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit 90%)		✓										
13.1.1	Number of samples:												
13.1.2	Number of target compounds in each analysis:												
13.1.3	Number of results rejected and not reported:												
	% Completeness = (13.1.1 x 13.1.2 - 13.1.3) x 100/(13.1.1 x 13.1.2)												
	% Completeness = 100%.												

Note:

METHOD BLANK DATA SHEET
USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.
SDG: 36440-58
Client: URS Corporation
Project: RFAAP RAAP 10 RFI/CMS, WO 001
Matrix: Water
Laboratory ID: 0807615-BLK1
File ID: 8062564-014
Prepared: 06/25/08 10:00
Preparation: 3020A Digestion
Initial/Final: 25 mL / 125 mL
Analyzed: 06/25/08 17:42
Instrument: 114
QC Batch: 0807615
Sequence: 8062564
Calibration: 8F25017

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
7439-96-5	Manganese, Total	0.30	3.0	0.648	ug/L	J

: 062411

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

38MW3

USEPA-6020A

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-58

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Preparation: 3020A Digestion

Initial/Final: 25 mL / 125 mL

Laboratory ID: 0807615-MS1

QC Batch: 0807615

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Manganese, Total	50.0	976	998	44 *	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

38MW3

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-58

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Preparation: 3020A Digestion

Initial/Final: 25 mL / 125 mL

Laboratory ID: 0807615-MSD1

QC Batch: 0807615

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Manganese, Total	50.0	1040	126 *	4	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-6020A

38MW3

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: 36440-58

Project: RFAAP RAAP 10 RFI/CMS, WO 001

Preparation: General Metals Prep

Initial/Final: 25 mL / 125 mL

Laboratory ID: 0807617-MSD1

QC Batch: 0807617

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Manganese, Dissolved	50.0	1090	146 *	3	20	80 - 120	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

: 08245

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Dissolved Metals by EPA 6000/7000 Series Methods

Qualification: The sample was digested as a result of elevated turbidity, particulate matter, and/or odor levels.

Analysis: USEPA-6020A

Sample/Analyte: 0806514-03 38MW3
0806514-04 Dup-2

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was greater than or equal to 4 times the spiked amount; the non-spiked sample result is not qualified.

Analysis: USEPA-6020A

Sample/Analyte: 0806514-03 38MW3 Manganese

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SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

Total Metals by EPA 6000/7000 Series Methods

Qualification: The MS and/or MSD recovery was outside the control limit. The non-spiked sample concentration for the same analyte was greater than or equal to 4 times the spiked amount; the non-spiked sample result is not qualified.

Analysis: USEPA-6020A

Sample/Analyte: 0806514-03 38MW3 Manganese

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SDG CASE NARRATIVE

URS Corporation
RFAAP RAAP 10 RFI/CMS, WO 001

SDG Executive Summary

This case narrative applies to samples received on June 25, 2008. All samples were scheduled for analysis in accordance with parameters outlined on the field chain of custody record, the TriMatrix bid form, and/or oral and written correspondence between URS Corporation and TriMatrix Laboratories, Inc..

Each sample receipt event was assigned a unique TriMatrix work order number. Sample receipt documentation is included in section A of this data package.

Project Technical Issues/Problems

Project-related data qualification designations and reporting conventions are included in Attachment 1 - *Project Technical Narrative.*

QA/QC Data Qualifications/Narrations

Quality assurance issues and/or quality control data qualifications and narrations related to the analysis and reporting of this SDG are presented in Attachment 2 - *Statement of Data Qualifications*. The absence of a statement page for a particular analyte group (*e.g.* Percent Solids) implies that no qualifying statements were generated for that analyte.

Data Review and Approval

All data was peer-reviewed by a second analyst, and then by appropriate data management staff against laboratory quality control requirements and project specifications. It was then reviewed and approved by the group supervisor/manager prior to further review by the project chemist.

Data Deliverables

The data deliverables, both hardcopy and/or electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. The EDD, if requested, will be issued separately from this hardcopy report. Hold time reports for each test procedure are presented following the CLP-like forms section of this report.

This report relates only to the sample(s) as received. Test results are in compliance with the requirements of the National Environmental Laboratory Accreditation Conference (NELAC). Estimates of analytical uncertainties for the test results contained within the report are available upon request.

Lisa M. Harvey, Project Chemist

07-08-2008
Date

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SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 0806514

TriMatrix Laboratories received the cooler(s) for this work order on June 25, 2008, at 14:38pm. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
37MW2	0806514-01	Ground Water	6/24/2008
Dup-1	0806514-02	Ground Water	6/24/2008
38MW3	0806514-03	Ground Water	6/24/2008
Dup-2	0806514-04	Ground Water	6/24/2008

No administrative issues were encountered during the receipt and analysis of this work order.

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SDG CASE NARRATIVE

Attachment 1
Project Technical Narrative

Sample Result Reporting Convention

Sample results are reported as RL "U" (e.g. 0.001 U) if the target analyte was not detected above the MDL.

If a sample for an organic analyte is reanalyzed and also reported, the second analysis includes the suffix "RE*n*" where *n* = the first, second, etc. reanalysis.

Data Qualifier Designation

If applicable, sample results are qualified with:

a "J" flag if the analyte was detected, but the concentration is greater than the MDL and less than the RL;

a "B" flag if the analyte was also detected at or above the RL in the associated method blank, and the sample concentration was less than five times the method blank result;

an "E" flag if the analyte exceeded the instrument calibration range;

an asterisk (*) if a report-generated statement of qualification applies; qualifying statements, if any, will be found in Attachment 2 to this narrative.

Batch and Analytical Batch Designation

A Quality Control (QC) Batch is a seven-digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation). Quality Control batches are limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.). Some batches may contain multiple sets of method blanks (BLK) and laboratory control samples (BS), where a set of method quality control analyses were prepared in concert with each set of samples on a given day.

An Analytical Batch (or Sequence) is a seven-digit number that associates all samples analyzed as a set under one analytical run.

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TriMatrix Laboratories, Inc.

5560 Corporate Exchange Court SE Grand Rapids, MI 49512
Phone (616) 975-4500 Fax (616) 942-7463
www.trimatrixlabs.com

Chain of Custody Record

COC No. 125029

36440-58

Page 1 of 1

For Lab Use Only
Cart: 5
VOA Rack/Tray: —
Receipt Log No.: 332
Project Chemist:
Laboratory Project No.: 0806514

Client Name: URS Corp
Address: 5540 Falmouth St. Suite 201
Richmond VA 23250
Phone: 804 965 7000
Fax: 967
Project Name: RFAAP SWMU 57, 58
Client Project No./P.O. No.: 16556351
Invoice No.: URS (X) Client ( ) Other (comments)
Contact/Report To: Tina Devine

Analyses Requested

Container Type (corresponds to Container Packing List)

Test Group	Matrix Code	Laboratory Sample Number		Sample ID	Cooler ID	Sample Date	Sample Time	COMP	GRAB	Matrix	Number of Containers Submitted										Total	Sample Comments
											Pest/Lindane 8081A	B	B									
											Mn Total	Mn Dissolved										
B	WG	01	1	37MW2		6/24/08	1340		X	GW	4										4	
D	FD WG	02	2	Dup-1		6/24/08	—		X	GW	2										2	
A		03	3	38MW3		6/24/08	1615		X	GW	[redacted]	V	V								2	
C	FD WG	04	4	Dup-2		6/24/08	—		X	GW	[redacted]	V	V								2	
			5																			
			6																			
			7																			
			8																			
			9																			
			10																			

Preservatives: A NONE pH~7; B HNO_3 pH<2; C H_2SO_4 pH<2; D 1+1 HCl pH<2; E NaOH pH>12; F ZnAc/NaOH pH>9; G MeOH; H Other (note below)

Sampled By (print): Brett Fisher
Sampler's Signature:
Company: URS

How Shipped? Hand Carrier Fedex
Tracking No.

Comments: Exp. Rush TAT
48H - metals (6010)
Luk - lead

1. Relinquished By	Date	Time	2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	6/24/08							
1. Received By	Date	Time	2. Received By	Date	Time	3. Received For Lab By	Date	Time
							6.25.08	0915

TriMatrixCOC -- COC

WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data is necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCS/LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	g	Laboratory duplicate imprecision
g	Tuning failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	h	Holding time violation
h	Holding time violation	h	Holding time violation	k	Cooler receipt temperature exceeds limits
i	Internal standard failure	i	Internal standard failure	l	LCS recovery failure
k	Cooler receipt temperature exceeds limits	k	Cooler receipt temperature exceeds limits	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination	n	Failed Signal to noise ratio		

APPENDIX G.2.3
SWMU 37 MONITORING WELL 4 SAMPLING DATA VALIDATION REPORT
2010

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DATA VALIDATION REPORT - Level III Review

SDG No.: _____RF100610_____ **Fraction: _____VOCs _____**

Lab: _____TriMatrix_____ **Project Name: __Radford_SWMU_37 __**

Reviewer: _____Andrea_Sansom____ **Date: _____July_1,_2010_____**

This report presents the findings of a review of the referenced data. The report consists of this summary, copies of data reports with data qualifying flags applied (as required), the completed data validation checklist, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the USEPA Region III Modifications to the National Functional Guidelines for Organic and Inorganic Data Review as pertains to the specifics of the analytical methods employed and provisions of the approved project-specific QAPP.

Major Anomalies: None.

Minor Anomalies: The continuing calibration displayed a percent difference greater than the control limit of 20% with a negative bias for acetone at 20.6%. The associated field sample results were non-detect and were flagged UJ,c.

Correctable Anomalies: None.

Comments: All data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: Andrea Sansom

Andrea Sansom

Radford SWMU 37
RF100610

Laboratory Sample Identification	Field Sample Identification	Date Sampled	Parameters Requested
1006296-01	37MW4	6/16/2010	VOC
1006296-02	DUP-1	6/16/2010	VOC
1006296-03	Trip Blank	6/16/2010	VOC

Radford SWMU37
Duplicate Statistics
37MW4/DUP-1

	Units	RL	5xRL	Sample Conc		Duplicate Conc		%RPD	Delta	2xRL	Pass/ Fail
GC/MS Volatiles 8260B											
Toluene	ug/kg	1	5	0.22	J	0.22	J	0%	0	4	Pass

Control limit

[sample]>5xRL use 60% for organics and 35% for metals
[sample]<5xRL use Delta<2xRL

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

37MW4

Laboratory: TriMatrix Laboratories, Inc. SDG: RF100610

Client: URS Corporation Project: RFAAP RAAP 10

Matrix: Water Laboratory ID: 1006296-01 File ID: 1006296-01.D

Sampled: 06/16/10 12:05 Prepared: 06/22/10 08:00 Analyzed: 06/22/10 12:11

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 1006220 Sequence: 0F23013 Calibration: 0F23002 Instrument: 323

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	2.1	U
71-43-2	Benzene	1	1.0	1.0	0.18	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.18	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.13	U
75-25-2	Bromoform	1	2.0	2.0	0.15	U
74-83-9	Bromomethane	1	1.0	1.0	0.18	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.18	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.13	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.19	U
75-00-3	Chloroethane	1	1.0	1.0	0.15	U
67-66-3	Chloroform	1	1.0	1.0	0.17	U
74-87-3	Chloromethane	1	1.0	1.0	0.16	U
110-82-7	Cyclohexane	1	5.0	5.0	0.25	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.40	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.12	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.13	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.12	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.21	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.13	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.13	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.13	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.20	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.15	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.25	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.23	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.14	U
591-78-6	2-Hexanone	1	10	10	0.29	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.15	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.30	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.28	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.20	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.26	U
78-93-3	2-Butanone (MEK)	1	10	10	0.55	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.28	U
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.070	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.16	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

37MW4

Laboratory: TriMatrix Laboratories, Inc. SDG: RF100610

Client: URS Corporation Project: RFAAP RAAP 10

Matrix: Water Laboratory ID: 1006296-01 File ID: 1006296-01.D

Sampled: 06/16/10 12:05 Prepared: 06/22/10 08:00 Analyzed: 06/22/10 12:11

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 1006220 Sequence: 0F23013 Calibration: 0F23002 Instrument: 323

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
108-88-3	Toluene	1	0.22	1.0	0.16	J
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.18	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.19	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.18	U
79-01-6	Trichloroethene	1	1.0	1.0	0.092	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.20	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.13	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.10	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.42	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.6	106	85 - 115	
1,2-Dichloroethane-d4	40.0	45.0	112	70 - 120	
Toluene-d8	40.0	37.1	93	85 - 120	
4-Bromofluorobenzene	40.0	36.2	91	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	255420	4.28	262326	4.28	
Chlorobenzene-d5	203366	7.26	237261	7.26	
1,4-Dichlorobenzene-d4	113175	9.55	144453	9.55	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: RF100610

Client: URS Corporation Project: RFAAP RAAP 10

Matrix: Water Laboratory ID: 1006296-02 File ID: 1006296-02.D

Sampled: 06/16/10 00:00 Prepared: 06/22/10 08:00 Analyzed: 06/22/10 12:39

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 1006220 Sequence: 0F23013 Calibration: 0F23002 Instrument: 323

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	2.1	U UJ c
71-43-2	Benzene	1	1.0	1.0	0.18	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.18	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.13	U
75-25-2	Bromoform	1	2.0	2.0	0.15	U
74-83-9	Bromomethane	1	1.0	1.0	0.18	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.18	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.13	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.19	U
75-00-3	Chloroethane	1	1.0	1.0	0.15	U
67-66-3	Chloroform	1	1.0	1.0	0.17	U
74-87-3	Chloromethane	1	1.0	1.0	0.16	U
110-82-7	Cyclohexane	1	5.0	5.0	0.25	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.40	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.12	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.13	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.12	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.21	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.13	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.13	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.13	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.20	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.15	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.25	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.23	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.14	U
591-78-6	2-Hexanone	1	10	10	0.29	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.15	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.30	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.28	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.20	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.26	U
78-93-3	2-Butanone (MEK)	1	10	10	0.55	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.28	U
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.070	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.16	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

DUP-1

Laboratory: TriMatrix Laboratories, Inc. SDG: RF100610

Client: URS Corporation Project: RFAAP RAAP 10

Matrix: Water Laboratory ID: 1006296-02 File ID: 1006296-02.D

Sampled: 06/16/10 00:00 Prepared: 06/22/10 08:00 Analyzed: 06/22/10 12:39

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 1006220 Sequence: 0F23013 Calibration: 0F23002 Instrument: 323

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
108-88-3	Toluene	1	0.22	1.0	0.16	J
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.18	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.19	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.18	U
79-01-6	Trichloroethene	1	1.0	1.0	0.092	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.20	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.13	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.10	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.42	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	41.8	105	85 - 115	
1,2-Dichloroethane-d4	40.0	45.2	113	70 - 120	
Toluene-d8	40.0	36.6	92	85 - 120	
4-Bromofluorobenzene	40.0	37.0	92	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	259095	4.28	262326	4.28	
Chlorobenzene-d5	204709	7.26	237261	7.26	
1,4-Dichlorobenzene-d4	115535	9.55	144453	9.55	

* Values outside of QC limits

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: RF100610

Client: URS Corporation Project: RFAAP RAAP 10

Matrix: Water Laboratory ID: 1006296-03 File ID: 1006296-03.D

Sampled: 06/16/10 12:05 Prepared: 06/22/10 08:00 Analyzed: 06/22/10 11:43

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 1006220 Sequence: 0F23013 Calibration: 0F23002 Instrument: 323

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
67-64-1	Acetone	1	20	20	2.1	U UJ,c
71-43-2	Benzene	1	1.0	1.0	0.18	U
74-97-5	Bromochloromethane	1	1.0	1.0	0.18	U
75-27-4	Bromodichloromethane	1	1.0	1.0	0.13	U
75-25-2	Bromoform	1	2.0	2.0	0.15	U
74-83-9	Bromomethane	1	1.0	1.0	0.18	U
75-15-0	Carbon Disulfide	1	5.0	5.0	0.18	U
56-23-5	Carbon Tetrachloride	1	1.0	1.0	0.13	U
108-90-7	Chlorobenzene	1	1.0	1.0	0.19	U
75-00-3	Chloroethane	1	1.0	1.0	0.15	U
67-66-3	Chloroform	1	1.0	1.0	0.17	U
74-87-3	Chloromethane	1	1.0	1.0	0.16	U
110-82-7	Cyclohexane	1	5.0	5.0	0.25	U
96-12-8	1,2-Dibromo-3-chloropropane	1	5.0	5.0	0.40	U
124-48-1	Dibromochloromethane	1	1.0	1.0	0.14	U
106-93-4	1,2-Dibromoethane	1	1.0	1.0	0.22	U
95-50-1	1,2-Dichlorobenzene	1	1.0	1.0	0.12	U
541-73-1	1,3-Dichlorobenzene	1	1.0	1.0	0.13	U
106-46-7	1,4-Dichlorobenzene	1	1.0	1.0	0.12	U
75-71-8	Dichlorodifluoromethane	1	1.0	1.0	0.21	U
75-34-3	1,1-Dichloroethane	1	1.0	1.0	0.13	U
107-06-2	1,2-Dichloroethane	1	1.0	1.0	0.13	U
75-35-4	1,1-Dichloroethene	1	1.0	1.0	0.13	U
156-59-2	cis-1,2-Dichloroethene	1	1.0	1.0	0.23	U
156-60-5	trans-1,2-Dichloroethene	1	1.0	1.0	0.20	U
78-87-5	1,2-Dichloropropane	1	1.0	1.0	0.15	U
10061-01-5	cis-1,3-Dichloropropene	1	1.0	1.0	0.25	U
10061-02-6	trans-1,3-Dichloropropene	1	1.0	1.0	0.23	U
100-41-4	Ethylbenzene	1	1.0	1.0	0.14	U
591-78-6	2-Hexanone	1	10	10	0.29	U
98-82-8	Isopropylbenzene	1	1.0	1.0	0.15	U
79-20-9	Methyl Acetate	1	5.0	5.0	0.30	U
1634-04-4	Methyl tert-Butyl Ether	1	1.0	1.0	0.28	U
108-87-2	Methylcyclohexane	1	5.0	5.0	0.20	U
75-09-2	Methylene Chloride	1	5.0	5.0	0.26	U
78-93-3	2-Butanone (MEK)	1	10	10	0.55	U
108-10-1	4-Methyl-2-pentanone (MIBK)	1	10	10	0.28	U
100-42-5	Styrene	1	1.0	1.0	0.11	U
79-34-5	1,1,2,2-Tetrachloroethane	1	1.0	1.0	0.070	U
127-18-4	Tetrachloroethene	1	1.0	1.0	0.16	U

ORGANIC ANALYSIS DATA SHEET
USEPA-8260B

Trip Blank

Laboratory: TriMatrix Laboratories, Inc. SDG: RF100610

Client: URS Corporation Project: RFAAP RAAP 10

Matrix: Water Laboratory ID: 1006296-03 File ID: 1006296-03.D

Sampled: 06/16/10 12:05 Prepared: 06/22/10 08:00 Analyzed: 06/22/10 11:43

Solids: Preparation: 5030B Aqueous Purge & Initial/Final: 5 mL / 5 mL

QC Batch: 1006220 Sequence: 0F23013 Calibration: 0F23002 Instrument: 323

CAS No.	Analyte	Dilution	CONC. (ug/L)	MRL	MDL	Q
108-88-3	Toluene	1	1.0	1.0	0.16	U
87-61-6	1,2,3-Trichlorobenzene	1	2.0	2.0	0.18	U
120-82-1	1,2,4-Trichlorobenzene	1	2.0	2.0	0.16	U
71-55-6	1,1,1-Trichloroethane	1	1.0	1.0	0.19	U
79-00-5	1,1,2-Trichloroethane	1	1.0	1.0	0.18	U
79-01-6	Trichloroethene	1	1.0	1.0	0.092	U
75-69-4	Trichlorofluoromethane	1	1.0	1.0	0.20	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	1	1.0	1.0	0.13	U
75-01-4	Vinyl Chloride	1	1.0	1.0	0.10	U
1330-20-7	Xylene (Total)	1	3.0	3.0	0.42	U

System Monitoring Compound	ADDED (ug/L)	CONC (ug/L)	% REC.	QC Limits	Q
Dibromofluoromethane	40.0	42.4	106	85 - 115	
1,2-Dichloroethane-d4	40.0	45.2	113	70 - 120	
Toluene-d8	40.0	36.7	92	85 - 120	
4-Bromofluorobenzene	40.0	36.4	91	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	257714	4.28	262326	4.28	
Chlorobenzene-d5	203235	7.26	237261	7.26	
1,4-Dichlorobenzene-d4	113796	9.55	144453	9.55	

* Values outside of QC limits

DATA VALIDATION WORKSHEET

Volatile Organic Analysis by GC/MS

Reviewer: Andrea Sansom
Date: July 1, 2010
DV Level: II III IV
Review Document:
__X__ NFG - Region III Modifications
__X__ Project QAPP/SAP

Project Name: Radford SWMU37
Project Number: 11656367.20000
Laboratory: TriMatrix
SDG No.: RF100610
Test Name: 8260B
Method No.: VOC

1.0 Laboratory Deliverables		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	
1.4	Do sample preservation, collection and storage condition meet method requirement?	X		
	If the temperature of the cooler was elevated (> 10 ^{O}C) or bubble size in aqueous sample was too big (tiny bubble is OK.), then flag all positive results with a "L" and all non-detects "UL".			
1.5	Do any soil samples contain more than 50% water?		X	
	If any sample analyzed as a soil, other than TCLP, contains % moisture greater than 50%, noted in the DV			

Notes:

2.0 Holding Times		Yes	No	NA
2.1	Were sample preserved as specified in the method or project QAPP?	X		
2.2	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, L(+)/UL(-). For aqueous unpreserved - 7 days for aromatic compounds All others - 14 days.		X	
2.3	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, L(+)/R(-) .		X	

Notes:

3.0 Blanks (Laboratory and Field)		Yes	No	NA
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per GCMS, 20 samples, batch, matrix, and level)?	X		
3.2	Do any method blanks have positive results? Action: If yes, positive sample results should be reported and qualified "B", if the concentration of the compound in the sample is less than or equal to 5 times (or 10 times for the common volatile lab contaminants - methylene chloride, acetone, and 2-butanone) the amount in the associated blank.		X	
3.3	Do any field equipment blanks/trip blanks have positive results? If Yes, use same rules above.		X	
3.4	Are there field equipment blank/trip blanks associated with every sample? If No, noted in the DV report.	X		

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are sufficient standards (5 for first order, 6 for second order, or 7 for third order) included in the calibration curve? If no, apply professional judgement towards usability.	X		
4.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgement to determine the effect on the data and note in the reviewer narrative.	X		
4.3	Has a continuing calibration standard been analyzed for every 12 hours of sample analysis per instrument?	X		
4.4	Are all calibration standard (ICV and CCV) %RSD (or correlation coefficient) or % drift within the control limits? Control Limits: r≥0.99, %RSD < ± 15% and %D < ± 20%		X	
	For initial Calibration: for %RSD > ± 15%, but < ± 50%, J(+) only. for %RSD > ± 50%, but < ± 80%, J(+)/UJ(-); for %RSD > + 80%, J(+)/R(-).			
	For Continuing Calibration: displaying a negative bias: %D > + 20% and < + 50%, J(+)/UJ(-), >50%J(+)/R(-); displaying a positive bias >20%, J(+).			
4.5	Do any SPCC compounds have an RRF < control limit? Control limits: >0.10 for chloromethane, 1,1-dichloroethane, & bromoform or >0.30 for chlorobenzene & 1,1,2,2-tetrachloroethane. If yes, L(+)/R(-).		X	

Notes:

5.0 GC/MS Instrument Performance Check		Yes	No	NA
5.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	X		
5.2	Are BFB enchanced bar graph spectrum and mass/charge (m/z) listing provided for each 12-hour shift?	X		
5.3	Have all samples been analyzed within twelve hours of the BFB tune?	X		
	If twelve hours have elapsed according to the system clock, and the laboratory had analyzed standards, blanks, field samples or QC samples after twelve (12) hours, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
5.4	Have ion abundance criteria for BFB been met for each instrument used?	X		
	If the BFB criteria were not met prior to the analyses of the standards, blanks, field samples and QC samples, all standards, blanks, field samples and QC samples are rejected "R".			

Notes:

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	X		
6.2	Are surrogate recoveries within acceptance criteria (not to exceed 50-150%) for all samples and method blanks?	X		
6.3	If No in Section 6.2, are these sample(s) or method blank(s) reanalyzed?			X
	If any system monitoring compound(s) in the volatile fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? DV report should indicate that extraction efficiency/ method accuracy cannot be verified.			X
	1 or more <10% / 1 high/low / 2 or 3 high/low / 2 or 3 all low / 2 or 3 all high Positives: L / J / J / L / K Non-detects: R / UJ / UJ / UL / NONE			
	Note: The B qualifier remains over surrogate flagging.			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	X		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	X		
7.3	Are there any %R for matrix spike recoveries outside the QC limits not to exceed 50-150%?		X	
7.4	Are there any RPD outside the QC limits not to exceed 50%?		X	
	No action is taken on MS/MSD data alone. However, using informed professional judgement, the data reviewer may use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If determined to affect only the sample spiked, then qualify the parent sample alone. If determined that problem is systematic, flag all associated samples.			

Notes:

8.0 Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)		Yes	No	NA
8.1	Is the LCS/LCSD recovery form present?	X		
8.2	Were LCS/LCSD analyzed at required frequency (one per 20 samples per batch) for each matrix?	X		
8.3	Are there any %R for LCS/LCSD recoveries outside the QC limits not to exceed 50-150%?		X	
	If Yes, for %R > UCL, J(+) only; for %R < LCL, J(+)/R(-).			
8.4	Are there any RPD for LCS/LCSD recoveries outside the QC limits not to exceed 50%?			X
	If Yes, J(+) only.			

Notes:

9.0 Internal Standard		Yes	No	NA
9.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration? If not, J(+)/UJ(-).	X		
	If extremely low area counts are reported, or performance exhibits a major abrupt drop-off, then a severe loss of sensitivity is indicated. Non-detect target compounds should then be qualified as unusable (R).			
9.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	X		
	The chromatographic profile for that sample must be examined to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Positive results should not needed to be qualified as "R", if the mass spectral criteria are met.			

Notes:

10.0 Field Duplicate		Yes	No	NA
10.1	Was a field duplicate prepared and analyzed at the correct frequency (one per 20 samples, matrix, and level)?	X		
	For sample results > 5 x RL, a control limit of 25% RPD for water and 35% RPD for soil will be used. For sample results < 5 x RL, a control limit of 2 x RL for water and 4 X RL for soil will be used.			
10.2	Are all analyte duplicate results within control limits? Generally, no action is taken on percent difference of field duplicate results. Results that fall outside criteria recommended above should be noted during data validation and discussed in the DV report.	X		

Notes:

11.0 Tentatively Identified Compounds (TICs) and Detection Limit Verification		Yes	No	NA
11.1	Are any TICs detected in the field samples? If Yes, all TIC results should be flagged "NJ" (tentatively idenified, and approximate concentration).			X
11.2	Do detection limits meet those required by the project QAPP and were they properly adjusted to reflect all sample dilutions and dry weight factors?	X		
11.3	Were sample concentrations above the highest standard run at a dilution? If not, for ion saturation flag "L", unsaturated results "J".			X

Notes:

12.0 Data Completeness		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	X		
	Number of samples: 2			
	Number of target compounds in each analysis: 50			
	Number of results rejected and not reported: 0			
	% Completeness = 100%			

Notes:

QC BATCH SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610

Client: URS Corporation
Project: RFAAP RAAP 10

QC Batch: 1006220
QC Batch Matrix: Water
Preparation: 5030B Aqueous Purge & Trap

Sample Name	Lab Sample ID	Date Prepared	Observations
Blank	1006220-BLK1	06/22/10 08:00	
LCS	1006220-BS1	06/22/10 08:00	
37MW4	1006220-MS1	06/22/10 08:00	
37MW4	1006220-MSD1	06/22/10 08:00	
37MW4	1006296-01	06/22/10 08:00	
DUP-1	1006296-02	06/22/10 08:00	
Trip Blank	1006296-03	06/22/10 08:00	

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610
Client: URS Corporation
Project: RFAAP RAAP 10
Matrix: Water
Laboratory ID: 1006220-BLK1
File ID: BLK0622.D
Prepared: 06/22/10 08:00
Preparation: 5030B Aqueous Purge &
Initial/Final: 5 mL / 5 mL
Analyzed: 06/22/10 10:18
Instrument: 323
QC Batch: 1006220
Sequence: 0F23013
Calibration: 0F23002

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
67-64-1	Acetone	2.1	20	20	ug/L	U
71-43-2	Benzene	0.18	1.0	1.0	ug/L	U
74-97-5	Bromochloromethane	0.18	1.0	1.0	ug/L	U
75-27-4	Bromodichloromethane	0.13	1.0	1.0	ug/L	U
75-25-2	Bromoform	0.15	2.0	2.0	ug/L	U
74-83-9	Bromomethane	0.18	1.0	1.0	ug/L	U
75-15-0	Carbon Disulfide	0.18	5.0	5.0	ug/L	U
56-23-5	Carbon Tetrachloride	0.13	1.0	1.0	ug/L	U
108-90-7	Chlorobenzene	0.19	1.0	1.0	ug/L	U
75-00-3	Chloroethane	0.15	1.0	1.0	ug/L	U
67-66-3	Chloroform	0.17	1.0	1.0	ug/L	U
74-87-3	Chloromethane	0.16	1.0	1.0	ug/L	U
110-82-7	Cyclohexane	0.25	5.0	5.0	ug/L	U
96-12-8	1,2-Dibromo-3-chloropropane	0.40	5.0	5.0	ug/L	U
124-48-1	Dibromochloromethane	0.14	1.0	1.0	ug/L	U
106-93-4	1,2-Dibromoethane	0.22	1.0	1.0	ug/L	U
95-50-1	1,2-Dichlorobenzene	0.12	1.0	1.0	ug/L	U
541-73-1	1,3-Dichlorobenzene	0.13	1.0	1.0	ug/L	U
106-46-7	1,4-Dichlorobenzene	0.12	1.0	1.0	ug/L	U
75-71-8	Dichlorodifluoromethane	0.21	1.0	1.0	ug/L	U
75-34-3	1,1-Dichloroethane	0.13	1.0	1.0	ug/L	U
107-06-2	1,2-Dichloroethane	0.13	1.0	1.0	ug/L	U
75-35-4	1,1-Dichloroethene	0.13	1.0	1.0	ug/L	U
156-59-2	cis-1,2-Dichloroethene	0.23	1.0	1.0	ug/L	U
156-60-5	trans-1,2-Dichloroethene	0.20	1.0	1.0	ug/L	U
78-87-5	1,2-Dichloropropane	0.15	1.0	1.0	ug/L	U
10061-01-5	cis-1,3-Dichloropropene	0.25	1.0	1.0	ug/L	U
10061-02-6	trans-1,3-Dichloropropene	0.23	1.0	1.0	ug/L	U
100-41-4	Ethylbenzene	0.14	1.0	1.0	ug/L	U
591-78-6	2-Hexanone	0.29	10	10	ug/L	U

METHOD BLANK DATA SHEET
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610
Client: URS Corporation
Project: RFAAP RAAP 10
Matrix: Water
Laboratory ID: 1006220-BLK1
File ID: BLK0622.D
Prepared: 06/22/10 08:00
Preparation: 5030B Aqueous Purge &
Initial/Final: 5 mL / 5 mL
Analyzed: 06/22/10 10:18
Instrument: 323
QC Batch: 1006220
Sequence: 0F23013
Calibration: 0F23002

CAS No.	Analyte	MDL	MRL	Concentration	Unit	Q
98-82-8	Isopropylbenzene	0.15	1.0	1.0	ug/L	U
79-20-9	Methyl Acetate	0.30	5.0	5.0	ug/L	U
1634-04-4	Methyl tert-Butyl Ether	0.28	1.0	1.0	ug/L	U
108-87-2	Methylcyclohexane	0.20	5.0	5.0	ug/L	U
75-09-2	Methylene Chloride	0.26	5.0	5.0	ug/L	U
78-93-3	2-Butanone (MEK)	0.55	10	10	ug/L	U
108-10-1	4-Methyl-2-pentanone (MIBK)	0.28	10	10	ug/L	U
100-42-5	Styrene	0.11	1.0	1.0	ug/L	U
79-34-5	1,1,2,2-Tetrachloroethane	0.070	1.0	1.0	ug/L	U
127-18-4	Tetrachloroethene	0.16	1.0	1.0	ug/L	U
108-88-3	Toluene	0.16	1.0	1.0	ug/L	U
87-61-6	1,2,3-Trichlorobenzene	0.18	2.0	2.0	ug/L	U
120-82-1	1,2,4-Trichlorobenzene	0.16	2.0	2.0	ug/L	U
71-55-6	1,1,1-Trichloroethane	0.19	1.0	1.0	ug/L	U
79-00-5	1,1,2-Trichloroethane	0.18	1.0	1.0	ug/L	U
79-01-6	Trichloroethene	0.092	1.0	1.0	ug/L	U
75-69-4	Trichlorofluoromethane	0.20	1.0	1.0	ug/L	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.13	1.0	1.0	ug/L	U
75-01-4	Vinyl Chloride	0.10	1.0	1.0	ug/L	U
1330-20-7	Xylene (Total)	0.42	3.0	3.0	ug/L	U

System Monitoring Compound	Added (ug/L)	Conc. (ug/L)	% REC	QC Limits	Q
Dibromofluoromethane	40.0	41.9	105	85 - 115	
1,2-Dichloroethane-d4	40.0	44.0	110	70 - 120	
Toluene-d8	40.0	36.9	92	85 - 120	
4-Bromofluorobenzene	40.0	36.5	91	75 - 120	

Internal Standard	Area	RT	Ref. Area	Ref. RT	Q
Fluorobenzene	258542	4.28	262326	4.28	
Chlorobenzene-d5	203670	7.26	237261	7.26	
1,4-Dichlorobenzene-d4	114051	9.55	144453	9.55	

LCS / LCS DUPLICATE RECOVERY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

Laboratory ID: 1006220-BS1

SDG: RF100610
Project: RFAAP RAAP 10
Preparation: 5030B Aqueous Purge & Trap
Initial/Final: 5 mL / 5 mL
QC Batch: 1006220
Sequence: 0F23013

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
Acetone	20.0	17.5	88	40 - 140	ug/L
Benzene	20.0	18.4	92	80 - 120	ug/L
Bromochloromethane	20.0	18.9	95	65 - 130	ug/L
Bromodichloromethane	20.0	19.8	99	75 - 120	ug/L
Bromoform	20.0	20.6	103	70 - 130	ug/L
Bromomethane	20.0	17.2	86	30 - 145	ug/L
Carbon Disulfide	20.0	18.0	90	35 - 160	ug/L
Carbon Tetrachloride	20.0	19.6	98	65 - 140	ug/L
Chlorobenzene	20.0	21.0	105	80 - 120	ug/L
Chloroethane	20.0	19.2	96	60 - 135	ug/L
Chloroform	20.0	19.5	98	65 - 135	ug/L
Chloromethane	20.0	17.4	87	40 - 125	ug/L
Cyclohexane	20.0	17.7	88	77 - 125	ug/L
1,2-Dibromo-3-chloropropane	20.0	20.0	100	50 - 130	ug/L
Dibromochloromethane	20.0	20.8	104	60 - 135	ug/L
1,2-Dibromoethane	20.0	21.4	107	80 - 120	ug/L
1,2-Dichlorobenzene	20.0	21.9	110	70 - 120	ug/L
1,3-Dichlorobenzene	20.0	21.9	110	75 - 125	ug/L
1,4-Dichlorobenzene	20.0	21.7	108	75 - 125	ug/L
Dichlorodifluoromethane	20.0	17.5	88	30 - 155	ug/L
1,1-Dichloroethane	20.0	17.6	88	70 - 135	ug/L
1,2-Dichloroethane	20.0	20.0	100	70 - 130	ug/L
1,1-Dichloroethene	20.0	18.4	92	70 - 130	ug/L
cis-1,2-Dichloroethene	20.0	18.7	94	70 - 125	ug/L
trans-1,2-Dichloroethene	20.0	18.5	92	60 - 140	ug/L
1,2-Dichloropropane	20.0	18.4	92	75 - 125	ug/L
cis-1,3-Dichloropropene	20.0	18.3	92	70 - 130	ug/L
trans-1,3-Dichloropropene	20.0	18.2	91	55 - 140	ug/L
Ethylbenzene	20.0	21.8	109	75 - 125	ug/L

LCS / LCS DUPLICATE RECOVERY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Matrix: Water

Laboratory ID: 1006220-BS1

SDG: RF100610
Project: RFAAP RAAP 10
Preparation: 5030B Aqueous Purge & Trap
Initial/Final: 5 mL / 5 mL
QC Batch: 1006220
Sequence: 0F23013

Analyte	Spike Added	LCS Conc.	LCS % Rec. #	QC Limits Rec.	Units
2-Hexanone	20.0	19.3	96	55 - 130	ug/L
Isopropylbenzene	20.0	21.2	106	75 - 125	ug/L
Methyl Acetate	20.0	18.2	91	70 - 130	ug/L
Methyl tert-Butyl Ether	20.0	19.0	95	65 - 125	ug/L
Methylcyclohexane	20.0	17.4	87	70 - 130	ug/L
Methylene Chloride	20.0	17.9	90	55 - 140	ug/L
2-Butanone (MEK)	20.0	17.4	87	30 - 150	ug/L
4-Methyl-2-pentanone (MIBK)	20.0	18.8	94	60 - 135	ug/L
Styrene	20.0	22.4	112	65 - 135	ug/L
1,1,2,2-Tetrachloroethane	20.0	21.3	106	65 - 130	ug/L
Tetrachloroethene	20.0	20.7	103	45 - 150	ug/L
Toluene	20.0	18.7	94	75 - 120	ug/L
1,2,3-Trichlorobenzene	20.0	23.8	119	55 - 140	ug/L
1,2,4-Trichlorobenzene	20.0	20.9	104	65 - 135	ug/L
1,1,1-Trichloroethane	20.0	19.5	98	65 - 130	ug/L
1,1,2-Trichloroethane	20.0	18.7	94	75 - 125	ug/L
Trichloroethene	20.0	17.7	88	70 - 125	ug/L
Trichlorofluoromethane	20.0	18.4	92	60 - 145	ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	18.2	91	50 - 150	ug/L
Vinyl Chloride	20.0	17.9	90	50 - 145	ug/L
Xylene (Total)	60.0	66.6	111	75 - 130	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8260B

37MW4

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

Laboratory ID: 1006220-MS1

SDG: RF100610

Project: RFAAP RAAP 10

Preparation: 5030B Aqueous Purge & Trap

Initial/Final: 5 mL / 5 mL

QC Batch: 1006220

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Acetone	20.0	ND	18.9	95	40 - 140	ug/L
Benzene	20.0	ND	19.1	96	80 - 120	ug/L
Bromochloromethane	20.0	ND	19.0	95	65 - 130	ug/L
Bromodichloromethane	20.0	ND	20.5	103	75 - 120	ug/L
Bromoform	20.0	ND	20.8	104	70 - 130	ug/L
Bromomethane	20.0	ND	14.2	71	30 - 145	ug/L
Carbon Disulfide	20.0	ND	18.4	92	35 - 160	ug/L
Carbon Tetrachloride	20.0	ND	20.9	104	65 - 140	ug/L
Chlorobenzene	20.0	ND	21.6	108	80 - 120	ug/L
Chloroethane	20.0	ND	19.1	95	60 - 135	ug/L
Chloroform	20.0	ND	20.1	101	65 - 135	ug/L
Chloromethane	20.0	ND	17.6	88	40 - 125	ug/L
Cyclohexane	20.0	ND	19.8	99	77 - 125	ug/L
1,2-Dibromo-3-chloropropane	20.0	ND	21.1	106	50 - 130	ug/L
Dibromochloromethane	20.0	ND	21.9	110	60 - 135	ug/L
1,2-Dibromoethane	20.0	ND	21.8	109	80 - 120	ug/L
1,2-Dichlorobenzene	20.0	ND	22.5	112	70 - 120	ug/L
1,3-Dichlorobenzene	20.0	ND	22.7	114	75 - 125	ug/L
1,4-Dichlorobenzene	20.0	ND	22.5	112	75 - 125	ug/L
Dichlorodifluoromethane	20.0	ND	18.7	93	30 - 155	ug/L
1,1-Dichloroethane	20.0	ND	19.8	99	70 - 135	ug/L
1,2-Dichloroethane	20.0	ND	20.4	102	70 - 130	ug/L
1,1-Dichloroethene	20.0	ND	19.5	97	70 - 130	ug/L
cis-1,2-Dichloroethene	20.0	ND	18.8	94	70 - 125	ug/L
trans-1,2-Dichloroethene	20.0	ND	19.4	97	60 - 140	ug/L
1,2-Dichloropropane	20.0	ND	18.6	93	75 - 125	ug/L
cis-1,3-Dichloropropene	20.0	ND	17.0	85	70 - 130	ug/L
trans-1,3-Dichloropropene	20.0	ND	17.7	88	55 - 140	ug/L
Ethylbenzene	20.0	ND	22.9	115	75 - 125	ug/L
2-Hexanone	20.0	ND	19.2	96	55 - 130	ug/L
Isopropylbenzene	20.0	ND	21.6	108	75 - 125	ug/L
Methyl Acetate	20.0	ND	17.1	86	70 - 130	ug/L
Methyl tert-Butyl Ether	20.0	ND	18.9	94	65 - 125	ug/L

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

USEPA-8260B

37MW4

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

SDG: RF100610

Project: RFAAP RAAP 10

Preparation: 5030B Aqueous Purge & Trap

Initial/Final: 5 mL / 5 mL

Laboratory ID: 1006220-MS1

QC Batch: 1006220

Analyte	Spike Added	Sample Conc.	MS Conc.	MS % Rec. #	QC Limits Rec.	Units
Methylcyclohexane	20.0	ND	17.9	90	70 - 130	ug/L
Methylene Chloride	20.0	ND	18.5	93	55 - 140	ug/L
2-Butanone (MEK)	20.0	ND	17.9	89	30 - 150	ug/L
4-Methyl-2-pentanone (MIBK)	20.0	ND	18.6	93	60 - 135	ug/L
Styrene	20.0	ND	23.1	116	65 - 135	ug/L
1,1,2,2-Tetrachloroethane	20.0	ND	22.5	112	65 - 130	ug/L
Tetrachloroethene	20.0	ND	21.7	108	45 - 150	ug/L
Toluene	20.0	0.220	19.6	97	75 - 120	ug/L
1,2,3-Trichlorobenzene	20.0	ND	22.9	114	55 - 140	ug/L
1,2,4-Trichlorobenzene	20.0	ND	20.4	102	65 - 135	ug/L
1,1,1-Trichloroethane	20.0	ND	20.4	102	65 - 130	ug/L
1,1,2-Trichloroethane	20.0	ND	19.2	96	75 - 125	ug/L
Trichloroethene	20.0	ND	18.7	93	70 - 125	ug/L
Trichlorofluoromethane	20.0	ND	21.1	106	60 - 145	ug/L
1,1,2-Trichloro-1,2,2-trifluoroetha	20.0	ND	20.2	101	50 - 150	ug/L
Vinyl Chloride	20.0	ND	18.2	91	50 - 145	ug/L
Xylene (Total)	60.0	ND	69.6	116	75 - 130	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

37MW4

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610

Client: URS Corporation
Project: RFAAP RAAP 10

Matrix: Water
Preparation: 5030B Aqueous Purge & Trap

Initial/Final: 5 mL / 5 mL

Laboratory ID: 1006220-MSD1
QC Batch: 1006220

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Acetone	20.0	18.1	91	4	30	40 - 140	ug/L
Benzene	20.0	18.8	94	2	30	80 - 120	ug/L
Bromochloromethane	20.0	18.6	93	2	30	65 - 130	ug/L
Bromodichloromethane	20.0	20.1	100	2	30	75 - 120	ug/L
Bromoform	20.0	20.8	104	0	30	70 - 130	ug/L
Bromomethane	20.0	16.6	83	16	30	30 - 145	ug/L
Carbon Disulfide	20.0	18.2	91	1	30	35 - 160	ug/L
Carbon Tetrachloride	20.0	20.2	101	4	30	65 - 140	ug/L
Chlorobenzene	20.0	21.9	109	1	30	80 - 120	ug/L
Chloroethane	20.0	18.9	94	1	30	60 - 135	ug/L
Chloroform	20.0	19.8	99	2	30	65 - 135	ug/L
Chloromethane	20.0	17.2	86	2	30	40 - 125	ug/L
Cyclohexane	20.0	19.0	95	4	30	77 - 125	ug/L
1,2-Dibromo-3-chloropropane	20.0	20.8	104	1	30	50 - 130	ug/L
Dibromochloromethane	20.0	21.5	108	2	30	60 - 135	ug/L
1,2-Dibromoethane	20.0	21.7	108	0.6	30	80 - 120	ug/L
1,2-Dichlorobenzene	20.0	22.4	112	0.5	30	70 - 120	ug/L
1,3-Dichlorobenzene	20.0	22.3	111	2	30	75 - 125	ug/L
1,4-Dichlorobenzene	20.0	21.8	109	3	30	75 - 125	ug/L
Dichlorodifluoromethane	20.0	17.8	89	5	30	30 - 155	ug/L
1,1-Dichloroethane	20.0	19.2	96	3	30	70 - 135	ug/L
1,2-Dichloroethane	20.0	20.4	102	0.3	30	70 - 130	ug/L
1,1-Dichloroethene	20.0	19.0	95	2	30	70 - 130	ug/L
cis-1,2-Dichloroethene	20.0	19.0	95	1	30	70 - 125	ug/L
trans-1,2-Dichloroethene	20.0	19.0	95	2	30	60 - 140	ug/L
1,2-Dichloropropane	20.0	18.7	93	0.05	30	75 - 125	ug/L
cis-1,3-Dichloropropene	20.0	17.2	86	2	30	70 - 130	ug/L
trans-1,3-Dichloropropene	20.0	18.2	91	3	30	55 - 140	ug/L
Ethylbenzene	20.0	22.6	113	1	30	75 - 125	ug/L
2-Hexanone	20.0	19.6	98	2	30	55 - 130	ug/L
Isopropylbenzene	20.0	21.3	106	2	30	75 - 125	ug/L
Methyl Acetate	20.0	17.0	85	0.8	30	70 - 130	ug/L
Methyl tert-Butyl Ether	20.0	19.3	96	2	30	65 - 125	ug/L
Methylcyclohexane	20.0	18.3	91	2	30	70 - 130	ug/L

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

37MW4

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

Client: URS Corporation

Matrix: Water

Laboratory ID: 1006220-MSD1

SDG: RF100610

Project: RFAAP RAAP 10

Preparation: 5030B Aqueous Purge & Trap

Initial/Final: 5 mL / 5 mL

QC Batch: 1006220

Analyte	Spike Added	MSD Conc.	MSD % Rec. #	% RPD #	QC Limits RPD	QC Limits Rec.	Units
Methylene Chloride	20.0	18.1	90	2	30	55 - 140	ug/L
2-Butanone (MEK)	20.0	19.9	100	11	30	30 - 150	ug/L
4-Methyl-2-pentanone (MIBK)	20.0	18.7	94	0.9	30	60 - 135	ug/L
Styrene	20.0	22.8	114	1	30	65 - 135	ug/L
1,1,2,2-Tetrachloroethane	20.0	22.4	112	0.3	30	65 - 130	ug/L
Tetrachloroethene	20.0	21.6	108	0.6	30	45 - 150	ug/L
Toluene	20.0	19.2	95	2	30	75 - 120	ug/L
1,2,3-Trichlorobenzene	20.0	23.3	117	2	30	55 - 140	ug/L
1,2,4-Trichlorobenzene	20.0	20.5	103	0.7	30	65 - 135	ug/L
1,1,1-Trichloroethane	20.0	20.0	100	2	30	65 - 130	ug/L
1,1,2-Trichloroethane	20.0	18.9	94	2	30	75 - 125	ug/L
Trichloroethene	20.0	18.2	91	3	30	70 - 125	ug/L
Trichlorofluoromethane	20.0	19.8	99	7	30	60 - 145	ug/L
1,1,2-Trichloro-1,2,2-trifluoroetha	20.0	18.9	95	7	30	50 - 150	ug/L
Vinyl Chloride	20.0	17.6	88	4	30	50 - 145	ug/L
Xylene (Total)	60.0	68.2	114	2	30	75 - 130	ug/L

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610
Client: URS Corporation
Project: RFAAP RAAP 10
Sequence: 0F23013
Instrument: 323
Matrix: Water
Calibration: 0F23002

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
Calibration Check (0F23013-CCV1)		**Lab File ID: CCV0622.D**		**Analyzed: 06/22/10 08:53**			
Dibromofluoromethane	3.61	3.61	0.00	+/-1.0	104	75 - 125	
1,2-Dichloroethane-d4	3.95	3.95	0.00	+/-1.0	107	75 - 125	
Toluene-d8	5.86	5.86	0.00	+/-1.0	99	75 - 125	
4-Bromofluorobenzene	8.43	8.43	0.00	+/-1.0	97	75 - 125	
LCS (1006220-BS1)		**Lab File ID: BS0622.D**		**Analyzed: 06/22/10 09:21**			
Dibromofluoromethane	3.61	3.61	0.00	+/-1.0	103	85 - 115	
1,2-Dichloroethane-d4	3.95	3.95	0.00	+/-1.0	109	70 - 120	
Toluene-d8	5.86	5.86	0.00	+/-1.0	99	85 - 120	
4-Bromofluorobenzene	8.43	8.43	0.00	+/-1.0	97	75 - 120	
Blank (1006220-BLK1)		**Lab File ID: BLK0622.D**		**Analyzed: 06/22/10 10:18**			
Dibromofluoromethane	3.61	3.61	0.00	+/-1.0	105	85 - 115	
1,2-Dichloroethane-d4	3.95	3.95	0.00	+/-1.0	110	70 - 120	
Toluene-d8	5.86	5.86	0.00	+/-1.0	92	85 - 120	
4-Bromofluorobenzene	8.43	8.43	0.00	+/-1.0	91	75 - 120	
Trip Blank (1006296-03)		**Lab File ID: 1006296-03.D**		**Analyzed: 06/22/10 11:43**			
Dibromofluoromethane	3.61	3.61	0.00	+/-1.0	106	85 - 115	
1,2-Dichloroethane-d4	3.95	3.95	0.00	+/-1.0	113	70 - 120	
Toluene-d8	5.86	5.86	0.00	+/-1.0	92	85 - 120	
4-Bromofluorobenzene	8.43	8.43	0.00	+/-1.0	91	75 - 120	
37MW4 (1006296-01)		**Lab File ID: 1006296-01.D**		**Analyzed: 06/22/10 12:11**			
Dibromofluoromethane	3.61	3.61	0.00	+/-1.0	106	85 - 115	
1,2-Dichloroethane-d4	3.95	3.95	0.00	+/-1.0	112	70 - 120	
Toluene-d8	5.86	5.86	0.00	+/-1.0	93	85 - 120	
4-Bromofluorobenzene	8.43	8.43	0.00	+/-1.0	91	75 - 120	
DUP-1 (1006296-02)		**Lab File ID: 1006296-02.D**		**Analyzed: 06/22/10 12:39**			
Dibromofluoromethane	3.61	3.61	0.00	+/-1.0	105	85 - 115	
1,2-Dichloroethane-d4	3.95	3.95	0.00	+/-1.0	113	70 - 120	
Toluene-d8	5.86	5.86	0.00	+/-1.0	92	85 - 120	
4-Bromofluorobenzene	8.43	8.43	0.00	+/-1.0	92	75 - 120	
Matrix Spike (1006220-MS1)		**Lab File ID: 29601MS.D**		**Analyzed: 06/22/10 15:29**			
Dibromofluoromethane	3.61	3.61	0.00	+/-1.0	105	85 - 115	
1,2-Dichloroethane-d4	3.95	3.95	0.00	+/-1.0	107	70 - 120	
Toluene-d8	5.86	5.86	0.00	+/-1.0	97	85 - 120	
4-Bromofluorobenzene	8.43	8.43	0.00	+/-1.0	95	75 - 120	

SURROGATE STANDARD RECOVERY AND RT SUMMARY

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610
Client: URS Corporation
Project: RFAAP RAAP 10
Sequence: 0F23013
Instrument: 323
Matrix: Water
Calibration: 0F23002

Lab Sample Id Surrogate Compound Name	RT	Calibration Mean RT	RT Diff	RT Diff Limit	% Recovery	Recovery Limits	Q
Matrix Spike Dup (1006220-MSD1)		**Lab File ID: 29601MD.D**		**Analyzed: 06/22/10 15:57**			
Dibromofluoromethane	3.61	3.61	0.00	+/-1.0	105	85 - 115	
1,2-Dichloroethane-d4	3.95	3.95	0.00	+/-1.0	108	70 - 120	
Toluene-d8	5.86	5.86	0.00	+/-1.0	97	85 - 120	
4-Bromofluorobenzene	8.43	8.43	0.00	+/-1.0	97	75 - 120	

INTERNAL STANDARD AREA AND RT SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610
Client: URS Corporation
Project: RFAAP RAAP 10
Sequence: 0F23013
Instrument: 323
Matrix: Water
Calibration: 0F23002

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Calibration Check (0F23013-CCV1)			**Lab File ID: CCV0622.D**			**Analyzed: 06/22/10 08:53**			
Fluorobenzene	247805	4.28	262326	4.28	94	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	199997	7.26	237261	7.26	84	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	119080	9.55	144453	9.55	82	50 - 200	0.0000	+/-0.50	
LCS (1006220-BS1)			**Lab File ID: BS0622.D**			**Analyzed: 06/22/10 09:21**			
Fluorobenzene	249176	4.28	262326	4.28	95	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	201777	7.26	237261	7.26	85	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	119713	9.55	144453	9.55	83	50 - 200	0.0000	+/-0.50	
Blank (1006220-BLK1)			**Lab File ID: BLK0622.D**			**Analyzed: 06/22/10 10:18**			
Fluorobenzene	258542	4.28	262326	4.28	99	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	203670	7.26	237261	7.26	86	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	114051	9.55	144453	9.55	79	50 - 200	0.0000	+/-0.50	
Trip Blank (1006296-03)			**Lab File ID: 1006296-03.D**			**Analyzed: 06/22/10 11:43**			
Fluorobenzene	257714	4.28	262326	4.28	98	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	203235	7.26	237261	7.26	86	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	113796	9.55	144453	9.55	79	50 - 200	0.0000	+/-0.50	
37MW4 (1006296-01)			**Lab File ID: 1006296-01.D**			**Analyzed: 06/22/10 12:11**			
Fluorobenzene	255420	4.28	262326	4.28	97	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	203366	7.26	237261	7.26	86	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	113175	9.55	144453	9.55	78	50 - 200	0.0000	+/-0.50	
DUP-1 (1006296-02)			**Lab File ID: 1006296-02.D**			**Analyzed: 06/22/10 12:39**			
Fluorobenzene	259095	4.28	262326	4.28	99	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	204709	7.26	237261	7.26	86	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	115535	9.55	144453	9.55	80	50 - 200	0.0000	+/-0.50	
Matrix Spike (1006220-MS1)			**Lab File ID: 29601MS.D**			**Analyzed: 06/22/10 15:29**			
Fluorobenzene	249780	4.28	262326	4.28	95	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	202662	7.26	237261	7.26	85	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	119401	9.55	144453	9.55	83	50 - 200	0.0000	+/-0.50	
Matrix Spike Dup (1006220-MSD1)			**Lab File ID: 29601MD.D**			**Analyzed: 06/22/10 15:57**			
Fluorobenzene	255297	4.28	262326	4.28	97	50 - 200	0.0000	+/-0.50	
Chlorobenzene-d5	204344	7.26	237261	7.26	86	50 - 200	0.0000	+/-0.50	
1,4-Dichlorobenzene-d4	122580	9.55	144453	9.55	85	50 - 200	0.0000	+/-0.50	

HOLDING TIME SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.

SDG: RF100610

Client: URS Corporation

Project: RFAAP RAAP 10

Method: Volatile Organic Compounds by EPA Method 8260B

Sample Name	Date Collected	Date Received	Date Leached	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
37MW4	06/16/10	06/17/10		06/22/10	6	NA	06/22/10	6	14	
DUP-1	06/16/10	06/17/10		06/22/10	6	NA	06/22/10	7	14	
Trip Blank	06/16/10	06/17/10		06/22/10	6	NA	06/22/10	6	14	

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Lab File ID: BFB0617.D
Instrument ID: 323
Sequence: 0F23007
Calibration: 0F23002

SDG: RF100610
Project: RFAAP RAAP 10
Injection Date: 06/17/10
Injection Time: 09:43
Lab Sample ID: 0F23007-TUN1

m/z	Ion Abundance Criteria	% Relative Abundance	
50	15 - 40% of 95	17.6	PASS
75	30 - 60% of 95	46.6	PASS
95	Base peak, 100% relative abundance	100	PASS
96	5 - 9% of 95	6.58	PASS
173	Less than 2% of 174	0.411	PASS
174	50 - 100% of 95	97.5	PASS
175	5 - 9% of 174	7.12	PASS
176	95 - 101% of 174	96.9	PASS
177	5 - 9% of 176	6.31	PASS

INITIAL CALIBRATION STANDARDS
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 0F23007

SDG: RF100610
Project: RFAAP RAAP 10
Instrument: 323
Calibration: 0F23002

Standard ID	Description	Lab Sample ID	Lab File ID	Analysis Date/Time
0040527	8260 Tune Working Standard 04-16-10	0F23007-TUN1	BFB0617.D	06/17/10 09:43
0060586	1 UG/L A	0F23007-CAL1	1P.D	06/17/10 10:12
0060587	5 UG/L A	0F23007-CAL2	5P.D	06/17/10 10:40
0060588	10 UG/L A	0F23007-CAL3	10P.D	06/17/10 11:09
0060589	20 UG/L A	0F23007-CAL4	20P.D	06/17/10 11:37
0060590	40 UG/L A	0F23007-CAL5	40P.D	06/17/10 12:05
0060591	100 UG/L A	0F23007-CAL6	100P.D	06/17/10 12:33
0060592	200 UG/L A	0F23007-CAL7	200P.D	06/17/10 13:30
0050435	40 UG/L B	0F23007-SCV1	LCS.D	06/17/10 14:55

INITIAL CALIBRATION DATA (Continued)
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610
Client: URS Corporation
Project: RFAAP RAAP 10
Calibration: 0F23002
Instrument: 323
Calibration Date: 06/22/10 08:00

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	Limit	Q
Acetone	0.111919	23.3635	1.69	2.159635E-02	0.99984		0.99	
Acrolein	5.198809E-02	4.616608	1.59	2.065086E-02			15	
Acrylonitrile	0.1245078	7.597764	2.158572	0.1746735			15	
Benzene	1.570376	2.879569	3.98	1.737091E-02			15	
Bromobenzene	1.275834	3.297074	8.55	1.934973E-02			15	
Bromochloromethane	0.3413665	4.573985	3.34	1.323394E-02			15	
Bromodichloromethane	0.4445066	10.3926	5.18	1.818596E-02			15	
Bromoform	0.253518	21.56954	8.101429	4.997638E-02	0.99851		SPCC (0.1)	
Bromomethane	0.2151209	7.758359	1.167143	0.418282			15	
n-Butylbenzene	1.514601	19.5185	9.95	1.280934E-02	0.99969		0.99	
sec-Butylbenzene	2.182317	17.37343	9.39	1.842537E-02	0.99958		0.99	
tert-Butylbenzene	1.637726	18.68662	9.18	1.634046E-02	0.99943		0.99	
Carbon Disulfide	0.7157252	8.678767	1.77	1.581199E-02			15	
Carbon Tetrachloride	0.50835	5.935749	3.75	0			15	
Chlorobenzene	1.213887	3.328581	7.29	1.279199E-02			SPCC (0.3)	
Chloroethane	0.2473363	2.8959	1.22	1.580108E-02			15	
2-Chloroethyl Vinyl Ether	0.145398	19.18423	5.515714	9.628311E-02	0.99308		0.99	
Chloroform	0.6956958	2.620422	3.44	1.856063E-02			CCC (30)	
1-Chlorohexane	0.3229233	2.999718	7.304286	7.211344E-02			15	
Chloromethane	0.5339327	1.538064	0.9585714	0.3946411			SPCC (0.1)	
2-Chlorotoluene	0.7160089	7.416055	8.75	0			15	
4-Chlorotoluene	2.219746	9.266307	8.862857	5.562668E-02			15	
Cyclohexane	0.5551335	11.49011	3.625714	0.1469116			15	
1,2-Dibromo-3-chloropropane	0.1392602	25.54175	10.72	1.459983E-02	0.99717		0.99	
Dibromochloromethane	0.3717742	16.17067	6.72	1.130151E-02	0.99955		0.99	
1,2-Dibromoethane	0.3615439	4.611945	6.81	1.216067E-02			15	
Dibromomethane	0.2292781	0.7101948	5	0			15	
trans-1,4-Dichloro-2-butene	0.2367716	10.14348	8.67	1.665301E-02			15	
1,2-Dichlorobenzene	1.442627	5.895161	9.931429	3.478198E-02			15	
1,3-Dichlorobenzene	1.492998	5.399265	9.48	8.254756E-03			15	
1,4-Dichlorobenzene	1.596738	1.215776	9.57	1.549997E-02			15	
Dichlorodifluoromethane	0.5510308	3.961179	0.86	1.856063E-02			15	

INITIAL CALIBRATION DATA (Continued)
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610
Client: URS Corporation
Project: RFAAP RAAP 10
Calibration: 0F23002
Instrument: 323
Calibration Date: 06/22/10 08:00

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	Limit	Q
1,1-Dichloroethane	0.6932001	7.652957	2.5	0			SPCC (0.1)	
1,2-Dichloroethane	0.5381768	5.052668	4.028572	9.495449E-02			15	
1,1-Dichloroethene	0.3107424	4.438624	1.64	1.279903E-02			CCC (30)	
cis-1,2-Dichloroethene	0.4436726	1.485381	3.08	1.217577E-02			15	
trans-1,2-Dichloroethene	0.3309409	3.030385	2.15	4.906081E-03			15	
1,2-Dichloroethene (Total)	0.3873067	2.023708	3.08	1.217577E-02			15	
1,2-Dichloropropane	0.3825206	5.449246	4.88	1.580108E-02			CCC (30)	
1,3-Dichloropropane	0.6591646	2.425826	6.511429	5.991861E-02			15	
2,2-Dichloropropane	0.4019148	10.69191	3.07	0.0239871			15	
1,1-Dichloropropene	0.4999171	5.902341	3.77	0.0158372			15	
cis-1,3-Dichloropropene	0.541396	15.56567	5.62	1.280689E-02	0.99977		0.99	
trans-1,3-Dichloropropene	0.4299495	21.49138	6.19	1.055412E-02	0.99942		0.99	
Ethylbenzene	1.815848	6.923066	7.41	1.740158E-02			CCC (30)	
Hexachlorobutadiene	0.3742226	4.902788	11.69	2.483191E-02			15	
2-Hexanone	0.1970737	23.9378	6.636667	0.0794238	0.99949		0.99	
Iodomethane	0.3586543	46.02588	1.73	1.617758E-02	0.99930		0.99	
Isopropylbenzene	2.208088	17.86273	8.28	0.0057199	0.99933		0.99	
4-Isopropyltoluene	1.944826	12.12129	9.55	2.078125E-02			15	
Methyl Acetate	0.2481103	4.659118	1.892857	0.2576603			15	
Methyl tert-Butyl Ether	0.7672174	7.170159	2.15	4.906081E-03			15	
Methylcyclohexane	0.4270799	15.96096	4.81	1.721709E-02	0.99982		0.99	
Methylene Chloride	0.4445992	7.468207	1.96	9.566672E-03			15	
2-Butanone (MEK)	0.1416413	9.417843	3.14	2.069697E-02			15	
4-Methyl-2-pentanone (MIBK)	0.2727859	21.83405	5.808333	0.0714647	0.99962		0.99	
Naphthalene	1.830416	30.65475	11.74714	4.045355E-02	0.99953		0.99	
n-Propylbenzene	0.7099685	14.64058	8.687143	5.462777E-02			15	
Styrene	1.231235	14.72267	7.94	1.414435E-02			15	
1,1,1,2-Tetrachloroethane	0.4046049	8.710037	7.39	1.193861E-02			15	
1,1,2,2-Tetrachloroethane	0.7704649	2.412552	8.612857	5.770733E-02			SPCC (0.3)	
Tetrachloroethene	0.5049167	1.660263	6.447143	7.592677E-02			15	
Toluene	1.651546	2.053029	5.93	3.88081E-03			CCC (30)	
1,2,3-Trichlorobenzene	0.7368775	14.12632	11.99	2.350338E-02			15	

INITIAL CALIBRATION DATA (Continued)
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Calibration: 0F23002

SDG: RF100610
Project: RFAAP RAAP 10
Instrument: 323
Calibration Date: 06/22/10 08:00

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	Limit	Q
1,2,4-Trichlorobenzene	0.8062453	16.50836	11.51143	2.797771E-02	0.99884		0.99	
1,1,1-Trichloroethane	0.5644627	6.440829	3.595714	0.1486312			15	
1,1,2-Trichloroethane	0.2877866	3.463156	6.36	2.065086E-02			15	
Trichloroethene	0.4527493	8.759127	4.648571	8.243684E-02			15	
Trichlorofluoromethane	0.640569	2.822078	1.35	1.702889E-02			15	
1,2,3-Trichloropropane	0.2537983	8.416212	8.64	1.332006E-02			15	
1,1,2-Trichloro-1,2,2-trifluoroethane	0.3311154	3.323649	1.634286	0.3269642			15	
1,2,4-Trimethylbenzene	2.146422	18.28551	9.23	1.825055E-02	0.99964		0.99	
1,3,5-Trimethylbenzene	2.069945	15.2916	8.87	2.047888E-02	0.99987		0.99	
Vinyl Acetate	0.6749242	12.73114	2.57	0.0202814			15	
Vinyl Chloride	0.4283628	2.322037	1	0			CCC (30)	
Xylene, Meta + Para	0.7146149	9.747853	7.531429	5.340074E-02			15	
Xylene, Ortho	0.670852	14.30368	7.91	1.630161E-02			15	
Xylene (Total)	0.7000272	10.77373	7.91	1.630161E-02			15	
Dichlorobenzenes (Total)	1.510788	3.688397	9.931429	3.478198E-02			15	
Dibromofluoromethane	0.2623268	2.724836	3.61	2.056574E-02			15	
1,2-Dichloroethane-d4	0.1483273	2.644815	3.95	0.0176125			15	
Toluene-d8	1.047458	2.550809	5.86	2.513325E-02			15	
4-Bromofluorobenzene	0.5119405	0.5616567	8.43	1.759605E-02			15	

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610
Client: URS Corporation
Project: RFAAP RAAP 10
Calibration: 0F23002
Laboratory ID: 0F23007-SCV1
Sequence: 0F23007
Standard ID: 0050435

Analyte	Expected (ug/L)	Found (ug/L)	% Rec.	QC Limit
Acetone	40.0	41.3	103	75-125
Benzene	40.0	39.7	99	75-125
Bromobenzene	40.0	38.4	96	75-125
Bromochloromethane	40.0	36.3	91	75-125
Bromodichloromethane	40.0	41.4	104	75-125
Bromoform	40.0	35.0	88	75-125
Bromomethane	40.0	44.2	111	75-125
n-Butylbenzene	40.0	35.8	90	75-125
sec-Butylbenzene	40.0	38.6	97	75-125
tert-Butylbenzene	40.0	37.5	94	75-125
Carbon Disulfide	40.0	39.6	99	75-125
Carbon Tetrachloride	40.0	40.5	101	75-125
Chlorobenzene	40.0	38.6	97	75-125
Chloroethane	40.0	42.0	105	75-125
Chloroform	40.0	36.0	90	75-125
Chloromethane	40.0	41.5	104	75-125
2-Chlorotoluene	40.0	39.9	100	75-125
4-Chlorotoluene	40.0	40.8	102	75-125
1,2-Dibromo-3-chloropropane	40.0	34.4	86	75-125
Dibromochloromethane	40.0	38.1	95	75-125
1,2-Dibromoethane	40.0	39.0	98	75-125
Dibromomethane	40.0	37.3	93	75-125
1,2-Dichlorobenzene	40.0	39.7	99	75-125
1,3-Dichlorobenzene	40.0	39.4	99	75-125
1,4-Dichlorobenzene	40.0	38.6	97	75-125
Dichlorodifluoromethane	40.0	44.2	111	75-125
1,1-Dichloroethane	40.0	39.2	98	75-125

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610
Client: URS Corporation
Project: RFAAP RAAP 10
Calibration: 0F23002
Laboratory ID: 0F23007-SCV1
Sequence: 0F23007
Standard ID: 0050435

1,2-Dichloroethane	40.0	38.6	97	75-125
1,1-Dichloroethene	40.0	39.9	100	75-125
cis-1,2-Dichloroethene	40.0	36.6	92	75-125
trans-1,2-Dichloroethene	40.0	37.8	95	75-125
1,2-Dichloropropane	40.0	39.0	98	75-125
1,3-Dichloropropane	40.0	38.2	96	75-125
2,2-Dichloropropane	40.0	39.0	98	75-125
1,1-Dichloropropene	40.0	41.6	104	75-125
cis-1,3-Dichloropropene	40.0	38.5	96	75-125
trans-1,3-Dichloropropene	40.0	38.4	96	75-125
Ethylbenzene	40.0	41.7	104	75-125
Hexachlorobutadiene	40.0	43.7	109	75-125
2-Hexanone	40.0	40.7	102	75-125
Isopropylbenzene	40.0	44.0	110	75-125
4-Isopropyltoluene	40.0	42.5	106	75-125
Methyl tert-Butyl Ether	40.0	39.8	100	75-125
Methylene Chloride	40.0	34.3	86	75-125
2-Butanone (MEK)	40.0	43.5	109	75-125
4-Methyl-2-pentanone (MIBK)	40.0	41.3	103	75-125
Naphthalene	40.0	38.1	95	75-125
n-Propylbenzene	40.0	40.6	102	75-125
Styrene	40.0	42.7	107	75-125
1,1,1,2-Tetrachloroethane	40.0	40.3	101	75-125
1,1,2,2-Tetrachloroethane	40.0	39.1	98	75-125
Tetrachloroethene	40.0	37.2	93	75-125
Toluene	40.0	39.9	100	75-125
1,2,3-Trichlorobenzene	40.0	41.8	105	75-125
1,2,4-Trichlorobenzene	40.0	37.3	93	75-125

SECOND-SOURCE CALIBRATION VERIFICATION

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
SDG: RF100610
Client: URS Corporation
Project: RFAAP RAAP 10
Calibration: 0F23002
Laboratory ID: 0F23007-SCV1
Sequence: 0F23007
Standard ID: 0050435

1,1,1-Trichloroethane	40.0	37.5	94	75-125
1,1,2-Trichloroethane	40.0	36.3	91	75-125
Trichloroethene	40.0	37.7	94	75-125
Trichlorofluoromethane	40.0	42.2	106	75-125
1,2,3-Trichloropropane	40.0	37.9	95	75-125
1,2,4-Trimethylbenzene	40.0	38.1	95	75-125
1,3,5-Trimethylbenzene	40.0	38.5	96	75-125
Vinyl Chloride	40.0	41.3	103	75-125
Xylene, Meta + Para	80.0	83.0	104	75-125
Xylene, Ortho	40.0	43.9	110	75-125
Xylene (Total)	120	127	106	75-125
Dibromofluoromethane	40.0	39.1	98	75-125
1,2-Dichloroethane-d4	40.0	38.3	96	75-125
Toluene-d8	40.0	40.5	101	75-125
4-Bromofluorobenzene	40.0	39.4	99	75-125

* Values outside of QC limits

Missing cyclohexane
Methyl acetate
Methyl cyclohexane
1,2-trichloro-1,2,2-trifluoroethane

Quantitation Report (Not Edited)

Data Path : C:\MSDChem\1\DATA\06-17-10\
Data File : LCS.D
InstName : 323
Acq On : 17 Jun 2010 2:55 pm
Operator : JDM
Sample : LCS
Misc :
ALS Vial : 12 Sample Multiplier: 1

40 - 25% = 30
40 + 25% = 50

Quant Time: Jun 18 07:34:09 2010
Quant Method : C:\MSDCHEM\1\METHODS\8260B-A93.M
Quant Title : VOLATILE GC/MS BY EPA 8260B/624/524.2
QLast Update : Thu Jun 17 13:55:48 2010
Response via : Initial Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units	Dev(Min) Rcv(Ar)
1) Fluorobenzene	4.28	96	267088	40.00	ug/L	0.00 101.82%
50) Chlorobenzene-d5	7.26	117	244605	40.00	ug/L	0.00 103.10%
65) 1,4-Dichlorobenzene-d4	9.55	152	146146	40.00	ug/L	0.00 101.17%
System Monitoring Compounds						
30) #Dibromofluoromethane	3.61	111	68441	39.07	ug/L	0.00
Spiked Amount 40.000			Recovery =	97.67%		
37) #1,2-Dichloroethane-d4	3.95	67	37900	38.27	ug/L	0.00
Spiked Amount 40.000			Recovery =	95.68%		
46) #Toluene-d8	5.86	98	283069	40.47	ug/L	0.00
Spiked Amount 40.000			Recovery =	101.18%		
64) #4-Bromofluorobenzene	8.43	95	123289	39.38	ug/L	0.00
Spiked Amount 40.000			Recovery =	98.45%		
Target Compounds						Qvalue
2) dichlorodifluoromethane	0.86	85	162597	44.19	ug/L	99
3) chloromethane	0.96	50	147971	41.50	ug/L	99
4) vinyl chloride	1.00	62	118243	41.34	ug/L	98
5) dichlorofluoromethane	1.32	67	173947	41.07	ug/L	99
6) bromomethane	1.17	94	63502	44.21	ug/L	100
7) chloroethane	1.22	64	69358	42.00	ug/L	89
8) trichlorofluoromethane	1.35	101	180333	42.16	ug/L	99
9) acrolein	1.59	56	13574	39.10	ug/L #	99
10) ethyl ether	1.50	74	50298	36.06	ug/L #	74
11) acrylonitrile	2.16	53	30861	37.12	ug/L	94
12) 1,1,2-trichloro-1,2,2-trif	1.63	101	87408	39.53	ug/L	92
13) 1,1-dichloroethene	1.64	96	82714	39.86	ug/L #	53
14) iodomethane	1.73	142	100949	31.61	ug/L	90
15) acetone	1.69	43	27213	41.34	ug/L	80
16) methyl acetate	1.89	43	59536	35.94	ug/L	88
17) carbon disulfide	1.77	76	189008	39.55	ug/L	99
18) methylene chloride	1.96	49	101956	34.34	ug/L #	71
19) trans-1,2-dichloroethene	2.15	96	83534	37.80	ug/L #	74
20) methyl (tert) butyl ether	2.15	73	204117	39.84	ug/L	96
21) 1,1-dichloroethane	2.50	63	181579	39.23	ug/L	97
22) vinyl acetate	2.57	43	184383	40.91	ug/L	88
23) 2,2-dichloropropane	3.07	77	104745	39.03	ug/L	95
24) cis-1,2-dichloroethene	3.08	96	108523	36.63	ug/L #	86
25) 2-butanone (MEK)	3.14	43	41137	43.50	ug/L	92
26) bromochloromethane	3.34	49	82762	36.31	ug/L #	76
27) chloroform	3.44	83	167224	36.00	ug/L	100
28) tetrahydrofuran	3.40	71	8981	39.20	ug/L #	56
29) 1,1,1-trichloroethane	3.59	97	141476	37.54	ug/L	93
31) carbon tetrachloride	3.75	117	137360	40.47	ug/L	99
32) 1,1-dichloropropene	3.77	75	138895	41.61	ug/L	94
33) cyclohexane	3.62	56	159970	43.16	ug/L	90
34) benzene	3.98	78	416404	39.71	ug/L	85
35) 1,2-dichloroethane	4.03	62	138598	38.57	ug/L	95
36) heptane	4.28	57	8522	No Calib	#	

Quantitation Report (Not Edited)

Data Path : C:\MSDChem\1\DATA\06-17-10\
Data File : LCS.D
InstName : 323
Acq On : 17 Jun 2010 2:55 pm
Operator : JDM
Sample : LCS
Misc :
ALS Vial : 12 Sample Multiplier: 1

Quant Time: Jun 18 07:34:09 2010
Quant Method : C:\MSDCHEM\1\METHODS\8260B-A93.M
Quant Title : VOLATILE GC/MS BY EPA 8260B/624/524.2
QLast Update : Thu Jun 17 13:55:48 2010
Response via : Initial Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min) Rcv(Ar)
38) trichloroethene	4.65	130	114016	37.71	ug/L		95
39) 1,2-dichloropropane	4.88	63	99477	38.95	ug/L		99
40) dibromomethane	5.00	93	57169	37.34	ug/L		94
41) bromodichloromethane	5.18	83	122775	41.37	ug/L		99
42) methylcyclohexane	4.81	83	129939	40.41	ug/L		90
43) 2-chloroehtyl vinyl ether	5.52	63	44780	43.59	ug/L		95
44) cis-1,3-dichloropropene	5.62	75	156170	38.47	ug/L		89
45) 4-methyl-2-pentanone (MIBK	5.81	43	85304	41.29	ug/L		89
47) toluene	5.93	91	440491	39.94	ug/L		99
48) trans-1,3-dichloropropene	6.19	75	129446	38.42	ug/L		89
49) 1,1,2-trichloroethane	6.36	83	69813	36.33	ug/L		99
51) tetrachloroethene	6.45	166	114845	37.20	ug/L		98
52) 1,3-dichloropropane	6.51	76	153894	38.18	ug/L		100
53) 2-hexanone (MBK)	6.64	43	56476	40.68	ug/L		89
54) dibromochloromethane	6.72	129	97939	38.14	ug/L		99
55) 1,2-dibromoethane	6.81	109	86243	39.01	ug/L		100
56) chlorobenzene	7.29	112	286604	38.61	ug/L		92
57) 1,1,1,2-tetrachloroethane	7.39	131	99635	40.27	ug/L		99
58) 1-chlorohexane	7.30	55	82637	41.85	ug/L	#	70
59) ethylbenzene	7.41	91	463056	41.70	ug/L		92
60) m+p-xylene	7.53	106	362795	83.02	ug/L	#	79
61) o-xylene	7.91	106	180151	43.91	ug/L	#	85
62) styrene	7.94	104	321681	42.72	ug/L		88
63) bromoform	8.10	173	63688	35.00	ug/L		99
66) isopropylbenzene	8.28	105	407932	44.01	ug/L		95
67) bromobenzene	8.55	77	179178	38.44	ug/L		81
68) 1,1,2,2-tetrachloroethane	8.61	83	110005	39.08	ug/L	#	100
69) 1,4-dichloro-2-butene	8.67	53	38532	44.54	ug/L	#	46
70) 1,2,3-trichloropropane	8.64	110	35133	37.89	ug/L	#	88
71) n-propylbenzene	8.68	120	105210	40.56	ug/L	#	73
72) 2-chlorotoluene	8.75	126	104310	39.87	ug/L	#	82
73) 1,3,5-trimethylbenzene	8.87	105	318003	38.53	ug/L		92
74) 4-chlorotoluene	8.86	91	330562	40.76	ug/L		90
75) tert-butylbenzene	9.18	119	256671	37.53	ug/L		93
76) 1,2,4-trimethylbenzene	9.23	105	334160	38.13	ug/L		93
77) sec-butylbenzene	9.39	105	348231	38.60	ug/L		96
78) 4-isopropyltoluene	9.55	119	302203	42.53	ug/L	#	68
79) 1,3-dichlorobenzene	9.48	146	214727	39.36	ug/L		98
80) 1,4-dichlorobenzene	9.57	146	225367	38.63	ug/L		98
81) 1,2-dichlorobenzene	9.93	146	209220	39.69	ug/L		98
82) n-butylbenzene	9.95	91	226766	35.85	ug/L		97
83) 1,2-dibromo-3-chloropropan	10.72	157	21016	34.41	ug/L		93
84) hexachloroethane	10.16	201	42628	35.80	ug/L	#	82
85) 1,2,4-trichlorobenzene	11.51	180	125182	37.26	ug/L		98
86) hexachlorobutadiene	11.69	225	59718	43.68	ug/L		98
87) naphthalene	11.74	128	316164	38.08	ug/L		96
88) 1,2,3-trichlorobenzene	11.99	180	112642	41.84	ug/L		99
89) 2-methylnaphthalene	12.87	142	115753	32.88	ug/L		97

(#) = qualifier out of range (m) = manual integration (+) = signals summed

MASS SPECTROMETER INSTRUMENT PERFORMANCE CHECK

USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Lab File ID: BFB0622.D
Instrument ID: 323
Sequence: 0F23013

SDG: RF100610
Project: RFAAP RAAP 10
Injection Date: 06/22/10
Injection Time: 08:24
Lab Sample ID: 0F23013-TUN1

m/z	Ion Abundance Criteria	% Relative Abundance	
50	15 - 40% of 95	17.6	PASS
75	30 - 60% of 95	50.2	PASS
95	Base peak, 100% relative abundance	100	PASS
96	5 - 9% of 95	7.26	PASS
173	Less than 2% of 174	0	PASS
174	50 - 100% of 95	99.1	PASS
175	5 - 9% of 174	7.03	PASS
176	95 - 101% of 174	95.9	PASS
177	5 - 9% of 176	6.48	PASS

ANALYSIS BATCH (SEQUENCE) SUMMARY
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Sequence: 0F23013

SDG: RF100610
Project: RFAAP RAAP 10
Instrument: 323
Calibration: 0F23002

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
MS Tune	0F23013-TUN1	BFB0622.D	06/22/10 08:24
Calibration Check	0F23013-CCV1	CCV0622.D	06/22/10 08:53
LCS	1006220-BS1	BS0622.D	06/22/10 09:21
Blank	1006220-BLK1	BLK0622.D	06/22/10 10:18
Trip Blank	1006296-03	1006296-03.D	06/22/10 11:43
37MW4	1006296-01	1006296-01.D	06/22/10 12:11
DUP-1	1006296-02	1006296-02.D	06/22/10 12:39
37MW4	1006220-MS1	29601MS.D	06/22/10 15:29
37MW4	1006220-MSD1	29601MD.D	06/22/10 15:57

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 323
Lab File ID: CCV0622.D
Sequence: 0F23013
Lab Sample ID: 0F23013-CCV1

SDG: RF100610
Project: RFAAP RAAP 10
Calibration: 0F23002
Calibration Date: 06/22/10 08:00
Injection Date: 06/22/10
Injection Time: 08:53

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
Acetone	L	20.0	15.9	0.111919	0.0859224		-20.6	40
Benzene	A	20.0	18.6	1.570376	1.462763		-6.9	25
Bromochloromethane	A	20.0	18.6	0.3413665	0.3170315		-7.1	25
Bromodichloromethane	A	20.0	19.8	0.4445066	0.440088		-1.0	25
Bromoform	L	20.0	20.2	0.253518	0.2730541	0.1	0.9	25
Bromomethane	A	20.0	16.9	0.2151209	0.1820706		-15.4	25
Carbon Disulfide	A	20.0	18.9	0.7157252	0.6773229		-5.4	25
Carbon Tetrachloride	A	20.0	20.5	0.50835	0.5213131		2.6	25
Chlorobenzene	A	20.0	21.1	1.213887	1.278209	0.3	5.3	25
Chloroethane	A	20.0	19.0	0.2473363	0.2347814		-5.1	25
Chloroform	A	20.0	19.8	0.6956958	0.6871855		-1.2	20
Chloromethane	A	20.0	17.7	0.5339327	0.4734368	0.1	-11.3	25
Cyclohexane	A	20.0	19.6	0.5551335	0.5437905		-2.0	25
1,2-Dibromo-3-chloropropane	L	20.0	19.0	0.1392602	0.1385623		-4.8	25
Dibromochloromethane	L	20.0	21.0	0.3717742	0.4170163		5.0	25
1,2-Dibromoethane	A	20.0	20.9	0.3615439	0.3784157		4.7	25
1,2-Dichlorobenzene	A	20.0	21.8	1.442627	1.575764		9.2	25
1,3-Dichlorobenzene	A	20.0	21.9	1.492998	1.635388		9.5	25
1,4-Dichlorobenzene	A	20.0	21.2	1.596738	1.688512		5.7	25
Dichlorodifluoromethane	A	20.0	19.4	0.5510308	0.5344121		-3.0	25
1,1-Dichloroethane	A	20.0	17.5	0.6932001	0.6061944	0.1	-12.6	25
1,2-Dichloroethane	A	20.0	19.7	0.5381768	0.5305301		-1.4	25
1,1-Dichloroethene	A	20.0	19.6	0.3107424	0.3042876		-2.1	20
cis-1,2-Dichloroethene	A	20.0	18.8	0.4436726	0.4182644		-5.7	25
trans-1,2-Dichloroethene	A	20.0	18.8	0.3309409	0.3111882		-6.0	25
1,2-Dichloropropane	A	20.0	18.5	0.3825206	0.354666		-7.3	20
cis-1,3-Dichloropropene	L	20.0	18.0	0.541396	0.5141462		-10.0	25
trans-1,3-Dichloropropene	L	20.0	17.9	0.4299495	0.4097335		-10.4	25
Ethylbenzene	A	20.0	22.0	1.815848	1.99952		10.1	20

CONTINUING CALIBRATION CHECK
USEPA-8260B

Laboratory: TriMatrix Laboratories, Inc.
Client: URS Corporation
Instrument ID: 323
Lab File ID: CCV0622.D
Sequence: 0F23013
Lab Sample ID: 0F23013-CCV1

SDG: RF100610
Project: RFAAP RAAP 10
Calibration: 0F23002
Calibration Date: 06/22/10 08:00
Injection Date: 06/22/10
Injection Time: 08:53

Analyte	Type	CONC. (ug/L)		Response Factor			% Diff. / Drift	
		STD	CCV	ICAL	CCV	MIN (#)	CCV	LIMIT (#)
2-Hexanone	L	20.0	18.7	0.1970737	0.1821127		-6.5	40
Isopropylbenzene	L	20.0	21.0	2.208088	2.494239		5.2	25
Methyl Acetate	A	20.0	17.8	0.2481103	0.220157		-11.3	25
Methyl tert-Butyl Ether	A	20.0	18.6	0.7672174	0.7131495		-7.0	25
Methylcyclohexane	L	20.0	18.6	0.4270799	0.4210892		-7.2	25
Methylene Chloride	A	20.0	18.3	0.4445992	0.4059482		-8.7	25
2-Butanone (MEK)	A	20.0	18.4	0.1416413	0.1301346		-8.1	40
4-Methyl-2-pentanone (MIBK)	L	20.0	17.1	0.2727859	0.2230786		-14.6	40
Styrene	A	20.0	22.4	1.231235	1.380101		12.1	25
1,1,2,2-Tetrachloroethane	A	20.0	21.0	0.7704649	0.8094222	0.3	5.1	25
Tetrachloroethene	A	20.0	21.5	0.5049167	0.5426281		7.5	25
Toluene	A	20.0	18.7	1.651546	1.547225		-6.3	20
1,2,3-Trichlorobenzene	A	20.0	22.4	0.7368775	0.8234968		11.8	25
1,2,4-Trichlorobenzene	L	20.0	20.0	0.8062453	0.8448102		0.2	25
1,1,1-Trichloroethane	A	20.0	19.8	0.5644627	0.5596901		-0.8	25
1,1,2-Trichloroethane	A	20.0	17.8	0.2877866	0.255806		-11.1	25
Trichloroethene	A	20.0	18.1	0.4527493	0.4093703		-9.6	25
Trichlorofluoromethane	A	20.0	20.8	0.640569	0.6666936		4.1	25
1,1,2-Trichloro-1,2,2-trifluoroeth	A	20.0	20.1	0.3311154	0.333488		0.7	25
Vinyl Chloride	A	20.0	18.7	0.4283628	0.4010331		-6.4	20
Xylene (Total)	A	60.0	67.4	0.7000272	0.7868318		12.4	25

Column to be used to flag Response Factor and %Diff/Drift values with an asterisk

* Values outside of QC limits

TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Sample Receipt and Login -- Work Order: 1006296

TriMatrix Laboratories received the cooler(s) for this work order on June 17, 2010, at 08:45am. Receiving documents include field chain-of-custody (COC) record(s), sample receipt form(s), and FedEx shipping document(s). The condition of the custody seals, the type and location of the coolant, and the temperatures recorded for each cooler are presented on the TriMatrix *Sample Receiving / Log-In Checklist* provided in section A of this package. The receipt temperature of the samples was determined by using an infrared thermometer to record the temperature of three random samples of varying container types and the accompanying temperature blank, if present.

Samples were scheduled for the analyses listed on the corresponding COC form. Field IDs and assigned laboratory identifiers are presented in the table below.

Field Sample Name	Laboratory Sample ID	Matrix	Date Sampled
37MW4	1006296-01	Water	6/16/2010
DUP-1	1006296-02	Water	6/16/2010
Trip Blank	1006296-03	Water	6/16/2010

No administrative issues were encountered during the receipt and analysis of this work order.

This report shall not be reproduced except in full, without written authorization of TriMatrix Laboratories, Inc.
Individual sample results relate only to the sample tested.
5560 Corporate Exchange Court SE ♦ Grand Rapids, MI 49512 ♦ Phone: 616.975.4500 ♦ Fax: 616.942.7463 ♦ www.trimatrixlabs.com

TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

URS Corporation
RFAAP RAAP 10

SDG Executive Summary

This case narrative applies to samples received on June 17, 2010. All samples were scheduled for analysis in accordance with parameters outlined on the field chain of custody record, the TriMatrix bid form, and/or oral and written correspondence between URS Corporation and TriMatrix Laboratories, Inc.

Each sample receipt event was assigned a unique TriMatrix work order number. Sample receipt documentation is included in section A of this data package.

Project Technical Issues/Problems

Project-related data qualification designations and reporting conventions are included in Attachment 1 - *Project Technical Narrative*.

QA/QC Data Qualifications/Narrations

Quality assurance issues and/or quality control data qualifications and narrations related to the analysis and reporting of this SDG are presented in Attachment 2 - *Statement of Data Qualifications*. The absence of a statement page for a particular analyte group (*e.g.* Percent Solids) implies that no qualifying statements were generated for that analyte.

Data Review and Approval

All data was peer-reviewed by a second analyst, and then by appropriate data management staff against laboratory quality control requirements and project specifications. It was then reviewed and approved by the group supervisor/manager prior to further review by the project chemist.

Data Deliverables

The data deliverables, both hardcopy and/or electronic (EDD), that comprise this data package are intended to comply with the documents referenced in the introductory section of this narrative. The EDD, if requested, will be issued separately from this hardcopy report. Hold time reports for each test procedure are presented following the CLP-like forms section of this report.

This report relates only to the sample(s) as received. Test results are in compliance with the requirements of the National Environmental Laboratory Accreditation Conference (NELAC). Estimates of analytical uncertainties for the test results contained within the report are available upon request.

Lisa M. Harvey, Project Chemist

Oct. 28, 2010
Date

SDG: RF100610

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Individual sample results relate only to the sample tested.

TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Attachment 1
Project Technical Narrative

Sample Result Reporting Convention

Sample results are reported as RL "U" (e.g. 0.001 U) if the target analyte was not detected above the MDL.

If a sample for an organic analyte is reanalyzed and also reported, the second analysis includes the suffix "RE*n*" where *n* = the first, second, etc. reanalysis.

Data Qualifier Designation

If applicable, sample results are qualified with:

a "J" flag if the analyte was detected, but the concentration is greater than the MDL and less than the RL;

a "B" flag if the analyte was also detected at or above the RL in the associated method blank, and the sample concentration was less than five times the method blank result;

a "E" flag if the analyte exceeded the instrument calibration range;

an asterisk (*) if a report-generated statement of qualification applies; qualifying statements, if any, will be found in Attachment 2 to this narrative.

Batch and Analytical Batch Designation

A Quality Control (QC) Batch is a seven-digit number that associates all samples that have been prepared together (or analyzed together if there is no preparation). Quality Control batches are limited to no more than twenty samples, excluding batch QC (method blanks, control spikes, etc.). Some batches may contain multiple sets of method blanks (BLK) and laboratory control samples (BS), where a set of method quality control analyses were prepared in concert with each set of samples on a given day.

An Analytical Batch (or Sequence) is a seven-digit number that associates all samples analyzed as a set under one analytical run.

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TRIMATRIX LABORATORIES

SDG CASE NARRATIVE

Attachment 2
Statement of Data Qualifications

All analyses have been validated and comply with our Quality Control Program.
No qualifications are required.

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SAMPLE RECEIVING / LOG-IN CHECKLIST

TRIMATRIX LABORATORIES

Client: URS Corp
Receipt Record Page/Line #:
Work Order #: New / Add To: 10016296
Project Chemist: CMR
Sample #s: 01-03

Recorded by (initials/date): LR 1/19/10

Cooler ☑ | Box ☐ | Other ☐
Qty Received: 1
IR Gun (#202) ☑
Thermometer Used: ☐ Digital Thermometer (#54) ☐ Other (#_____)
☐ See Additional Cooler Information Form

Cooler #	Time	Custody Seals	Coolant Location	Coolant/Temperature Taken Via	Alternate Temperature Taken Via	Recorded °C	Correction Factor °C	Actual °C	Cooler ID on COC?	VOC Trip Blank received?
2588		☐ None ☑ Present / Intact ☐ Present / Not Intact	Dispersed / Top / Middle / Bottom	☑ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers	☐ Temperature Blank (TB) ☐ 1 Container	Temp Blank:			☑	☑
						TB location: Representative / Not Representative				
						1 2.4	–	2.4		
						2 2.7	–	2.7		
						3 3.4	–	3.4		
						Average °C		2.9		
		☐ None ☐ Present / Intact ☐ Present / Not Intact	Dispersed / Top / Middle / Bottom	☐ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers	☐ Temperature Blank (TB) ☐ 1 Container	Temp Blank:			☐	☐
						TB location: Representative / Not Representative				
						1				
						2				
						3				
						Average °C				
		☐ None ☐ Present / Intact ☐ Present / Not Intact	Dispersed / Top / Middle / Bottom	☐ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers	☐ Temperature Blank (TB) ☐ 1 Container	Temp Blank:			☐	☐
						TB location: Representative / Not Representative				
						1				
						2				
						3				
						Average °C				
		☐ None ☐ Present / Intact ☐ Present / Not Intact	Dispersed / Top / Middle / Bottom	☐ Loose Ice / Avg 2-3 containers ☐ Bagged Ice / Avg 2-3 containers ☐ Blue Ice / Avg 2-3 containers ☐ None / Avg 2-3 containers	☐ Temperature Blank (TB) ☐ 1 Container	Temp Blank:			☐	☐
						TB location: Representative / Not Representative				
						1				
						2				
						3				
						Average °C				

If any shaded areas checked, complete Sample Receiving Non-Conformance Form

Paperwork Received

☐ No COC Received

N/A	Yes	No	
	☑	☐	Chain of Custody record(s)?
	☐		If No, COC Initiated By _____
	☑		Rec'd for Lab Signed/Date/Time?
☐	☑		Shipping document?
☑	☐		Other _____

COC ID #s

☑ TriMatrix 133778

☐ Other (Name or ID#)_____

Check COC for Accuracy

☐ No analysis requested

Yes	No	
☑	☐	Sample ID matches COC?
☑	☐	Sample Date and Time matches COC?
☑		Container type completed on COC?
☑	☐	All container types indicated are received?

Sample Condition Summary

☐ Non-TriMatrix containers, see Notes

N/A	Yes	No	
	☐	☑	Broken containers/lids?
	☐	☑	Missing or incomplete labels?
	☐	☑	Illegible information on labels?
	☐	☑	Low volume received?
	☐	☑	Inappropriate containers received?
☐	☐	☑	VOC vials / TOX containers have headspace?
☐	☐	☑	Extra sample locations / containers not listed on COC?

Check Sample Preservation

N/A	Yes	No	
	☑	☐	Average sample temperature ≤6° C?
☐	☑		Completed Sample Preservation Verification Form?
☐	☑	☐	Samples preserved correctly?
☑	☐		If "No", added orange tag?
☑	☐		Received pre-preserved VOC soils?

☐ MeOH ☐ Na_2SO_4

Check for Short Hold-Time Prep/Analyses

☐ Bacteriological
☐ Air Bags
☐ EnCores / Methanol Pre-Preserved
☐ Formaldehyde/Aldehyde
☐ Green-tagged containers
☐ Yellow/White-tagged 1L ambers (SV Prep-Lab)

AFTER HOURS ONLY:
COPIES OF COC TO LAB AREA(S)
☐ NONE RECEIVED
☑ RECEIVED, COCs TO LAB(S)

Notes

☑ Trip Blank received ☐ Trip Blank not listed on COC
☐ No COC received, Proj. Chemist reviewed (Init/Date) _____
☐ No analysis requested, Proj. Chemist completed (Init/Date) _____

Cooler Received (Date/Time)	Paperwork Delivered (Date/Time)	≤1 Hour Goal Met?
1/19/10 0845	1/19/10 1025	Yes (No)

TRIMATRIX LABORATORIES

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Chain of Custody Record

COC No. 133778

Pg. ____ of ____

For Lab Use Only
Cart: 3
VOA Rack/Tray: 740 tb
Receipt Log No.: 1975
Project Chemist: SH
Work Order No.: 10010296

Client Name: URS Corporation
Address: 3340 Falmouth St. Suite 201
City, State Zip: Richmond, VA 23230
Phone/Fax: (804) 965-9000 / 965-9764
Email:

Project Name: RFAAP RAAP ID
Client Project No. / P.O. No.: 11656367
Invoice To: ☐ Client ☐ Other (comments)
Contact/Report To: Tina MacGilvray

Analyses Requested

	D	A	C	A	A	A					
	VOCs 8260B	TCLP-metals + Cu, Ni, Zn	COD	pH	TCLP volatiles	PF, Expl., 8, PCBs					
Container Type (correspond to Container Packing List)											
Number of Containers Submitted										Total	Sample Comments
1 37mw4 ms/msd	2588	6/16/10	1205		X	GW	5				5	
2 DUP-1	|	6/16/10	—		X	GW	3				3	
3 IDM water	|	6/16/10	1235	X		W		2	1	1	4	
4 IDM Soil	|	6/16/10	1237	X		S				1 2	3	
5 Trip Blank		6/16/10	1205		X	W	1				1	
6												
7												
8												
9												
10												

⇦ PRESERVATIVES
A NONE pH~7
B HNO_3 pH<2
C H_2SO_4 pH<2
D 1+1 HCl pH<2
E NaOH pH>12
F ZnAc/NaOH pH>9
G MeOH
H Other (note below)

Sampled By (print): MARK FISHER
Sampler's Signature:
Company: URS Corp.

How Shipped? Hand ____ Carrier FedEx
Tracking No.:

Comments: Include Copper, Nickel & Zinc in the TCLP metals for IDM water

1. Relinquished By	Date	Time
	6/16/10	1330

1. Received By	Date	Time

2. Relinquished By	Date	Time

2. Received By	Date	Time

3. Relinquished By	Date	Time
Rec'd / Weak	6/22/10	

6/17/10 0845

WHITE COPY - REPORT YELLOW COPY - LABORATORY PINK COPY - FIELD

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Region III Modifications to the National Functional Guidelines for Data Review (September 1994).

Data Validation Flags

Flag	Interpretation
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
U	Not detected. The associated number indicates the approximate sample concentration is necessary to be detected.
B	Not detected substantially above the level reported in laboratory or field blanks.
N	Tentative Identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	Not detected, quantitation limit may be inaccurate or imprecise.
UL	Not detected, quantitation limit is probably higher.
NT	Not tested, no analytical result provided.

The other type of code used by URS is a "Reason Code". The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	c	Calibration failure
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	d	MS/MSD imprecision
d	MS/MSD imprecision	d	MS/MSD imprecision	e	LCSD imprecision
e	LCSD imprecision	e	LCSD imprecision	f	Field duplicate imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	g	Laboratory duplicate imprecision
g	Tuning failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	h	Holding time violation
h	Holding time violation	h	Holding time violation	k	Cooler receipt temperature exceeds limits
i	Internal standard failure	i	Internal standard failure	l	LCS recovery failure
k	Cooler receipt temperature exceeds limits	k	Cooler receipt temperature exceeds limits	m	MS/MSD recovery failure
l	LCS recovery failure	l	LCS recovery failure	n	ICS failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	o	Calibration blank contamination
p	Poor chromatography	p	Poor chromatography	p	Preparation blank contamination
q	Concentration exceeded the linear range of the instrument	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	u	No confirmation column	v	Post-digestion spike failure
w	Identification criteria failure	w	Retention time failure	w	CRDL Standard Failure
x	Field blank contamination	x	Field blank contamination	x	Field blank contamination
y	Trip blank contamination	z	Method blank contamination	z	Laboratory storage blank contamination
z	Method blank contamination				